The Marketing of Global Warming: A Repeated Measures Examination of the Effects of Cognitive Dissonance, Endorsement, and Information on Beliefs in a Social Cause

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This dissertation is dedicated to my family and my parents. My Mother, Mary Jane, and my late Father, Larry, inspired my quest for knowledge. Carol, my wife, and my children listened to many hours of discussions about cognitive dissonance theory. My family endured several years of delays. I am thankful for my family's patience with circumstances that were beyond my control.

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ABSTRACT

The Marketing of Global Warming: A Repeated Measures Examination of the Effects of Cognitive Dissonance, Endorsement, and Information on Beliefs in a Social Cause

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Consumers often must choose between mutually exclusive products or beliefs related to products, such as to believe or ignore social and environmental causes. Cognitive dissonance (CD) (Festinger, 1957) is a common psychological discomfort that must be resolved, when experienced between inconsistent beliefs, attitudes, or choices. Advertising and marketing promotion to influence consumer decision making often uses celebrity / expert endorsers (Hollensen & Schimmelpfennig, 2013) to improve brand effectiveness and increase sales, yet how endorsements affect consumer attitudes and CD has not been explored.

During an attempt to revise models of predicting consumer behavior to include CD measurement (e.g., theory of reasoned action in Ajzen & Fishbein, 1980; theory of planned behavior in Ajzen, 1991) it was noted that attempts to add scales to measure social norms improved model effectiveness. Moreover, attempts to measure CD (e.g., Cassel & Chow, 2002; Elliot & Devine, 1994; Hausknecht, Sweeney, Soutar, & Johnson, 1998; Sakai, 1999; Shultz & Lepper, 1996; and Sweeney, Hausknecht, & Soutar, 2000) did not measure the social context of CD as originally conceived by

Festinger to explain illogical behaviors given observable facts such as cigarette smoking and cult activities, etc. After review of the CD phenomenon and its common origins in Lewin (1936, 1951), Osgood and Tannenbaum (1955), Heider (1946, 1958), and Festinger (1954, 1957), it was discovered that CD is a multivariate phenomenon and more complex than existing models of decision making or measurement instruments could accommodate.

This dissertation derived a CD instrument with semantic differential scales from congruity theory (Osgood & Tannenbaum, 1955) and balance theory (Heider, 1946, 1958) to measure multivariate CD during attitude change using endorsement by former U.S. Vice President Albert Gore, Jr. of an important social cause: global warming. With a repeated measures procedure, CD was induced using a social comparison referent (SCR) of Mr. Gore for a snowball sample of 567 respondents recruited from online political groups and social media websites. Information about global warming was presented within simulated news headlines to 16 randomly assigned groups of 567 respondents with alternating combinations of positively / negatively toned messages, high credibility / low credibility publications, and domestic-attributed research / foreign-attributed research. The instrument was tested for sensitivity, validity, and reliability.

The results indicated that when presented with information in opposition to their original opinion, regardless of their view of the endorser SCR's opinion, respondents, in this order: 1. Changed their perception of the endorser's attitude toward global warming (termed *social meaning* in this dissertation); 2. Changed their

view of the value of the endorser's opinion (i.e., *referent meaning*); and, lastly, 3. Changed their own opinion on global warming (i.e., *object meaning*).

This dissertation demonstrated that due to the effect of CD, attitude measurement of an endorsement can be improved by adding additional scales to measure the perceived social context (i.e., a social comparison referent [SCR]) of the endorsement. Evidence has shown that to change a consumer attitude toward a belief or product, the mediating effect of the endorser SCR on the attitude should be considered. The presence of the endorser SCR shows the relationship between congruity theory and balance theory, and is evidence that Lewin's (1936) topological psychology suggested examination of the social context of attitude measurement will increase accuracy in estimating behavior. Measurement of the SCR is an important step in attitude measurement to minimize the effect of unintended or unknown social comparison threats to internal validity on measurement scales.

CHAPTER 1: INTRODUCTION

The objective, verifiable *truth* is somewhat irrelevant to what individuals express as an attitude about a particular topic, especially when they are unsure about the topic. Individuals may insist that they believe *the truth*, but in the absence of observable facts to support what they believe to be true, they actually believe other individuals or groups as well. In other words, individuals believe to a degree what they think other individuals or groups believe, and they change their own beliefs as a last resort; intuitively, the strength of the belief in a topic during attitude measurement is associated with a related social context. This dissertation addresses how variables that measure social context interact with cognitive dissonance (CD) during attitude measurement as originally envisioned by Festinger (1957). An instrument to measure CD associated with an identified, endorser social comparison referent (SCR) is proposed and tested.

CD is a condition of psychological tension that is observable when a respondent thinks about inconsistent beliefs or choices, etc. (Festinger, 1957). According to CD theory applied to the instrument developed in this dissertation, objects under consideration by a respondent, such as ideas, belief, attitudes, choices, brands, or products, etc., that are associated with a social context, as defined by an endorser social comparison referent (SCR), can be dissonant with related objects. Related objects are associated with an SCR, which leads to psychological discomfort arising from the social context and then motivation to reduce CD.

CD theory has application in circumstances in which a respondent is faced with mutually exclusive beliefs, choices, or behaviors, and can be experienced before

and after the decision to believe, to choose, or to engage in the behavior has occurred. Such situations are commonplace in social psychology, marketing, and advertising. For example: 1. A volunteer commits many difficult hours to complete recycling tasks that have minimal economic value after reading environmental awareness messages in a magazine, yet afterwards the individual reports to others that the experience was extremely valuable to mankind and personally rewarding; 2. A consumer experiences buyer's remorse about the purchased product, relative to another product because the purchased product is difficult to return or replace with another product; 3. A consumer views advertising messages about continued positive outcomes that are meant to reinforce the decision to repeatedly purchase a brand; 4. A consumer receives *shock advertising* or *negative sales* approaches intended to provide information to the consumer about the future avoidance of negative consequences that are designed to generate psychological discomfort in the event that attitude change occurs; and 5. A consumer posts pictures of recreational and consumption activities on social media websites with the expectation of receiving supportive feedback.

Consumers often seek interpersonal support on social media for ordinary daily activities, such as ordering a cheese pizza at a restaurant or wearing a pair of shoes to work; he or she simply only needs to take a picture with a cell telephone or smartphone and upload it to Facebook or Twitter, etc. By using Facebook, friends will presumably read the *status* (and view the picture) online and click *like* to acknowledge the posting or they will not click *like* and read on to another posting; and on Facebook, Twitter and with other social media each consumer can instantly draw a non-scientific sample of social support (e.g., an endorsement) on any subject that can be explained

using posted text or graphics. Additionally, when other users of social media indicate that they *like* a product or a user-generated posting, this is interpreted as an endorsement. Moreover, private information is often revealed in social media to solicit social support for incorporation into consumption activities. Hence, CD theory is more relevant to marketing practitioners today than ever in the past and awareness of CD theory has multiple applications in social media marketing and advertising.

When online consumers read informational messages or are faced with situations with which they disagree, they often click-through to another website, hide postings on Facebook or unsubscribe from email lists and online groups to minimize the importance of the information they just comprehended and thereby reduce the CD experienced. As discussed in this dissertation, CD theory helps to explain why consumers change their attitude when contextually-based social support is provided (or not available) along with advertising or marketing promotion, and why direct sales (which includes purchase-related social support) is an expensive but highly-effective tool for lowering CD that arises during the purchasing process. CD theory can be applied to explain how social media marketing activities (and information-packed websites) can play an important role in marketing high-priced products with multiple decision makers, which in the past required a highly trained, direct sales force.

Ten fundamental marketing scenarios in which CD is likely to be experienced were described by Holloway (1967). These CD scenarios follow a similar endorsement pattern of beliefs and associated endorser SCR. This dissertation examined a large sample of 567 cases using commonly understood beliefs about

global warming occurring along with a well-known endorser SCR, rather than examine these scenarios individually:

- Attractiveness of the Rejected Alternative – each product brand contains attractive and desirable qualities, making it difficult to choose between the brands;
- Negative Factors of the Chosen Alternative – the chosen alternative possesses some positive factors and additional more prominent negative factors;
- Number of Alternatives – a larger number of alternatives in the product decision induced more CD than a smaller number of alternatives;
- Cognitive Overlap – two favored choices of the same product model share so many common features (but not all) that it is difficult to make meaningful distinctions and complete the purchase;
- Importance of Cognitions Involved – making a product purchase decision among choices in which an unknown number of requirements are very important to other individuals involved;
- Positive Inducement – receiving a gift from another individual that is wanted and needed generates less CD than if one is received but not wanted;
- Discrepant or Negative Action – the act of purchasing the product requires that the individual behave differently than their past behavior and/or established social norms;
- Information Available – the lack of availability of information about the product or the lack of experience with the product during the purchase decision generates CD;

- Anticipated Dissonance – the consumer expects to experience the psychological discomfort of CD, such as buyer's remorse, when explaining his/her purchase to other individuals;
- Familiarity and Knowledge – a lack of familiarity or knowledge that is incorporated into an impulse decision to purchase a product results in CD during the decision.

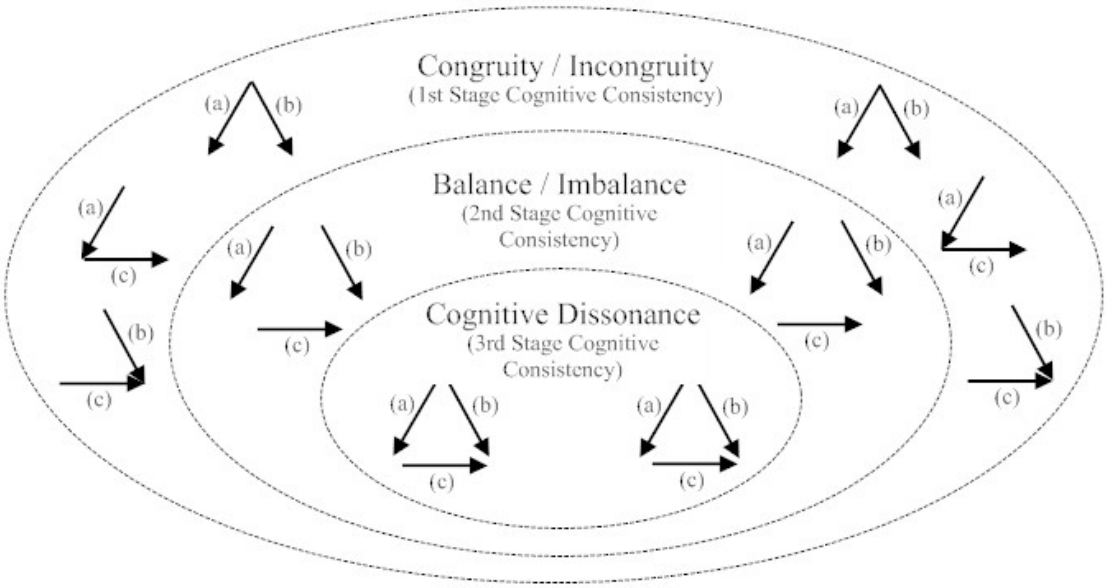
This dissertation makes three main contributions to research literature related to marketing, advertising, consumer behavior, cognitive dissonance (CD), and social psychology. The CD research literature is reconciled with related cognitive consistency theories to develop an instrument that measures CD within the social context, as was originally envisioned by Festinger (1954, 1956, 1957) and is consistent with cognitive consistency theories in social psychology. The instrument extends the research on measuring CD that was accomplished by Hausknecht et al. (1998), etc. The CD instrument was tested with a commonly understood belief and social context that could not be achieved with specific product brands. Former vice president Al Gore's endorsement of global warming was used as a topic for attitude change. Confirming/disconfirming information was introduced as simulated news headlines. Responses to the news headlines demonstrated how advertising messages provide information that induces attitude change, after the respondent engages in cognitive balancing with the social context. The CD instrument was used to help practitioners in marketing and consumer behavior: 1. Classify types of CD that are experienced by consumers when mutually existing beliefs and choices are faced

during consumption activities; 2. Differentiate CD from similar constructs, and 3. Compare how the parallel addition of measurement of social norms has improved the power of pre-existing models of predicting consumer behavior. The answers to research questions add to the knowledge described above and support the statistically significant effect that a positive or negative information stimulus has on altering the multivariate relationships of CD during attitude measurement, when variables defining the social context are included in the CD instrument.

Research Contribution 1. Introduction and Reconciliation of Cognitive Dissonance Literature with Cognitive Consistency Theories

The contribution of this dissertation to general CD research literature is a methodology that demonstrated why and how four of the major cognitive consistency theories combine as a hierarchy of effects within the social context of attitude measurement. In Figure 1, complementary elements of cognitive consistency theories are shown in a unified methodology: field theory (Lewin, 1936, 1951), balance theory (Heider, 1946, 1958), congruity theory (Osgood & Tannenbaum, 1955), and CD theory (Festinger, 1954, 1957) describe complementary forces that are activated in related circumstances, yet there is no record of the theories being tested simultaneously. In Figure 1, the methodology behind the CD instrument depicts congruity, balance, and CD as three stages in cognitive consistency that fit together within field theory.

Figure 1: Balance Model of Cognitive Dissonance within Field Theory -- Stages of Cognitive Consistency of Referent (a), Object (b), and Social (c) Meanings in Congruity, Balance, and Cognitive Dissonance with Lewin's (1936) Undefined, Overlapping Jordan Curves



Consider referent meaning (a), object meaning (b), and social meaning (c) depicted in Figure 1 and defined in Table 1.0 as measured by the CD instrument on the favorability scale. The social context (or perceived social reality) in which CD arises along with an attitude toward a binary set of beliefs or choices is measured by the CD instrument, after cognitive interaction and consumer deliberation. According to the *balance model* of cognitive dissonance within field theory applied in this dissertation, in column b of Table 1.0, *object meaning* (b) is how the person views a specific belief object (e.g., measured attitude), such as *global warming is occurring*. In column a, *referent meaning* (a) is the person's views of the opinions of an endorser social comparison referent (SCR), such as a public official and celebrity endorser (e.g., former U.S. Vice President Al Gore) about whether *global warming is occurring*. In

column c, *social meaning* (c) the person's perception of how the endorser social comparison referent (SCR) views the belief object *global warming is occurring*.

Table 1.0: *Dissonance Induction via Incongruent/Unbalanced Beliefs with an endorsement Social Context on the generic "Favorability" scale*

	a	b	c	d
	Referent Meaning (Respondent's views of the Endorser's Opinion)	**Object Meaning** (Respondent's Opinion)	**Social Meaning** (Respondent's Assessment of the Endorser's Opinion)	**Congruity / Balance / Cognitive Dissonance**
1	Favorable (+)	Favorable (+)	Favorable (+)	Congruent/ Balanced – No CD
2	Favorable (+)	Unfavorable (-)	Unfavorable (-)	Congruent/Balanced – No CD
3	Unfavorable (-)	Favorable (+)	Unfavorable (-)	Congruent/Balanced – No CD
4	Unfavorable (-)	Unfavorable (-)	Favorable (+)	Congruent/Balanced – No CD
5	Unfavorable (-)	Unfavorable (-)	Unfavorable (-)	Incongruent/Unbalanced – CD
6	Favorable (+)	Unfavorable (-)	Favorable (+)	Incongruent/Unbalanced – CD
7	Favorable (+)	Favorable (+)	Unfavorable (-)	Incongruent/Unbalanced – CD
8	Unfavorable (-)	Favorable (+)	Favorable (+)	Incongruent/Unbalanced – CD

According to congruity theory (Osgood & Tannenbaum, 1955), scales measuring referent meaning (a), object meaning (b), and social meaning (c), as defined in Table 1.0, will be associated with each other in Figure 1 as the first stage of psychological tension in theories of cognitive consistency. As stipulated by congruity theory (Osgood & Tannenbaum, 1955), each of referent meaning (a), object meaning (b), and social meaning (c) will combine pairwise to form path relationships.

According to balance theory (Heider, 1946, 1958) there will be agreement between referent meaning (a), object meaning (b), and social meaning (c) as shown in Table 1.0 as the second level of psychological tension in theories of cognitive consistency as shown in Figure 1. As stipulated by balance theory (Heider, 1946, 1958), each of referent meaning (a), object meaning (b), and social meaning (c) are

considered three at a time, and the *nonconforming* meanings that generate an imbalance on magnitude (e.g., scale values 1 to 10), according to the eight rows in Table 1.0, will be altered by the respondent to *conform* with the other two meanings; for example, row 6 will become identical to row 1, and thereby become congruent/balanced and reduce CD, if the respondent changes from a unfavorable assessment to a favorable assessment of object meaning, etc. (i.e., changes their own opinion).

According to CD theory (Festinger, 1957), two object meanings (e.g., measured attitude toward mutually exclusive choices or beliefs) will become dissonant with each other but also each are associated with a social context (e.g., a likely referent meaning and social meaning), respectively, which comprises a third level of psychological tension in Figure 1; the association with the social context has been traditionally omitted from CD measurement although it is integral to the definition of CD. As stipulated by CD theory (Festinger, 1957), mutually exclusive beliefs or choices are considered by the respondent as objects (i.e., object meaning in Table 1.0) within a perceived social context (e.g., referent meaning and social meaning in Table 1.0), with dissonance induction within the cognitive processes of the respondent increasing CD and dissonance reduction within the cognitive processes of the respondent decreasing CD.

When considering the major theories of cognitive consistency as levels of psychological tension within field theory, it becomes probable that the originators of the theories were describing different but complementary phenomena; the description of CD theory positioning it at the 3rd level and making it the most complex of the three

phenomena observable within field theory. According to field theory (Lewin, 1936, 1951) as it applies to CD, two sets of objects (i.e., object meaning in column b of Table 1.0) can be measured within the social context (e.g., referent meaning and social meaning in Table 1.0); when considering Festinger's (1957) description, CD can be measured using a single SCR with each dissonant object as the balancing entity, as described by balance theory (Heider, 1958). Past CD measurement attempts can be described as having considered only measured shifts in object meanings in this framework, while ignoring any potential shifts in the social context that would be measured with referent meaning and social meaning. In sum, any attitude change between dissonant object meanings that resulted from CD reduction with an identified endorser SCR can be measured more accurately by including measures of the changes in referent meaning and social meaning. Attitude change that results from CD reduction relative to an unidentified endorser SCR is unknown and may provide an attitude measurement that cannot be compared with other attitude measurements or may not be reflective of behavior related to the attitude.

This dissertation contributed to the social psychology literature by integrating complementary cognitive consistency theories (i.e., congruity theory, balance theory, and CD theory) within field theory in a way that was not examined. Moreover, theoretical insights from these integrated theories were extended by developing an instrument to measure the combined phenomena, which together conform to the original definition of CD, and then testing propositions derived from CD research in a repeated measures experimental research design.

Research Contribution 2. Extension of Cognitive Dissonance Measurement Literature and Consumer Behavior Literature to Measure Social Context of CD and to Classify of CD Types

The CD measurement literature was extended with an instrument to measure CD along with variables representing the social context, which was not specifically included in previous measurement attempts. The DISS instrument (Cassel & Chow, 2002) did not measure the implied social context of the disparate pairs of objects as experienced by the respondent. The Multi-Power Function model (Sakai, 1999) did not measure the social context presented by a specific social comparison referent (SCR), or manipulate the independent variable. A 24-item CD scale (Elliot & Devine, 1994) measured induced-compliance CD after CD reduction had occurred and did not manipulate the independent variable in an experimental design. Post-purchase CD reduction was measured with behavioral pre-disposition (Hausknecht et al., 1998), yet the social context was not explored and an experimental design was not used. Unlike these *between subjects* operationalizations, CD is experienced *within subjects*, by the individual subjectively (Festinger, 1957) with the attributed (i.e., perceived) social context, which is measured by the proposed CD instrument using referent meaning and social meaning described in Table 1.0.

This dissertation contributes to the consumer behavior literature by: 1. Describing a methodology for classifying types of CD based on the referent meaning, object meaning, and social meaning; 2. Differentiating CD from similar constructs in marketing, consumer behavior, and social psychology; and 3. Comparing the CD instrument to established models of predicting consumer behavior. The CD instrument can be used to classify the four established paradigms of CD research (see Appendix

H: Classification of Cognitive Dissonance Types and Existing Models of Predicting Consumer Behavior): effort-justification, induced-compliance, belief-disconfirmation, and free-choice (Harmon-Jones & Mills, 1999). The CD instrument makes possible a methodology for classifying types of CD (e.g., belief disconfirmation CD and free-choice CD) based on combinations of high and low scale measurements of referent meaning, object meaning and social meaning, which distinguishes CD from similar psychological and marketing constructs. The CD instrument incorporates social context into attitude measurement similar to models of predicting consumer behavior, such as the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behavior (Ajzen, 1991). Models of predicting consumer behavior were improved by adding scales to measure subjective norm, which is consistent with the findings of this dissertation using scales to measure referent meaning and social meaning.

Research Contribution 3. Application of Cognitive Dissonance Instrument to Marketing / Advertising Endorsement Literature

This dissertation extends the marketing promotion and advertising endorsement literature, such as Spry, A., Pappu, R., and Cornwell (2011), etc., by applying the CD instrument to measurement of endorsement effects on attitude toward the occurrence of global warming, an important factor in environmentally based consumer decision making, but representative of other beliefs that influence consumer decision making. The endorsement of a belief is comprised of social meaning and referent meaning, as defined in Table 1.0. The results demonstrated that due to the effect of CD, attitude measurement of an endorsement is improved by adding

additional scales to measure the perceived social context (i.e., an endorser SCR) of the endorsement. The effect of the respondent receiving new information on endorsement and attitude measurement shows the specific relationship among advertising, endorsers, and attitude change in a unified theoretical framework. In ordinary endorsement situations, there is generally a specific entity or person functioning in the role of intermediary that is perceived to confer attributes on associated beliefs. However, unknown endorsers that come to the respondent's mind, political groups, actors, narrating voices, fictional/cartoon characters, or human models that appear in advertising can be associated with an idea, event, belief, cause, product, or brand.

According to the balance model of CD measurement described in this dissertation, endorsement of an idea, cause or belief is a special instance of CD in which an endorsing individual or group becomes the primary social context for the CD induction and CD reduction. Advertising and marketing promotion activities frequently use endorsement to change attitude through CD induction and CD reduction: affinity groups (Ka-shing, Fock, & Hui, 2006), celebrity event endorsement (Cunningham, Fink, & Kenix, 2008), corporate social responsibility campaigns (Bower & Grau, 2009), corporate team sponsorship (Pope, Voges, & Brown, 2009), sports celebrity endorsement (Koernig & Boyd, 2009), brand alliances (Halonen-Knight & Hurmerinta, 2010), political advertising (Veer, Becirovic, & Martin, 2010), product endorsement, brand endorsement, and brand alliances (Halonen-Knight & Hurmerinta, 2010), celebrity endorsement (Spry, Pappu, & Cornwell, 2011), and corporate event sponsorship (Walker, Hall, Todd, & Kent, 2011) all can be advertised

using endorsement. However, the specific process by which endorsements affect consumer attitudes and CD has not been explored yet.

The results indicate that to change a consumer attitude toward a belief or product, the mediating effect of the endorser SCR on the attitude should be considered. The presence of the endorser SCR confirms the relationship between congruity theory and balance theory, and is evidence that Lewin's (1936) topological psychology correctly suggested examination of the social context during attitude measurement. The optimal selection of an endorser will result in a belief associated with the product or the product brand, etc. The endorser selection results in the brand being perceived in the mind of the consumer, with the consumer being more receptive to positive information and less receptive to negative information about the product due to the endorser. This dissertation demonstrated that due to the effect of CD within the social context, the more closely the endorser's perceived attitudes about the product match consumer attitudes about the product, the more resistant consumer attitudes are to change when new and conflicting information is received by consumers. The contribution to knowledge of this dissertation is why (and how) endorsement works so well in changing attitudes toward a belief, regardless of whether or not the belief is directly associated with a product purchase decision in the future. Future product purchases could be influenced by important environmental and societal beliefs that are fundamentally dependent upon an endorser SCR.

Research Questions

This research extends the CD literature, CD measurement literature, Consumer Behavior Literature, and the Marketing / Advertising Endorsement literature by

answering research questions that supported the effect of new information on multivariate relationships derived in the context of field theory (Lewin, 1936) from balance theory (Heider, 1958) and CD theory (Festinger, 1957). This dissertation develops an instrument to measure CD as a set of belief elements: referent meaning, object meaning and social meaning as defined in Table 1.0. The balance model of CD incorporates important differences from previous approaches to measure CD, by including the social context in the measurement scales and addressing CD measurement issues.

It is possible to enhance past CD measurement approaches to detect low levels of CD induction by using congruity theory to explain balanced cognitions and balance theory to explain the dissonant cognitive form (DCF) in Table 1.0. The DISS test (Cassel & Chow, 2002) examined potentially disparate pairs of objects from the perspective of the observer. The implied social context (e.g., attributed social meaning) of the disparity pairs as experienced by the respondent is not measured with an experimental design. Sakai's (1999) Multi-Power Function (MPF) examined cognitions as the K to n… element if the D (i.e., dissonant) and C (i.e., consonant) information elements are reversed, yet experimental consideration of the social reality of the social comparison referent (SCR) and attributed social meaning is omitted from the MPF model. Elliot and Devine (1994) tested a 24-item scale to measure CD in the induced-compliance paradigm, but the measurement was made after the CD reduction had occurred, and an experimental design and manipulation of the independent variable were not included. Hausknecht et al. (1998) measured post-purchase CD along three dimensions: an emotional dimension, a cognitive dimension, and

behavioral pre-disposition to engage in behaviors without an explicit social context and with a non-experimental design.

Considering attempts to measure CD, the measurement of social context via referent meaning and the attributed social meaning is added for measuring CD that conforms to Festinger's (1957) description, resulting in the following research questions (RQ):

> RQ1: Is there a generalizable procedure for measuring cognitive dissonance within a social context for a social marketing issue that is experienced by potential consumers? If so, what is the procedure?

RQ1 contributes to general CD research literature and CD measurement literature by developing a scaled instrument to measure CD and by diagraming the variables in Dissonant Cognitive Forms (DCF) described in Table 1.0; RQ1 demonstrated through the validity of the scale items that the absence of variables to measure the social context along with the measurement of CD is a conceptual oversight, which is a primary contribution to the CD measurement literature. The CD instrument developed and tested for RQ1 can be used to diagram cognitions involving the testing of endorsers as an addition to the Marketing / Advertising Endorsement literature. The CD instrument can be used to augment the measurement of social norms to enhance future models of predicting consumer decision making, as such as the theory of planned behavior and its derivations as an addition to the consumer behavior literature. The ability to diagram the CD relative to the SCR and the belief object being evaluated makes distinction between how CD arises for consumers

arising from evaluation of mutually exclusive beliefs and arising from mutually exclusive choices. RQ1 established the validity CD measurement scales to measure the multivariate relationships between referent meaning, object meaning, and social meaning.

A series of interactions consistent with the Festinger's (1957) description of CD reduction between variables were anticipated, when a stimulus of information was introduced. As it is discussed in RQ1 it is important to observe interaction between the variables measuring CD within the social context when the stimuli (e.g., information) is introduced and then withdrawn (i.e., the independent variable is manipulated to observe changes in the level of CD.) When the original stimulus is withdrawn through the introduction of other information, a series of opposing interactions between variables that represent CD were additionally anticipated by Festinger (1957) in his original postulation of CD and leading to the research question:

> RQ2: Does the introduction of involuntary, unfavorable information about a social marketing issue increase or decrease belief-disconfirmation cognitive dissonance that is experienced by potential consumers?

RQ2 is a contribution to general CD research literature by confirming one of the postulates of CD theory according to which dissonance would change when disconfirming information and confirming information was involuntarily offered to respondents. RQ2 contributes to the CD measurement literature by demonstrating the interaction between the variables measuring referent meaning, object meaning, and social meaning in Table 1.0. Marketing / Advertising Endorsement literature is

extended by showing endorsement affects attitude measured with semantic differential scales, when information that differs from the consumer's opinion is presented through advertising, which is a common advertising circumstance. A contribution to the consumer behavior literature by RQ2 is that the manipulation of the independent variable is associated with changes in the dependent variables that more clearly distinguish CD from other constructs. RQ2 shows how the presentation of confirming or disconfirming information changes CD that is experienced by the respondent.

As conceived by Festinger (1957), the induction of CD at threshold levels will generate corresponding and immediate attempts by respondents to reduce CD; attempts by respondents to reduce CD are secondary effects not otherwise attributable to the introduction of new information (cf. RQ2) or the withdrawal of old information. According to Festinger (1957), once CD had been induced through the introduction of new information, the interaction of variables resulting from the psychological discomfort felt and measured by RQ2 can be shown to be induced by examining RQ3:

> RQ3: Does the induction of belief-disconfirmation cognitive dissonance about a social marketing issue result in attempts (either directly or through social interaction) to reduce dissonance through voluntarily seeking consonant information and avoiding dissonant information?

RQ3 is a contribution to CD literature by showing how CD is reduced after being induced by presenting information: a. social meaning, b. referent meaning, and c. object meaning. RQ3 is a contribution to the CD measurement literature by showing that the social context is a factor in attitude measurement in the manner in which the

endorser SCR can affect the balancing of scale items. RQ3 is a contribution to the marketing / advertising endorsement literature by demonstrating the specific relationship that between the endorsement (and the endorser chosen), the advertising information, and any resulting attitude change, if it follows the advertising. RQ3 demonstrates that dissonance reduction activities will result in balancing referent meaning, object meaning and social meaning.

The research questions addressed the relationships amongst referent meaning, object meaning, and social meaning: 1. Establishing the validity of the scales to measure the multivariate, balance theory relationships; 2. Demonstrating how introduction of new, disconfirming information about global warming (GW) for the portion of the sample that viewed Mr. Gore as a positive endorser for GW and how the introduction of new, confirming information about GW for the portion of the sample that viewed Mr. Gore as a negative endorser for GW changed the attitude (i.e., object meaning) of respondents; and 3.Indicating how dissonance reduction activities resulted in the largest, statistically significant changes by respondents to: a. social meaning, b. referent meaning, and c. object meaning, in that order.

Changes in attitude (measured by object meaning) are first balanced with a specific social comparison referent (SCR), and social meaning and referent meaning, resulting in only small, but statistically significant changes in attitude. The results indicate that the strongest changes in attitude (e.g., object meaning) result from substitution of a new endorser that has a positive perceived attitude (e.g., object meaning) toward the new attitude or substitution of a new endorser, that has a negative perceived attitude toward the old attitude. Mr. Gore’s positive endorsement for beliefs

about GW and his negative endorsement of beliefs against GW are supported by the testing of the CD measurement instrument.

CHAPTER 2: LITERATURE REVIEW

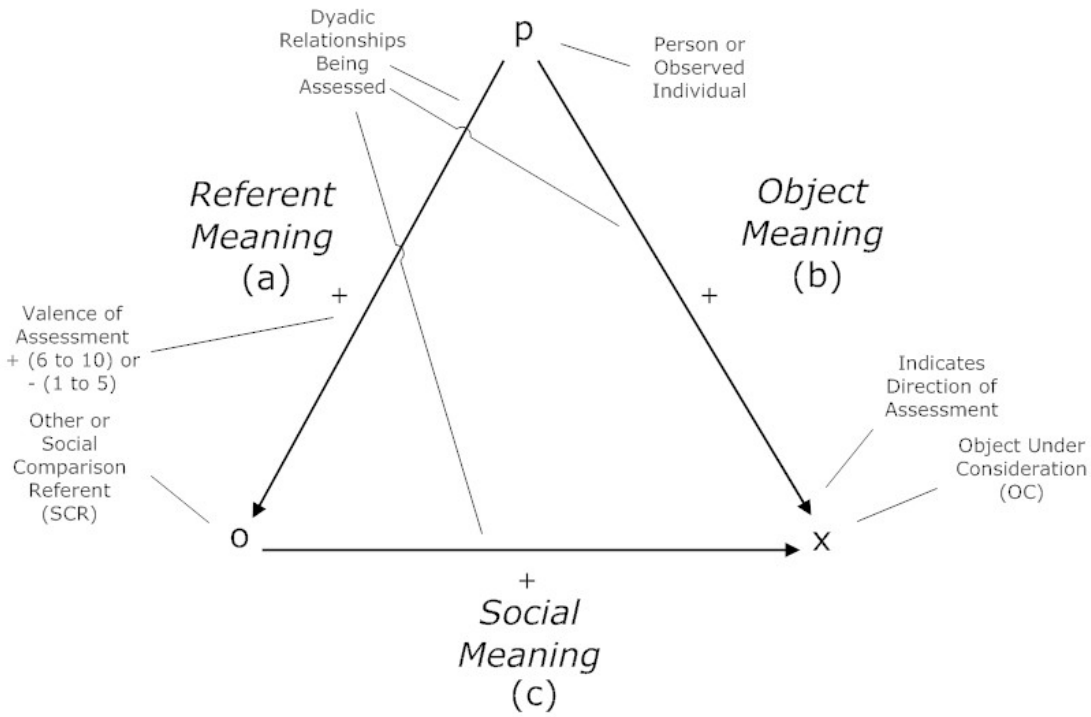
The purpose of this chapter is to summarize existing research related to cognitive dissonance (CD) in marketing and social psychology, and describe how advertising endorsement can be explained using CD theory. This chapter is organized around the five primary contributions to research described in Chapter 1. The suppositions underlying the measurement instrument described in this dissertation are outlined within the context of the research questions using cognitive consistency research, including research based on field theory (Lewin, 1951) balance theory (Heider, 1946, 1958), congruity theory (Osgood & Tannenbaum, 1955), and CD theory (Festinger, 1957). Balance theory describes how evaluations of potentially dissonant cognitive objects relate to endorser social comparison referents (SCR). Congruity theory describes how evaluation of the relationship of potentially dissonant cognitive objects with the SCR generates CD. CD theory describes how evaluations of potentially dissonant cognitive objects and related endorser SCRs change to either reduce or induce CD. A historical perspective of CD research is developed and contrasted with the current state of CD research. The suppositions supporting the testing of the instrument are stated using this perspective, thereby showing the significance to marketing and the contribution to that body of knowledge.

Introduction and Research Contribution 1. Reconciliation of Cognitive Dissonance Literature with Cognitive Consistency Theories

Methodological Introduction to Measuring Endorsement

CD can be measured relative to an endorser with balance theory (Heider, 1946, 1958). Heider (1946) described balanced social cognitions (see Figure 2) in which an observed individual's sentiment toward the object (x) is balanced with the sentiment toward the object by a third (or other) party (o) (e.g., the endorser) and the sentiment of the observed individual (p) toward that third party. The triad cognition p, o, and x depicted in Figure 2 uses notation that is adapted from Heider (1958) and Zajonc (1960) (see Appendix B Table B1).

Figure 2: Balanced Triad of Referent (a), Object (b), and Social (c) Meanings



In Figure 2, the observed individual (p) has an assessment of the object (x) (e.g., familiarity and importance, etc.), which is defined in this dissertation as object

meaning (b) (OM). The observed individual has estimation of a third party's (o) assessment of the object (x) (e.g., familiarity and importance, etc.), which is defined in this dissertation social meaning (c) (SM). The observed individual (p) has an assessment of the third party (o) (e.g., familiarity and importance, etc.), which is defined in this dissertation as referent meaning (a) (RM). Heider (1946) postulated that valence (i.e., positive or negative values) of the sentiments represented within the triadic structure shown in Figure 2 become imbalanced *qualitatively* given certain conditions. In this dissertation, the person (p), the social comparison referent (SCR) or other (o), and the object under consideration (OC) or (x) are elements of dyadic relationships, and an endorsement is comprised of SM (c) and RM (a). This dissertation assumes that assessment of RM (a), OM (b) and SM (c) can be accomplished using semantic differential scales depicted in Figure 3[1] and specified in the suppositions shown in Table 2.1.

Figure 3: First and Second Balanced Triad Cognitions of Referent (a), Object (b), and Social (c) Meanings

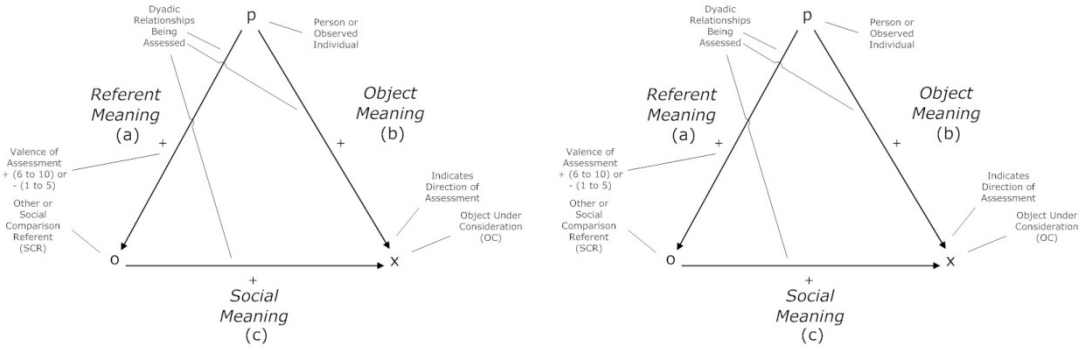


Table 2.1: *Multivariate Suppositions to measure CD in a Single Dimension*

[1] In this dissertation, the terms referent meaning (a), object meaning (b), and social meaning (c) shown in Figure 2 are introduced to facilitate the measurement of cognitive dissonance for pairs of triads that comprise dissonant cognitive forms (DCF). Moreover, the terms social comparison referent (SCR) and object under consideration (OC) are introduced to make Heider's (1946) notation more understandable to non-specialists in social psychology (see Glossary).

	Multivariate CD Measurement Suppositions in a Single Dimension
S_1 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in the first triad cognition in Figure 3, the partial least squares (PLS) β coefficient for the combination of referent meaning (a) and object meaning (b) will increase.
S_2 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in the first triad cognition in Figure 3, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase.
S_3 (Congruity Theory)	As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in the first triad cognition in Figure 3, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase.
S_4 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in the second triad cognition in Figure 3, the PLS β coefficients for the combination of referent meaning (a) and object meaning (b) will increase.
S_5 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in the second triad cognition in Figure 3, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase.
S_6 (Congruity Theory)	As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in the second triad cognition in Figure 3, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase.
S_7 (Balance Theory)	In the first and second triad cognitions in Figure 3, if the three PLS β coefficients are significant, then the center of polarization will tend to move toward changing PLS β coefficients to become insignificant.
S_8 (Balance Theory)	In the first and second triad cognitions in Figure 3, if the three PLS β coefficients are insignificant, then the center of polarization will tend to move toward the changing PLS β coefficients to become significant.
S_9 (Dissonance Theory)	For the first and second triad cognitions in Figure 3, as the centers of polarization increase due to the manipulated factors, the level of cognitive dissonance will increase; and as the centers of polarization decrease due to the manipulated factors, the level of cognitive dissonance will decrease.

The implied condition used in this dissertation is that in the p, o, and x triad cognition simultaneously exists in two forms (e.g., Figure 3): a pair of unbalanced and/or balanced cognitions (cf. Festinger, 1957), with psychological tension between

the two cognitions reduced by resolution of imbalance in one of the cognitions.[2] Osgood and Tannenbaum's (1955) postulation that simultaneously decoded meanings quantitatively tend toward congruence, provides a theoretical means for imbalance among the meanings within the cognition p, o, and x to be considered and resolved. The primary linkage between pairs of unbalanced and balanced cognitions is the assessment of the object within a social context under conditions resembling four types of situations thought by Festinger (1957) to induce CD: 1. Logic, 2. Society, 3. Systems, and 4. Memory. This dissertation defines dissonant pairs of cognitions, depicted in Figure 2 and Figure 3, as *dissonant cognitive forms* (DCFs) (see Appendix B Table B1). DCFs provide notation to define paradigms under which CD research has been conducted and to define the magnitude of the CD experienced.

Theoretical Overview of Cognitive Consistency

The theory of CD (Festinger, 1957) postulates that when an individual holds two logically or psychologically inconsistent cognitions simultaneously, a psychological tension (or CD) is experienced based on the content of the cognitions. Engel, Kollat, and Blackwell's model of consumer purchase decision making suggested that for post-purchase CD, consumers seek out CD-reducing information and avoid CD-increasing information, according to the magnitude of the CD experienced (Engel, Blackwell, & Miniard, 1995). The act of seeking unfavorable information by consumers that increases CD, after intention to consume is established, is contrary to Festinger's original conception of CD. Wicklund and Brehm (1976) suggested that various extra-theoretical factors have an effect on how exposure to

[2] A contribution of Heider (1958) that extends balance theory with causal unit relations shown in Figure 2 and Figure 3 to the creation of the investigated instrument.

information influences the magnitude of CD, including de facto exposure, curiosity, intellectual honesty, usefulness, and attractiveness of choice alternatives. For example, information such as direct-to-consumer (DTC) pharmaceutical advertising about the efficacy of prescription drug and over-the-counter remedies is readily available on the Web; voluntary access to this DTC information increases or decreases the CD experienced by patients during medical care decisions. Oliver (1997) noted that consumer exposure to information was, at that time, an active but inconclusive area of CD research. In an early experiment to test CD theory, Jecker (1964, 1968) reported that there is weak evidence indicating that selective exposure to favorable or unfavorable information has little bearing on CD reduction activities. Moreover, Mills (1999) lamented that there are gaps in the literature relative to how the magnitude of the CD described by Festinger (1957) affects interest in dissonant information,

> On the basis of what little research there is on the topic, I conclude that the assumption in the 1957 version that the magnitude of avoidance of dissonance is influenced by the amount of existing dissonance is in need of revision (Mills, 1999, p. 30).

In sum, the question of whether consumer exposure to unfavorable or favorable information relative to the magnitude of the CD reduction remains unanswered, the exploration of which is encumbered by the measurement of the magnitude of the CD.

CD research has been conducted along four primary paths of inquiry: effort justification, induced compliance, belief disconfirmation, and free choice (Harmon-Jones & Mills, 1999). Expending effort toward the completion of an unpleasant activity to gain a desired outcome arouses in the effort-justification CD paradigm. In the induced-compliance CD paradigm, the individual experiences CD when engaging in behavior that is forced or rewarded, but the behavior differs from past attitudes,

opinions, or beliefs. The belief-disconfirmation CD paradigm posits that information inconsistent with one's beliefs will arouse CD. The free-choice paradigm directly applies to the study of CD induced after a purchase decision due to the perception of a clear decision point, responsibility associated with consumer free choice, and the spread of the attractiveness of alternatives. During consumer behavior, belief-disconfirmation CD may be experienced relative to beliefs about making the decision about a product and free-choice CD may be manifested in trying to consume a product (cf. theory of trying to consume in Bagozzi & Warshaw, 1990).[3]

Considered outside the context of field theory (Lewin, 1951), the impact of CD theory has been extensive in the number of empirical studies examining CD reduction. Hunt (1970, 2002) suggested that there are fundamental laws of CD from which bridge laws and testable hypotheses have been derived to investigate specific classes of the phenomenon. However, empirical evidence of the induction of CD is limited in the research literature. An individual can experience CD induction alone or in social settings, but CD reduction is usually achieved in a perceived social context, involving external behaviors of interpersonal interaction and information seeking. It is possible that the methods employed to measure CD induction have been multi-dimensional to the degree they measured variables with the tripartite attitude model (i.e., thinking, feeling, and acting) but are heavily weighted toward sentiment and evaluation. Generally, these methods have not isolated the cognitive dimension, not examined how information is introduced into common consumer cognitions, and not tested how the meaning of cognitions changes in stages of cognitive equilibrium. Moreover,

[3] The theory of trying to consume is an extension of Ajzen's (1991) theory of planned behavior, which is an extension of the theory of reasoned action.

Festinger (1957) suggested that dissonant relations could exist between belief elements and clusters of belief elements, but modern definitions often do not make this distinction, such as Aronson (1968): "…two cognitions are dissonant if, considering these two cognitions alone, the opposite of one follows from the other" (p. 6). Fiedler (1994) noted that to understand cognitive representations and processes, the texture of the social ecology (cf. Barker, 1968) must first be understood in the manner anticipated by Lewin (1951). Hence, the measurement of cognitive structures associated with CD induction and CD reduction in a social context of an endorser is considered in this dissertation. According to the original theory Festinger (1957), CD is a psychological tension that is uncomfortable to the individual who experiences it. CD (Festinger, 1957) is an uncomfortable psychological tension that is empirically distinguishable from similar uncomfortable psychological tensions such as need or frustration (see Appendix A).[4] By extrapolation, discomfort or discord is reduced by adding consonant cognitions, raising the importance of consonant cognitions, removing dissonant cognitions, or lowering the importance of dissonant cognitions (Harmon-Jones, 2001). Conversely, CD is increased by adding dissonant cognitions, increasing the importance of dissonant cognitions, removing consonant cognitions, or lowering the importance of consonant cognitions (Festinger, 1957). However, until this dissertation the measurement of CD induction and CD reduction by examining the attributed social context has been methodologically challenged: Dr. Leon Festinger did not specify how to identify and quantify dissonant cognitions. Two relevant attempts

[4] There is a class of constructs similar to cognitive dissonance that share common cognitive processes that lead to some form of psychological tension (see Appendix A). Frustration, doubt, guilt, regret, and confusion are emotions (i.e., tensions) that share the process of weighing the assessment of objects that do not fit together outside a social context in which the constructs arise.

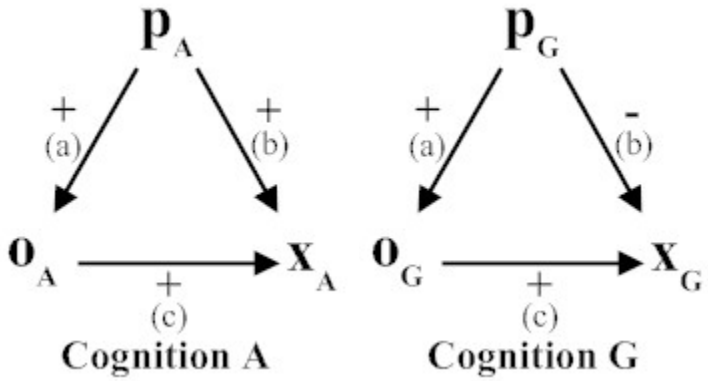
to model CD are Shultz and Lepper (1996, 2000) and Sakai (1999), but these models do not isolate single pairs of dissonant cognitions, do not fully account for fluctuations in the magnitude of CD, and do not explore the social context of the cognitions. To address these issues, this research outlines a general model for framing the interaction of dissonant cognitions, when considering two unbalanced, social cognitions.

The assessment of object meaning (OM) (b) in a social context in Figure 2 can be accomplished with the semantic differential (Osgood et al., 1957), allowing the measurement process to be multi-dimensional. A consideration sometimes overlooked in CD research is that although an observer may perceive two cognitions to be dissonant from the sources of logic, society, systems, or memory (cf. Festinger, 1957), the observed individual may not recognize the cognitive discrepancy. Conversely, the observer may not readily recognize situations that may generate CD in the thoughts of the observed individual. That is, CD is a subjective phenomenon that occurs between the evaluations of cognitive objects: ideas, opinions, or beliefs. CD also occurs between other measurable psychological constructs such as memories of attitudes, behavior, and values. In effect, the semantic differential affords the opportunity to separate the meaning of the *sign* elements of cognitions from the individual's own underlying desires for self-efficacy (Bandura, 1977) and self-affirmation (Watson, Papamarcos, Teague, & Bean, 2004).

An important contribution of Heider (1958) to this dissertation is the implied condition that the p, o, and x triad cognition depicted in Figure 2 and Figure 4 simultaneously exists in two forms: unbalanced and balanced (cf. Festinger, 1957), with psychological tension between the two cognitions reduced by resolution of

imbalance in one of the cognitions. Osgood and Tannenbaum (1955) postulated that simultaneously decoded meanings quantitatively tend toward congruity, providing a theoretical means for imbalance among the meanings within the cognition p, o, and x to be considered and resolved. The primary linkage between the unbalanced and balanced cognitions is the assessment of the object (i.e., object meaning [OM] [b]) set in social context under conditions resembling the four types of situations thought by Festinger (1957) to induce CD (i.e., society, logic, systems, and memory). In Figure 4, in Cognition A on the left, the person favors the object X_A and OM (b) is positive. The person favors the opinion of another person O_A and RM (a) is positive. The other person O_A favors the object X_A and SM (c) is positive. Cognition A is balanced. In Figure 4, in Cognition G, the same person does not favor X_G, which is now dissonant with X_A because the person favors X_A over X_G. The person favors the opinion of person O_G and RM (a) is positive. The person does not favor X_G and OM (b) is negative. The other person O_G favors X_G and SM (c) is positive. Cognition G is out of balance because the individual does not agree with someone whom they normally agree. Therefore, the imbalance (and resulting CD) in Figure 4 arises from X_A, the object under consideration (OC) in Cognition A on the left, being dissonant with X_G, the OC in Cognition G on the right and the assessment of OM (b) in Cognition G, disagreeing with the assessment of referent meaning (RM) (a).

Figure 4: Triads of Referent (a), Object (b), and Social (c) Meanings Resulting in Dissonant Cognitive Form (DCF)



Heider's (1946) conception of imbalance was qualitative, either positive or negative. Osgood and Tannenbaum (1955) presented a quantitative method to express the congruity formula for the combination of meanings along a single dimension in semantic space. If the modes of resolution (Kaplan & Crockett, 1968) are anticipated to provide meaning resolution within the two juxtaposed cognitions, it is possible to depict the p, o, and x cognition in semantic space as a series of resolved meanings shown in Figure 4. CD research traditionally has lacked such a means for modeling the interaction between dissonant pairs of cognitions. This dissertation proposed that dissonant pairs of cognitions, as depicted in Figure 4, or *dissonant cognitive forms* (DCF) (see Appendix B Table B1) can be used to model paradigms under which past CD research was conducted and provide a means to define the magnitude of the CD experienced.

Cognitive Dissonance in Endorsement

One in four ads in the U.S., and one in five ads globally, feature a celebrity or expert endorser (Hollensen & Schimmelpfennig, 2013). In the endorser literature,

there is wide opinion on the optimal *match up* (i.e., selection) of the endorser with the product, brand, event, service, or social marketing cause. The optimal selection of an endorser will result in a product, etc. being perceived in the mind of the consumer, with the consumer being more receptive to positive information and less receptive to negative information about the product. In my view, due to CD, the more closely the endorser's perceived attitudes about the product match consumer attitudes about the product, the more resistant consumer attitudes are to change when conflicting information is received from a third party. This dissertation examined how the endorser affects CD by developing new scales for measuring multivariate CD and presenting confirming / disconfirming information to respondents in a repeated measures procedure.

Research Context of Field Theory

The roots of Festinger's quest to understand CD is set in the context of Lewin's (1951) use of field theory to explain resistance to change.[5] Festinger (1957) stated, "The fact that a decision once having been made, gives rise to processes that tend to stabilize the decision has also been recognized, particularly by Kurt Lewin" (p. 33). Next, Festinger (1957) referenced Lewin (1958)[6] to support the notion that group

[5] In Patnoe (1986), Stanley Schacter recollected Festinger's experimental method and his view that Festinger was the father of experimental social psychology, "Social psychology experiments before he [Festinger] came along were essentially morasses. In the democracy-autocracy study for example, they were attempting to create the experimental parallel to what is democracy and compare it with the autocratic. They were manipulating a million things. Leon, I think for the first time, introduced really strong manipulations of the independent variables, tight controls, good measures of the dependent variables and a great deal of precision in what you are looking for" (p. 235).

[6] Festinger (1957) referenced Lewin's essay entitled *Group Decision and Social Change* in the 1952 version of *Readings in Social Psychology, 2nd Edition*. This dissertation references the 1958 edition of *Readings in Social Psychology, 3rd Edition*, as the 1952 edition of the source was unavailable for inspection. However, Lewin's essay has been reprinted in other volumes, such as the APA's *The Complete Social Scientist* edited by Martin Gold (Lewin, 1999), and the passages referenced in this document are identical in available sources to those quoted by Festinger (1957).

decisions must be stabilized among alternatives for the individual.[7] Note that Festinger (1957) did not refer to the subsequent narrative in Lewin (1958) that links the CD-inducing decision with the group context:

> One of the reasons why "group carried changes" are more readily brought about seems to be the unwillingness of the individual to depart too far from group standards; he is likely to change only if the group changes.... One may try to link the greater effectiveness of the group decision procedures to the fact that the lecture reaches the individual in a more individualistic fashion than group discussion. If a change of sentiment of the group becomes apparent during the discussion, the individual will be more ready to come along…. It should be stressed that in our case the decision which follows the group discussion does not have the character of a decision [with] regard to a group goal; it is rather a decision about individual goals in a group setting (Lewin, 1958, p. 204).

Festinger (1957) continued on p. 33 to explain how the decision generates the conditions for CD in the study of homemakers serving glandular meats by illustrating the role of the decision within the group, through the process of *freezing* and *spreading* alternatives. However, Festinger's (1957) quotation of Lewin (1951) truncated the narrative relative to the role of social comparison during CD induction and CD reduction,

> This seems to be, at least in part, the explanation for the otherwise paradoxical fact that a process like decision which takes only a few minutes is able to affect conduct for many months to come. The decision links motivation to action and, at the same time, seems to have a "freezing" effect which is partly due to the individual's tendency to "stick to his decision"… (Lewin, 1951, p. 233).

Considering the mediation of social interaction or social reality during the induction of CD regardless of the source (e.g., individuals, groups or society), consider the remainder of the passage quoted from Lewin (1951) starting with the last sentence of the quotation,

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[7] Text is also found in Lewin (1999) on p. 273-274

> The decision links motivation to action and, at the same time, seems to have a "freezing" effect which is partly due to the individual's tendency to "stick to his decision" *and partly to the "commitment to a group." The importance of the second factor would be different for a students' cooperative where the individuals remain together, for housewives from the same block who see each other once in a while, and for farm mothers who are not in contact with each other. The experiments show, however, that even decisions concerning individual achievement can be effective which are made in a group setting of persons who do not see each other again* [italics added] (Lewin, 1951, p. 233).

Additional evidence of how Lewin's (1951) position on the effectiveness of decisions made by group members was interpreted by Festinger is found in subsequent elaborations about the investigation of pre-decisional conflict on CD induction, "In other words, Lewin believed that simply making a decision exerted a stabilizing effect on the situation. The person then tended to behave in line with the decision, even if this were difficult to do" (Festinger et al., 1964, p. 5). However, Lewin (1951) attributed the tension following a decision to both the commitment to the content of the decision *and* the commitment to the social context of the group.

Applications of Lewin's work by Festinger and other researchers presumably inspired subsequent CD research to focus on the decision and leave unanswered the role of reality as it relates to the group, social context, and social pressure. Subsequent research has not investigated social context to tests of CD induction and CD reduction. The measurement instrument described in this dissertation is based on Heider's (1946) conception of balance as it applies to Festinger's (1957) definition of CD, when social pressure is considered. Festinger's (1957) discussed an exploration of CD between objects without directly addressing the balancing of perceptions of social reality. However, Festinger (1954) separately discussed the social comparison phenomenon relative to social reality as "…comparison with others … produce[s] tendencies to

change one's evaluation" (p. 122); "action on the part of members of that group to reduce the discrepancy" (p. 124); and the "pressures toward uniformity" (p. 126). Festinger (1957) included concepts of attribution about social context from social comparison theory (Festinger, 1954) in CD theory without formally linking the theories. Finally, in his essay on group dynamics, Lewin (1951) foresaw the influence of group standards (i.e., new information) on beliefs, feelings, and behaviors within group settings,

> A theory emerges that one of the causes of resistance to change lies in the relation between the individual and the value of group standards. This theory permits conclusions concerning the resistance of certain types of social equilibria to change, the unfreezing, moving and freezing of a level, and the effectiveness of group procedures for changing attitudes or conduct (Lewin, 1951, p. 234).

Moreover, the relationship between social habits and resistance to change considering the underlying cognitions is found in Lewin's essay on group decisions:

> The effect of group decision can probably be best understood by relating it to a theory of quasi-stationary social equilibria, to social habits and resistance to change, and to the various problems of unfreezing, changing and freezing social levels (Lewin, 1958, p. 211).

The theories of cognitive consistency relevant to the described model of CD are interrelated when considered with Lewin's (1936) topological psychology, which provided the foundation for his more popular works in field theory. Congruity theory (Osgood & Tannenbaum, 1955), balance theory (Heider, 1946), and CD theory (Festinger, 1957) identify different stages of tension within and between the situation (cf. Lewin, 1936). Congruity theory addresses mediations of two incongruent but simultaneously considered evaluations (i.e., dyads). Balance theory addresses mediations of three sets of two socially incongruent evaluations (i.e., triads). CD

theory addresses mediations of two socially juxtaposed situations each involving at least three sets of two incongruent evaluations (i.e., sets of at least two triads).

Balance Theory

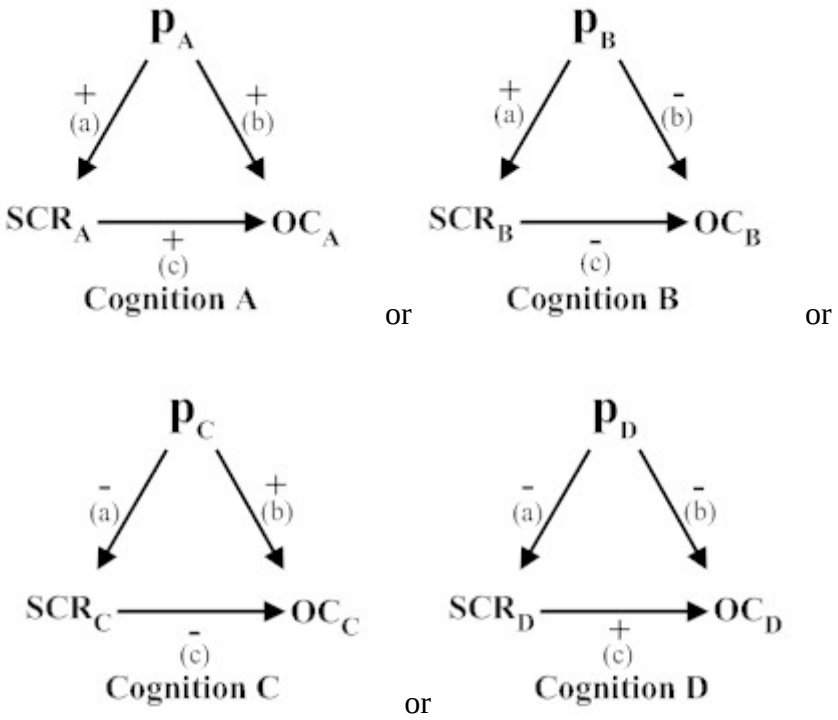
"Attitudes toward persons and causal unit formations influence each other" (Heider, 1946, p. 107). Heider (1946) postulated that causal unit formations tend toward balance in a subject's life space (cf. Lewin, 1936). A causal unit formation is a set of interrelated dyads that influence each other in at least one direction, regardless of whether the relationship within the dyads is positive or negative. Balance is maintained within cognitions through the changing of the dynamic character, action, or cognitive reorganization. As it applies to the described instrument for measuring CD, Heider (1946) defined the triad unit formation (i.e., p, o, and x or p, o, and q, where p = person, o = other person (s) and x = the impersonal entity or object as shown in Figure 2, but x was also defined as "a situation, an event, an idea, or a thing, etc.", p. 107, and "impersonal entities, things, situations or changes, etc.", or q = another person, p. 107) comprised of sentiment toward entities or objects and sentiment between interpersonal relationships.

The triadic cognitions adapted for this dissertation (see Figure 2), which are bound by relation (i.e., U, meaning union) and attitude (i.e., L, meaning like), were considered by Heider (1946) to change from unbalanced triad patterns toward balanced triads of unit relations to maintain a similar dynamic character. A balanced state exists when the attitudes of two people, who have favorable attitudes toward each other, agree regarding the entity or object and the attitudes of those, who have unfavorable attitudes toward each other, disagree regarding the entity or object (i.e., a

similar dynamic character). An unbalanced state exists when the attitudes of two people, who have favorable attitudes toward each other, disagree regarding an entity or object, or when the attitudes of two people, who have unfavorable attitudes toward each other, agree regarding the entity or object (i.e., a different dynamic character).

Heider's (1958) balanced states (see Figure 5) and unbalanced states (see Figure 6) can be depicted in triad form with the social comparison referent (SCR) and the object under consideration (OC) defined in this dissertation (cf. Cartwright & Harary, 1956; Zajonc, 1960). The triad form of the cognition is similar to how Heider diagrammed causality in interpersonal relations (cf. Zajonc, 1960) as follows: where p = person, o = another person(s), x = the impersonal entity or object (belief, attitudinal memory, expectation, values, behavior, concepts or ideas), plus (+) arrow = positive attitude, and minus (-) arrow = negative attitude. (Heider's notation: L = relative positive attitude, ~L relative negative attitude, U = associated with, ~U = not associated, pC = p causes). When discussing the measurement of CD, the triadic cognitions are described as p = observed individual (p), SCR = the social comparison referent is another person(s) or group(s), and OC = the impersonal entity or object under consideration.

Figure 5: Balanced Cognitions Derived from Balance Theory



In the balanced state, if the relative strength and valence (positive or negative tone) of one sentiment (e.g., importance or familiarity, etc.) is strongly positive or three of the sentiments are positive, there is no tension perceived by the individual that can be resolved by altering the valence of at least one other sentiment. Cognitions representing balanced states are depicted in Figure 5.

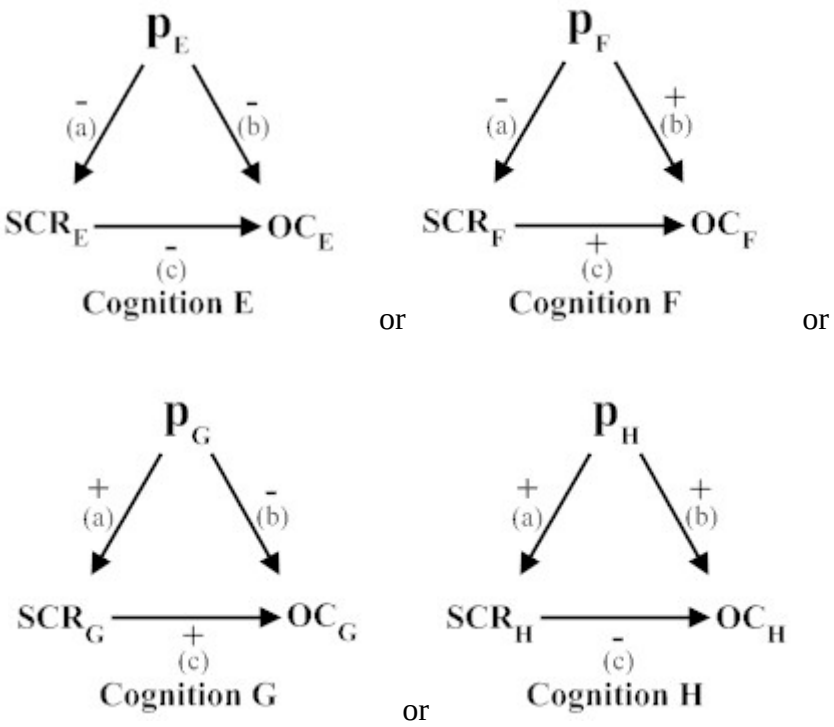
As shown in Figure 5, a notation for understanding balanced cognitions is outlined for this dissertation using the *p …> SCR* dyadic relationship (i.e., *p +> SCR* or *p -> SCR*) to represent referent meaning (RM) (a), the *p …> OC* dyad to represent object meaning (OM) (b), and the *SCR …> OC* dyad to represent social meaning (SM) (c): Cognition A (+ + +), Cognition B (+ - -), Cognition C (- + -) and Cognition D (- -

+) are balanced cognitions. An example of the positive assessments (e.g., scalar responses 6 to 10 for importance or familiarity, etc.) forming the balanced Cognition A using this notation is:

- p_A +> SCR_A: p_A believes SCR_A is a positive referent relative to object OC_A; that is, p_A believes he or she likes the opinions of SCR_A
- p_A +> OC_A: p_A believes object OC_A is good, strong, and active; that is, p_A believes he or she likes object OC_A
- SCR_A +> OC_A: expertise of SCR_A relative to OC_A as perceived by p_A; that is, p_A perceives that SCR_A believes object OC_A is good and SCR_A believes he or she likes object OC_A;

In the unbalanced state, if the relative strength and valence (positive or negative tone) of one sentiment is strongly negative or three of the sentiments are negative, there is a tension perceived by the individual that can be resolved by altering the valence of at least one other sentiment. Cognitions representing unbalanced states are depicted in Figure 6 (cf. Cartwright & Harary, 1956; Heider, 1958; Zajonc, 1960).

Figure 6: Unbalanced Cognitions Derived from Balance Theory



As shown in Figure 6, a notation for understanding imbalanced cognitions is outlined using the *p* …> *SCR* dyadic relationship (i.e., *p* +> *SCR* or *p* -> *SCR*) to represent RM (a), the *p* …> *OC* dyad to represent OM (b), and the *SCR* …> *OC* dyad to represent SM (c): Cognition E (- - -), Cognition F (- + +), Cognition G (+ - +) and Cognition H (+ + -) are unbalanced cognitions. An example of the negative assessments (e.g., scalar responses 1 to 5 for importance or familiarity, etc.) forming the imbalanced Cognition E using this notation is:

- p_E -> SCR_E: p_E believes SCR_E is negative referent relative to OC_E; that is, p_E believes he or she does not like the opinions of SCR_E;
- p_E -> OC_E: p_E believes object OC_E is bad, weak, or passive; that is, p_E believes he or she dislikes object OC_E;

- *SCR_E -> OC_E:* lack of expertise of SCR_E relative to OC_E as perceived by p_E; that is, p_E perceives that SCR_E believes object OC_E is bad and SCR_E believes he or she dislikes object OC_E;

Heider's (1946) postulation of balance conjoined two personal entities and one impersonal entity (i.e., p, o, and x) or three personal entities (p, o, and q) by applying Lewin's (1951) three inner (i.e., internal) conflict scenarios: positive-positive (i.e., approach-approach), negative-negative (i.e., avoidance-avoidance), and positive-negative (i.e., approach-avoidance).Whether the triads are balanced or unbalanced, agreement in the (positive or negative) direction of the attitudes reinforces balanced attitudes and disagreement in the direction of the attitudes reinforces unbalanced attitudes. Still, Lewin's influence on Heider was extensive;[8] Heider (1958) applied balance theory (Heider, 1946) to account for many of the known types of tension and the causal ramifications (i.e., *naïve psychology* and attribution theory) that could be identified in hodological space,[9] which included sentiment. Balance theory was one of several theories that formed the basis of attribution theory (Aronson, 1980) to help account for the way in which individuals ascribe or attribute behaviors to other individuals and how that attribution of cause influences motivation.

Heider (1946) postulated that valence (i.e., tone) of the positive or negative sentiments (e.g., importance or familiarity, etc.) represented within the triad cognitive structure become imbalanced qualitatively given certain conditions. In the triad

[8] As evidence of Lewin's impact on Dr. Fritz Heider, consider that Dr. and Mrs. Grace Heider translated Lewin's (1936) *Principles of Topological Psychology* from the German language into the English language.

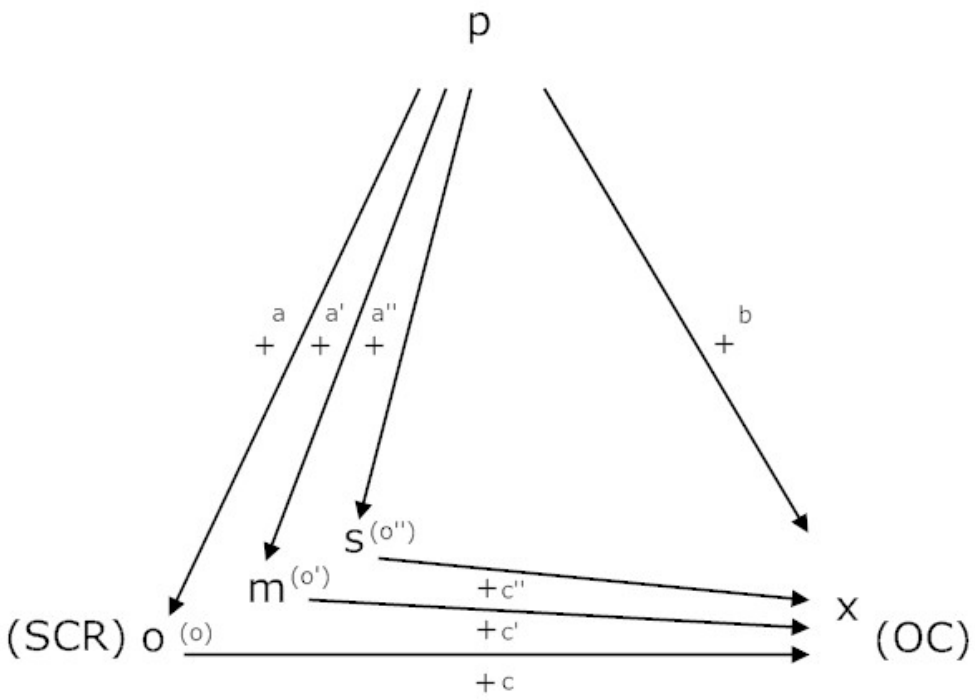
[9] From Lewin (1951), hodological space is a person's perceived path of anticipated locomotion within the social situation.

cognitive structure shown in Figure 2, the person (p), the social comparison referent (SCR) or other (o), and the object under consideration (OC) or (x) are elements of dyadic relationships that form *significates* (i.e., tangible representations of *signs* / symbols) as described by Osgood, Suci, and Tannenbaum (1957). For example, the person's (p) perception of the object under consideration (OC or x), (dyad p and x), is the object sign that possesses OM (b) in the semantic differential. In other words, the p, o, and x are elements of dyadic relationships that form *significates*, the signs of which represent these *significate* relationships; the meanings of the *signs* describing the relationships of the survey instrument in this dissertation represent the *significates* in semantic space (Osgood et al., 1957), the measurement of hodological space (i.e., a person's perceived path of anticipated locomotion within the social situation) (Lewin, 1951). Therefore, assessment with the semantic differential defines RM (a) to represent the dyad *p and o*, OM (b) to represent the dyad *p and x*, and SM (c) to represent the dyad *o and x*.

In Figure 7, an extended triad depicts the complete social context of all SCRs for the belief that is subject to balancing equilibria in Figure 2, when information is introduced and meanings of the dyads in the triad are defined: p is the person making the evaluations, o is the most likely SCR, x is the object (belief or idea) under consideration (OC), m is the media publication source of the information, and s is the attribution source quoted for the information. When the meaning of the dyadic relationships of the triad are measured, a is the RM of (o) the SCR, a' is the RM of (m or o'), the media publication source, a'' is the RM of (s or o'') attribution source, b is the OM of (x) the object under consideration, c is the SM of x to o, c' is the SM of x to

(m or o') the media publication source, c'' is the SM of x to (s or o'') the attribution source.

Figure 7: Balanced Triad of Multi-relational Social Comparison Referents (SCR)



Congruity Theory

"The 'meaning' of an event in psychology may be said to be known if its psychological position and its psychological direction are determined" (Lewin, 1951, p. 74). Congruity theory, a second major approach to cognitive consistency, originated in Osgood's work with the measurement of meaning with semantic differential scales (Osgood & Tannenbaum, 1955; Osgood et al., 1957). The theory posits that when differences in meaning of two cognitive elements (such as a and b in Figure 7) appear incongruent to an individual, a proportional change in cognition will occur to restore equilibrium to form an assertion, which Osgood and Tannenbaum (1955) referred to as the *congruity principle* (i.e., two cognitive elements are resolved as a vs. b to form the

product ab). Assertions link (1) meaning of cognitive elements with simple linguistic qualifications through adjectives, (2) simple perceptual contiguity through a graphical image, (3) statements of classification regarding the cognitive elements, and (4) source-object assertions (Kaplan & Crockett, 1968). Specifically, the general principle of congruity was stated as, “Whenever two signs are related by an assertion, the mediating reaction characteristic of each shifts toward congruence with that characteristic of the other, the magnitude of the shift being inversely proportional to intensities of the interacting reactions” (Osgood et al., 1957, p. 201). Tannenbaum (1968) acknowledged that a postulate of congruity theory is similar to balance theory: Different degrees of attitude polarization (e.g., association) of the points of meaning resolution are sufficient to generate pressure toward change of attitudes, and not different attitude polarizations alone.

The specific cognitive organization tested by Osgood and Tannenbaum (1955) resembles each of the dyads in the p, o, and x relationship shown in Figure 7 and suggested by Heider (1946, 1958). The dyads are considered individually in congruity theory, as “(a) existing attitude toward the source of a message, (b) existing attitude toward the concept evaluated by the source, and (c) the nature of the evaluating assertion which related the source and concept in the message” (Osgood & Tannenbaum, 1955, p. 43). Heider’s (1946, 1958) notation parallels that used by Osgood and Tannenbaum (1955): The assessment of x (i.e., the source) by o (i.e., the concept) is in the form of an assertion that reduces the process of achieving congruity in the resolution of two meanings, such as *a and b* in Figure 7. This resolution process is identical to the process of balancing through the combination of the assessment of x

by p (i.e., sentiment about the object) and the assessment of o by p (i.e., sentiment about the other person). In the example, RM (a) in Figure 2 is resolved with OM (b); OM (b) is resolved with SM (c); and SM (c) is resolved with RM (a). For the described model, the simple aggregation model operates with the congruity principle within the triad cognitive structures depicted in Figure 7 used to express the various dissonant cognitive forms (DCF).

Cognitive Dissonance Theory

According to the theory of Cognitive Dissonance (CD) (Festinger, 1957), CD is experienced in situations involving comparisons of logic, society, systems, and memory:[10]

- Logic (i.e., logical inconsistency)–when a specific type of non sequitur in which the logical fallacy arises between cognitions that are perceived by the individual as related but do not follow from each other–the obverse of either cognition does not follow from the other, such as smoking cigarettes *and* training for a marathon race; in contrast, not smoking while training for a marathon race; or smoking while not training for a marathon are logically consistent;
- Society (i.e., inconsistency with cultural mores and beliefs instilled by society through the process of enculturation)–when what is required by one social context is prohibited in another social context and the resolution is not logically

[10] Dr. Stanley Schacter, a student of the Research Center for Group Dynamics at MIT in the fall of 1946, was greatly influenced by Festinger, especially after Lewin died in 1947 (cf. Marrow, 1969; Patnoe, 1986). Schacter's recollections provide some clues to the relationship of Festinger's studies of social influence and situations in which dissonance could be experienced, "We did a complete survey of the [Westgate housing] community and a complete sociometric and we started finding all these nice relationships and took off. That particular study led to Leon's whole theory of pressures to conformity and social influence which in turn led to dissonance" (Patnoe, 1986, p. 232).

ascertained, such as the wearing of head coverings in social and religious contexts for men and women around the world; consistency between cognitions in this situation arises from the social context derived from the culture;

- Systems (i.e., inconsistency between a single cognition and the larger system of which the cognition is a part)–when accepting a belief is strongly associated within a surrounding and inconsistent belief system, such as purchasing a large, fuel-inefficient vehicle to ensure passenger safety from an automobile company that pollutes the environment by manufacturing such vehicles;
- Memory (i.e., past experience)–when the meaning of cognition is inconsistent with a related memory, such as driving above the speed limit with the knowledge of large fines for being apprehended.

CD catalyzes other post-purchase constructs. For example, customer dissatisfaction differs in the nature of the decision and the length of time that elapses following the decision. Festinger et al. (1964) anticipated this elusiveness of pre-decision conflict among information elements known about each aspect of a decision. The level of this conflict between these two information element views (i.e., alternatives) relates to the amount of post-decision CD that will be experienced (Festinger et al., 1964).

CD can be induced or reduced by many circumstances that present information to the consumer (Oliver, 1997). As the converse of CD, the magnitude of consonance can be increased or decreased as well (Shultz & Lepper, 1996). Relevance, the bonding force for pairs of dissonant and consonant beliefs, can be increased or decreased relative to other constructs, making it the force that defines the scope of the

CD. A decision between alternatives makes them relevant and related for CD induction. Moreover, involuntary and voluntary exposure to information induces or reduces CD (Festinger, 1957). Providing information is helpful in influencing or predicting associated CD-related behaviors. Sequential, involuntary exposure to information increased CD reduction behaviors among student participants in a CD experiment (Jonas, Schulz-Hardt, Frey, & Thelen, 2001).

CD induction and reduction in social contexts is understood as pairs of social cognitions that possess structures that tend toward balanced meaning. There is a tiered relationship between Lewin's (1936) topological psychology, Heider's (1946) balance theory, Osgood and Tannenbaum's congruity theory (1955), and Festinger's (1957) CD theory. Zajonc (1960) recognized similarities between these theories of cognitive consistency. Moreover, Osgood et al. (1957) noted that congruity theory addresses the human tendency to resolve inconsistency much like the theories postulated by Heider (1946, 1958) and Festinger (1957). In confirming the complementary relationships between field theory, balance theory, and CD theory, Aronson (1980) noted:

> …Heider's balance theory works on a common premise with dissonance theory and other consistency theories. Consistency of relationship is, in many cases, of itself desirable for the individual; and lack of consistency or its loss, an unbalanced relationship, causes the individual to seek it, restoring the balance (Aronson, 1980, p. 14).

The described model in Figure 2 frames the structure of social cognitions as a linked structure of referent meaning (RM) (a), object meaning (OM) (b), and social meaning (SM) (c). Recall that RM (a) is what the individual thinks about what other people think about the object. OM (b) is what the individual thinks (i.e., idea, opinion, or belief) about an object (i.e., idea, opinion, belief, person, place, thing, value,

concept or memory of belief, feeling, or behavior). SM (c) is the individual's perception of what other people think about the object. As the meanings are associated, become congruent, and move toward balance, they converge to decrease CD. As the meanings disassociate, become incongruent, and move toward imbalance, they diverge to increase CD.

The integrated relationship between balance theory, congruity theory, and CD theory is shown in Figure 1. The originators of the prominent theories of cognitive consistency were aware of some similarities, even though the theories were not considered as a hierarchy of effects that is presented in this dissertation. Heider (1958) noted that Osgood and Tannenbaum (1955) similarly suggested a formulation that cognitions are comprised of sentiment, unit formation, and the balanced state. When elaborating on the congruity principle, Osgood et al. (1957) drew a comparison with Heider (1946) and Festinger's then forthcoming book on CD theory, demonstrating that the similarities between the three theories of cognitive consistency were recognized by their originators, even if the relationship between the theories were not described. The integration of the congruence theory, balance theory, and CD theory shown in Figure 1 will used to develop a more accurate measurement model and instrument of CD, and the details of how the theories in Figure 1 will be expanded to create a CD instrument will be discussed in the following section.

Research Contribution 2. Extension of Cognitive Dissonance Measurement Literature and Consumer Behavior Literature to Measure Social Context of CD and to Classify of CD Types

According to Festinger (1957), CD is a psychological tension that is uncomfortable to the individual who experiences it. The discomfort or discord experienced with CD is increased by adding dissonant cognitions, increasing the importance of dissonant cognitions, removing consonant cognitions, or lowering the importance of consonant cognitions (Festinger, 1957).

On Balancing Perceptions of Social Reality

Olson and Stone (2005) noted that the influence of behavior on attitudes through the CD phenomenon has been explored in empirical research, but how CD theory explains the influence of attitude on behavior is less well understood. Instead of measuring feelings or behavioral intention, the described model uses the cognitive-based semantic differential items based on the hypothesized evaluative, activity, and potency dimensions to map the underlying belief-related cognitions. Information can change the underlying cognitions that are active during cognitive deliberation, a process that is governed by cognitive consistency.

Marketing Promotion and the Social Comparison Referent.

The promotion of some types of products and services evoke dissonant cognitive forms (DCF) each in their respective social realities, expecting the individual to react in a manner conducive to the objectives of the advertising campaign. The intent to use these products may be dissonant with religious teachings, personal sensibilities, social customs, and memories of past ideas, opinions, beliefs,

and behaviors. The marketing communications of business organizations, social marketing of non-profit organizations, and preaching of religious organizations attempt to activate CD-inducing messages for stakeholders, especially when the SCR is a higher authority, such as God.

Interaction of Cognitive Dissonance with Social Comparison Factors.

The described model suggests conditions underlying how individuals or divisive members of a group could rise to power within the perceptions of individuals in the group. Such *tyrants* and *mobs* could become the most likely SCR (e.g., a cult of personality and perceived social context) for decisions involving the balancing of potentially dissonant beliefs held by the group.[11] Such factions usurp the larger group identity by serving as the SCR in CD induction and reduction processes. The tyrant or faction serving in the role as the SCR aids the introduction of new information or disinformation, potentially leading to extension of the collective good or to the practice of incomprehensible and false systems of belief, en masse.

CD research generally has not measured the reality of the social environment. The model in this dissertation based on Heider's (1946) p, o, and x triad cognitions (see Figure 2) treats social reality as a mediating variable. Festinger (1957) recognized the importance of physical, psychological, and social reality on the CD phenomenon and generally allowed for the influence of these realities as mediating variables; he suggested that the cognitive elements (i.e., objects) in consonant or dissonant relations

[11] In Patnoe (1986), Robert Krauss from the Research Center for Group Dynamics at MIT, who was trained by Morton Deutsch, recalled of the early social psychologists, "They had been through this [war] experience which I think for all them – somebody like Stanley [Schacter] would say – molded their character in significant ways. Then you have Lewin offering this vision. And it really was a vision of a way of dealing with the things that were perceived as having caused this catastrophe [(i.e., the rise of German Nationalism, the Führer Cult, The Holocaust, and World War II)]. They were hard-headed idealists" (p. 135).

are comprised of single elements or clusters of elements but did not define a specific measurement model.

The model cognitions were adapted from balance theory to measure CD because the theories are complementary explorations of Lewin's (1951) resistance and readiness to change. The primary difference between the described model and other models of CD measurement is that instead of designating one of the cognitions as the main cognition for all possible dissonant and consonant elements within the individual's perception, the described model stipulates that two dissonant objects each be balanced with social reality in their own cluster of elements as Lewin (1936) and Festinger (1957) described (i.e., Lewin's situation in life space, 1936, or Festinger's reality clusters, 1957). Moreover, the distance in semantic space between the degrees of polarization (i.e., associations of the scaled measurements) of the combined meaning of the elements in the reality clusters defines relevance, importance, and the magnitude of the CD.[12]

Current Models of Cognitive Dissonance Estimation

The model in this dissertation asserts that dissonant cognitive objects under consideration (OC) are framed in a unique set of belief elements comprising a dual triad cognition that accounts for CD induction and CD reduction processes. If the CD between two cognitions is measurable, the measurement of the CD between *n* number of dissonant but related cognitions is measurable. Hence, other formulations of CD use quantitative measurements, such as Cassel and Chow (2002), Sakai (1999),

[12] By applying the described measurement model, each dissonant object set in the context of its own reality cluster could be measured in dissonant or consonant relations with other potentially relevant and important object clusters as part of an effort to measure *macro-dissonance* in the individual's perception (cf. Festinger's dissonance ratio, 1957).

Hausknecht, Sweeney, Soutar, and Johnson (1998), Sweeney, Hausknecht, and Soutar (2000), Elliot and Devine (1994), and Shultz and Lepper (1996). These attempts to measure CD differ from the described model in this dissertation because they measured the total CD from the observer's perspective, mixed cognitive meaning with affect and conation of behavior, or do not include social reality.

General measures of CD, such as the DISS cognitive dissonance test, were developed to investigate the construct outside the consumer context (Cassel & Chow, 2002). DISS is a self-administered survey instrument comprised of two hundred true or false questions. Forty-two questions are grouped into twenty-one disparity pairs, which measure disparity between cognitions that express social values, family relationship, and attitudes toward interpersonal relationships. The value of the DISS test resides in the assessment of cognitions that are or can become dissonant under requisite circumstances, which result in CD of sufficient magnitude to trigger CD reduction behaviors. A limitation of the DISS test relative to the model described in this dissertation is that it examines potentially disparate pairs of objects and, therefore, measures CD from the perspective of the observer. Moreover, the implied social context of the disparity pairs is not measured.

Sakai (1999) proposed the multiplicative power function (MPF), a method for calculating the CD between cognitive elements linked in a one-to-many relationship experienced by an observer or perceived by an observed individual. In the MPF model, the key cognition (i.e., K), is any action, behavior, belief or feeling-related cognition. The dissonant cognitions (i.e., D) and the consonant cognitions (i.e., C) are considered as complete cognitive units expressed in sentence form. In the MPF model,

the importance of dissonant cognitions, consonant cognitions, and a key cognition are weighted with theoretical constants that estimate the magnitude of the CD. Given Sakai's (1999) model for calculating the magnitude of CD employing K, CD is calculable from either of the dissonant cognitions by reversing the signs of the consonant or dissonant relations and is comparable across samples and settings. Sakai's (1999) MPF model underscores the functioning of the described CD model in the case that either of the juxtaposed cognitions can be explored as the K element if the D and C information elements are reversed. However, the consideration of the social reality of the SCR was omitted from the MPF model.

Hausknecht et al. (1998) proposed measuring post-purchase CD along three dimensions, two attitudinal dimensions (i.e., emotional and cognitive) and one behavioral dimension (i.e., behavioral pre-disposition to engage in behaviors that can be characterized as CD reduction). The emotional dimension was measured by employing scale items referring to a host of psychological constructs, such as anxiety, frustration, fear, worry, and guilt that were reasonably thought to describe the psychological tension experienced by consumers, if they reconsider a purchase decision. The cognitive dimension was assessed with response items employing verbs (such as thought, realize, know, wondered, hoped, remembered and expected) that capture the cognitive dimensions of CD that are experienced. The behavioral dimension was examined by recording behaviors thought to reduce CD and behavioral intent scales. This method of measuring CD, through emotional and cognitive attitude components, represents an important divergence from previous attempts to measure CD in the respect that the presence of CD reduction behaviors alone is not assumed

evidence of dissonant cognitions. Potential limitations of this method of CD measurement is that CD and affective (i.e., emotional) dissonance are measured together, the CD construct is measured along with other similar constructs (see Appendix A), and the method does not address social comparison factors.

Elliot and Devine (1994) tested a 24-item scale to measure CD in the induced-compliance paradigm, after the CD reduction processes were thought to have taken place, with a series of experiments to examine CD as a motivational state. The scale measured the psychological discomfort experienced by those who consented to compose a counter-intuitive essay. The CD reported by the counter-intuitive essay group exceeded that induced in the intuitive essay group or the no essay group (Elliot & Devine, 1994). Moreover, subjects in the counter-intuitive essay group reported experiencing reduced levels of CD after changing their attitude, which is a postulated CD reduction strategy. While CD was possibly measured with this scale, the measurement was accomplished after the CD induction or reduction processes had taken place and the study did not address how information induced CD or reduced CD.

Shultz and Lepper (1996) proposed a consonance model to measure CD. The consonance model was enumerated as a "constraint satisfaction neural network" (Shultz & Lepper, 1996, p. 219) by employing data simulation using the insufficient-justification (i.e., effort-justification and induced-compliance CD) and free-choice CD paradigms. In this conceptualization, all potentially related dissonant cognitions were mapped and CD reduction was characterized as a progressive application of constraint satisfaction to relevant beliefs and attitudes. Shultz and Lepper (1998) suggested that *elementary* CD exists between two cognitions and *total* CD exists when two

cognitions “are connected to other such cognitions to form a network representing a person’s relevant beliefs and attitudes regarding a particular experimental situation” (p. 222). Shultz and Lepper (1996) noted that since dissonant cognitions are obversely aligned and follow from one another, a pair of cognitions is consonant when one of the cognitions implies the other. The implication being that the opposite of CD is consonance and the opposite of consonance is CD.

While attempts to measure CD have addressed important theoretical problems, it is possible to enhance the power of these approaches by harmonizing cognitive consistency theory (i.e., employing congruity theory to explain balanced cognitions and balance theory to explain DCFs). Some researchers proposed measuring the cognition relative to all other potentially consonant or dissonant cognitions (Read & Miller, 1994; Sakai, 1999; Shultz & Lepper, 1996). Still, other researchers measured potentially dissonant cognitions (Cassel & Chow, 2002) or emotional and cognitive dimensions as representative of the presence of the psychological discomfort and affect (Hausknecht et al., 1998). In contrast with these operationalizations of CD, an observed individual experiences CD subjectively within the perceived (i.e., attributed) social context, and that experience is not easily reconciled with objective measurements of CD from the observer’s perspective. Therefore, past conceptualizations of observed CD lacked the precision necessary to detect low levels of CD induction or make clear distinctions between CD and other similarly-defined constructs; however, the CD measurement model in this dissertation can allow researchers to differentiate CD from similar constructs and can provide more precision in measuring CD induction an reduction.

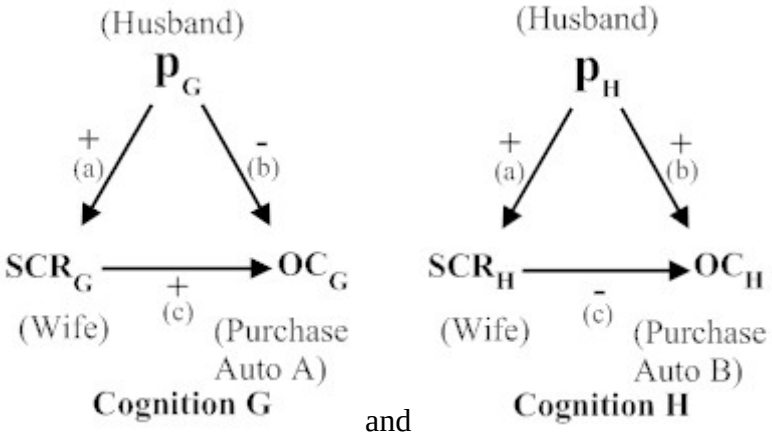
Cognitive Dissonance Between Social Cognitions

For purposes of measuring CD, social cognition is identified in semantic space by the center of polarization of the degrees of polarization from the congruity formula (Osgood & Tannenbaum, 1955). The center of polarization (i.e., changes in associations of the scaled measurements) represents the center of semantic balance and imbalance for the cognition, which is a measure of central tendency for the degrees of polarization of the meaning combinations at the points of congruity resolution. In other words, the center of polarization is the total tendency for the cognition to move in a particular dimension.

For example, in a typical consumer purchase scenario, an imbalance is shown in Figure 8 arising from belief-disconfirmation CD between referent (a), object (b), and social (c) meanings in the evaluative dimension, involving a husband (p), the wife (SCR) and two automobiles considered for purchase (OC), only one of which can be purchased (see entire example in Appendix I: Cognitive Dissonance Example of Brand Loyalty with Endorser during Consumer Purchase). On the left of Figure 8, if the husband's RM (a) toward the wife's SCR_G opinion of purchasing one of two automobiles OC_G is positive, OM (b) toward OC_G is negative, and SM (c) toward OC_G is strongly positive (i.e., + - +), then there is an imbalance in social Cognitive G and CD exists. On the right of Figure 8, if the husband's RM (a) toward the wife's SCR_H opinion of purchasing the other automobile OC_H is positive, OM (b) toward OC_H is negative and SM (c) toward OC_H is positive (i.e., + + -), there is an imbalance in social Cognition H and CD exists. Generally, if one of the degrees of polarization (i.e., associations of the scaled measurements) is substantially different from the other two,

then a state of imbalance exists within the cognition (cf. Heider, 1946).[13] Both cognitions are imbalanced indicating a high level of belief-disconfirmation CD; after the purchase is made, this scenario depicts free-choice CD.

Figure 8: Belief-Disconfirmation Dissonant Cognitive Form (DCF)–Automobile Purchase Alternatives



and

How New Information Shapes Cognitive Dissonance

The receipt of new information changes meaning in the described model of measuring CD at various stages of the cognitive structure, and information does not immediately become consonant or dissonant without being appropriately vetted by an individual within a perceived social context. For example, negative information in Figure 8 about Automobile A, Automobile B, the wife's opinion of either automobile, or regarding the wife's opinions of either automobile can be received. To generate CD, such information must generate incongruence between referent (a), object (b), or social (c) meanings, and unbalance at least one cognition in the DCF. When Festinger (1957) discussed consonant and dissonant cognitions between objects, he inferred that

[13] Alternatively, if one of the meanings, underlying the degree of polarization is negative or three are negative, then a state of imbalance exists; however, if two meanings are negative or three are positive then a state of balance exists within the cognition.

such information operates at the same level of the cognition as the assessment of the objects. This dissertation asserts that the consonant and dissonant cognitions between objects are subordinate to the social cognitions in the described model and that any relationship between the social cognition and dissonant or consonant information is manifested in the meanings within the cognition: referent (a), object (b), and social (c) meanings. The manifestation of the most resistant cognitive element (Festinger, 1957) is in the strength of the meanings of the entire cognition in a social context.

Research Contribution 3. Application of Cognitive Dissonance Instrument to Marketing / Advertising Endorsement Literature

In recent literature, there are several examples of advertising and marketing promotion in which endorsement plays a role in CD induction and CD reduction: Celebrity endorsement (Spry, Pappu, & Cornwell, 2011), sports celebrity endorsement (Koernig & Boyd, 2009), product endorsement, brand endorsement, and brand alliances (Halonen-Knight & Hurmerinta, 2010), celebrity event endorsement (Cunningham, Fink, & Kenix, 2008), corporate event sponsorship (Walker, Hall, Todd, & Kent, 2011), corporate team sponsorship (Pope, Voges, & Brown, 2009), affinity groups (Ka-shing, Fock, & Hui, 2006), political advertising (Veer, Becirovic, & Martin, 2010), and corporate social responsibility campaigns (Bower & Grau, 2009). For the typical endorsement situation, there is a named entity or person who acts as an intermediary and confers attributes on associated beliefs; but unknown spokespersons, voices, fictional characters, or human models can be linked to a product or brand.

When advertising is viewed, the endorser becomes an SCR (see Appendix G: Framing Cognitive Dissonance Measurement as Endorsement), or social context, and the viewer of the ad is faced with assessment (i.e., SM [c]) of what the endorser thinks of product, brand, corporation, event, belief, or social cause featured in the ad. The assessment of what the endorser's opinion means to the viewer is RM (a). Moreover, the assessment of the main theme of the ad by the viewer is OM (b). Lastly, if given time to think about the ad, the viewer assesses, the opposite belief or choice conveyed in the main theme in the ad, including RM (a), SM (c), and OM (b).

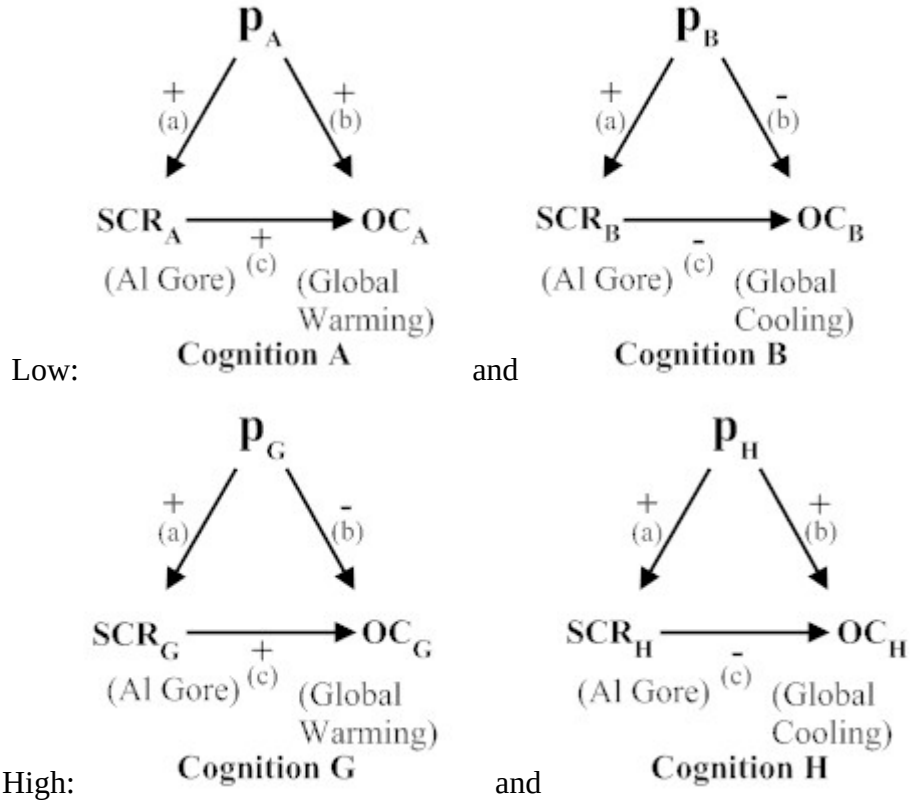
The effect of RM (a) on the attitude toward the ad, brand, or product has been considered primarily as a set of attributes that may or may not be transferable; the presumption in these studies is that SM (c) is positive unless described specifically in the ad. RM (a) has been explored as attractiveness, trustworthiness, and expertise of athlete endorsers (Pikas, Schied, & Pikas, 2012), role model influence (Dix, Phau, & Pougnet, 2010), body shape, (D'Alessandro & Chitty, 2011), excitement/ruggedness, competence/sophistication, and sincerity (Dees, Bennett, & Ferreira, 2010), attractiveness (Liu & Brock, 2011), and facial hair (e.g., beard, mustache, or sideburns) mediating expertise or trustworthiness (Guido, Peluso, & Moffa, 2011).

Other studies considered the effect of endorser attributes on the ad, brand, or product attitude, etc. and found reciprocal transfer effects between OM (b) and RM (a), without direct examination of SM (c). A positive brand image can improve a negative celebrity endorser image and a positive celebrity endorser image can improve a negative brand image (Yang, Lo, & Wang, 2012), and brand credibility has a mediating effect on the relationship of celebrity endorser credibility and brand equity

(Spry, Pappu, & Cornwell, 2011). Moreover, the relationship between OM (b) and RM (a) was investigated as the relationship of endorser attractiveness and endorser expertise on ad attitude (Sallam & Wahid, 2012) and the strength of attachment to a celebrity endorser and attitudes toward the ad and brand (Ilicic & Webster, 2011).

While often not considered in the endorser studies, an approximation of SM (c) was indirectly investigated in a study that found that the effect of an endorser's expertise and trustworthiness with a fear-based ad increased positive thoughts about the endorser more than with a non-fear-based ad (Kim & Lee, 2012). The majority of current endorser studies did not directly measure SM (c), which is a direct assessment of what the endorser was perceived to think about the product or belief, and that could be adjusted by the respondent to reduce CD. To examine CD for an instance of consumer behavior involving multiple social comparison factors (see Figure 7), including an endorser, media-based information about global climate change within simulated headlines was presented to increase and decrease CD according to the example depicted in the scenario in Figure 9. In Figure 9, Mr. Gore is a positive endorser for beliefs about global warming (GW) for a portion of the sample and a negative endorser for the remainder of the sample. In this scenario, an individual who agrees with the SCR's evaluation of dissonant OCs, global warming (GW) and global cooling (GC), experiences low levels of CD in the upper left and upper right of Figure 9. However, the introduction of media information induces CD through imbalanced evaluations of dissonant OCs and relevant SCRs, as shown in the lower left and lower right of Figure 9.

Figure 9: Belief-Disconfirmation Dissonant Cognitive Form (DCF)–Global Warming vs. Global Cooling



To explore CD measurement depicted in Figure 9, the steps outlined by Zaichkowsky (1985) (cf. Churchill, 1979) were generally implemented in this dissertation to construct a measurement instrument for CD using the situations involving the endorser SCR, Mr. Gore. The variables depicted in the figures were measured in anticipation of multiple cognitive shifts upon introduction of information. The DCF situations for the three beliefs (i.e., GW vs. GC, GW vs. no climate change [NC], and NC vs. GC) with two sets of headlines yielded at least six CD situations that could be examined, including the changes in GW meanings before and after the headlines were presented in time periods T0 to T1, T1 to T2, and T0 to T2.

Brand managers and ad agencies often must select among potential endorsers to represent their product, brands, or social marketing causes, etc. This dissertation investigates a model of CD measurement for selecting endorsers, based on consideration of how the respondent reevaluates SM (c), RM (a), and OM (b) to reduce CD for beliefs about global warming. The balance model of CD measurement is a method for assessing what possible celebrity endorser could produce an optimal CD reduction path if the consumer is presented with confirming / disconfirming information about belief in a social cause. It follows that the celebrity or expert endorser, in the role of an SCR, is a specific social context in which information about a brand is interpreted by the consumer. Using this method, the most likely candidates for endorser could be evaluated for changes in SM (c) and RM (a), and the *best* residual effect on OM (b) about a brand with a sample of likely buyers.

Constructs similar to CD have been researched within the frameworks of CD theory, balance theory, congruity theory, and general cognitive consistency theory, with little agreement in the literature about general methodology to measure CD. Festinger (1957) described the importance of social comparison to induce CD and the manipulation of social reality to reduce CD, yet until this dissertation, research has not developed a systematic approach to measuring multivariate CD that accounted for the relevant social context, including celebrity endorsers of a product, brand, event, service, or social marketing cause.

The dissertation suggests how to measure an endorser effect for mutually-exclusive beliefs or product choices, and demonstrates how a series of informational messages can be tested to show a change in the endorser relationship as a social

context and an attitude toward the object (i.e., OM [b]). OM (b) has been explored extensively in the literature, including as endorser expertise with the level of consumer knowledge (Biswas, Biswas, Das, & Neel, 2006) and the congruency of the product with endorser's professional expertise, moderated the favorability of respondents' brand attitude (Siemens et al., 2008). However, the current endorser literature does not examine SM (c), and has limited examination of constructs similar to OM (b) with the portion of RM (a) that relates to evaluation of the SCR's opinion.

Summary and Suppositions

Both of the cognitions in the dissonant cognitive form (DCF) arise from the congruity of interactions between referent (a), object (b), and social (c) meaning. The expansion and contraction of CD between the two cognitions is attributable to the unbalancing and balancing action in the cognitions. For the derivation of the suppositions of the formation and movement of cognitions, Heider (1946) originally defined the p, o, and x cognition as a mechanism of qualitative unbalancing and balancing of positive and negative sentiments. However, the classification of sentiment and meaning as positive or negative, quantitatively proposed by Osgood and Tannenbaum (1955) depends upon the scale chosen. Therefore, the favored interpretation of Heider's (1946) conditions of imbalance is that cognitive forces interact through relative rather than absolute differences in meaning.

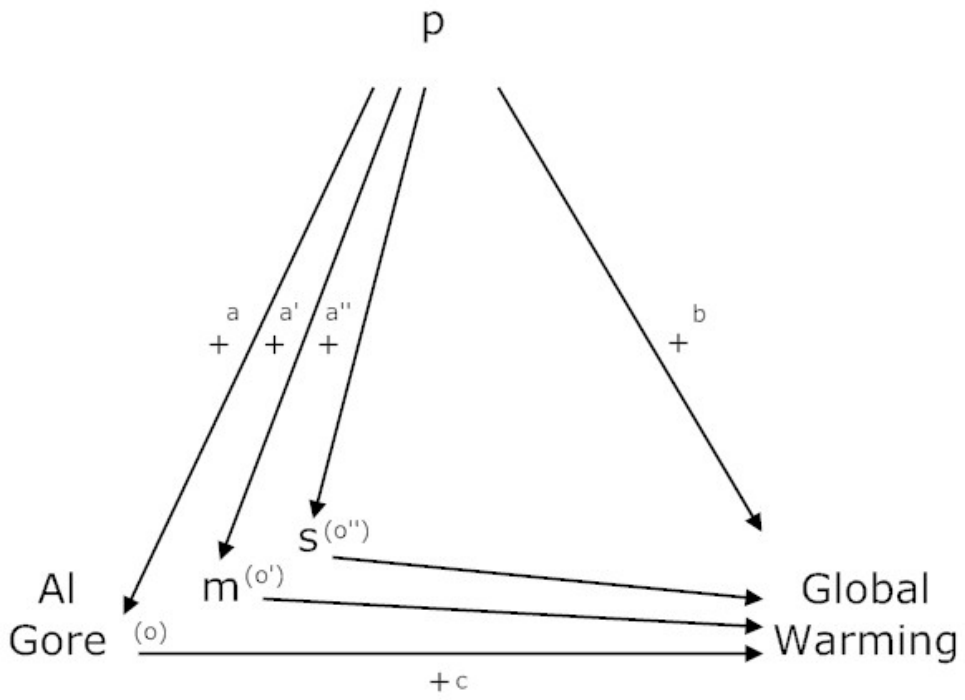
Summary of the Described Measurement Model

Given the unified cognitive consistency theories discussed in this dissertation, a harmonized model of CD was applied to the problem of developing a measurement instrument. In Chapter 3, beliefs about global climate change will be examined. It is

difficult to hold simultaneously supporting beliefs for global warming (GW) and global cooling (GC) without experiencing psychological discomfort. To measure CD for this instance of beliefs associated with consumer behavior, suggested by the multiple social comparison factors described in Figure 7, media information about global climate change was presented to increase and decrease CD according to the example depicted in the scenario in Figure 9. It is expected that low levels of CD are experienced when beliefs about GW (top left in Figure 9) and GC (top right in Figure 9) are balanced for the SCR, after the introduction of information attributed to media sources. It is expected that high levels of CD are experienced when beliefs about GW (lower left in Figure 9) and GC (lower right in Figure 9) are unbalanced for the SCR, after the introduction of information that is attributed to media sources.

As described in the next chapter, for Figure 9, the variables depicted in the Figure 10, Figure 11, and Figure 12 were measured in anticipation of multiple cognitive shifts upon introduction of information, but the CD effect is evidenced in the variables measured for GW across repeated measures: GWoT0, GWoT1, and GWoT2.

Figure 10: One-Half Dissonant Cognitive Form (DCF) for Testing Sensitivity of Measurement Instrument–Global Warming



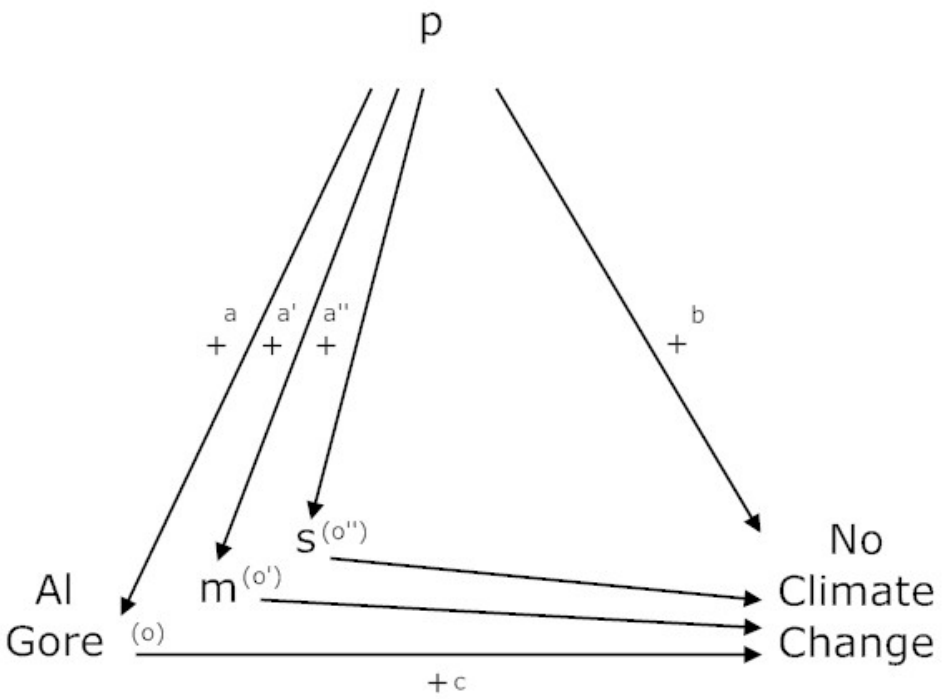
The half DCF in Figure 10 depicts a situation involving hypothesized multidimensional (i.e., scales) and multi-relational (i.e., multiple-SCRs) measurement of CD. RM (a) was measured for Mr. Al Gore (o), former U.S. Vice President and 2007 Nobel Peace Prize co-winner,[14] the media publication source of the information (o'), and the attribution source quoted for the information (o''), after the presentation of two sets of headlines.

RM (a, a', and a'') is measured for each potential SCR in the perceived social situation, which is represented by the DCF to ascertain relative social power of the entities. OM (b) is measured for each headline relative to GW and is measured once

[14] Former U.S. Vice President Gore was selected as an endorser/SCR for this research, because of his prominent advocacy of public action on global climate change.

for the situation by each DCF, because the situation for each SCR is identical. SM (c) is measured only for Mr. Gore (o) and is measured once for the situation for each triad. The measurements of a, a', a'', b, and c for each set of headlines provide the bases for understanding possible imbalance associated with belief in GW in the most likely social context for the sample.

Figure 11: One-Half Dissonant Cognitive Form (DCF) for Testing Sensitivity of Measurement Instrument–No Climate Change

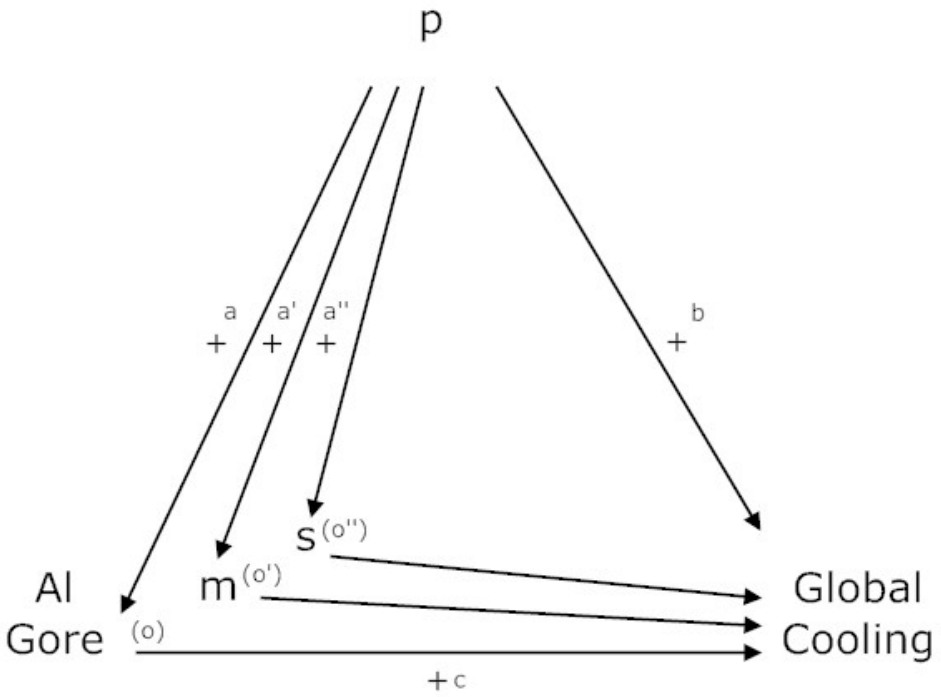


The measurement of the half DCF associated with GW in Figure 10 is repeated for NC in Figure 11 and GC in Figure 12. The measurements of DCFs for GW, NC,[15] and GC are accomplished with two sets of headlines and yielded at least six CD

[15] A belief in no climate change is thought to be a *logical midpoint* between belief in global warming and global cooling. Hence, dissonance between global warming and no climate should be induced when information induces cognitive dissonance between global warming and global cooling but to a lesser degree of magnitude (see Appendix F: A Procedure for Diagramming Dissonant Cognitive Forms [DCF]).

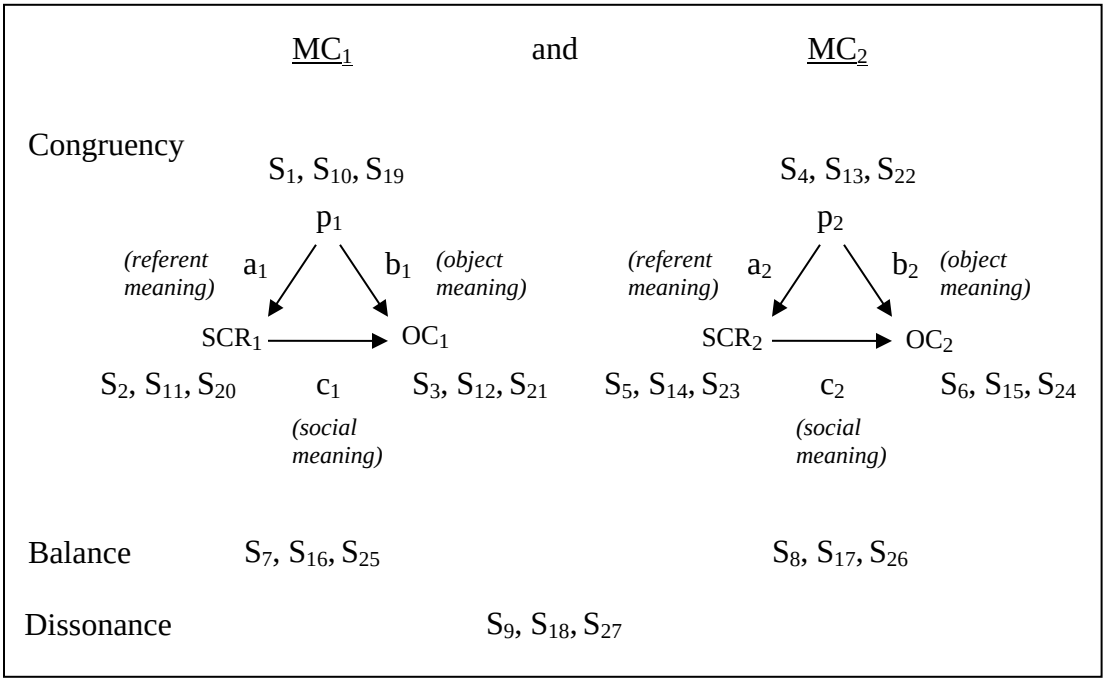
measurements (i.e., GW vs. GC, GW vs. NC, and NC vs. GC), but examination of GW at T0, T1, and T2 demonstrated the induction of CD in the measured variables.

Figure 12: One-Half Dissonant Cognitive Form (DCF) for Testing Sensitivity of Measurement Instrument–Global Cooling



In Figure 13, the specific measurements necessary to test the described model are shown, suppositions addressing each hypothesized dimension of semantic space are enumerated (S_1- S_9: Evaluative Dimension, S_{10}-S_{18}: Activity Dimension, and S_{19}-S_{27}: Potency Dimension) in Figure 13.

Figure 13: Model Cognitions MC_1 and MC_2–Described Model of Cognitive Dissonance Measurement in Evaluative, Activity, and Potency Dimensions



The model for CD is described in Figure 13 where:

- MC_1–On the left, the first triad cognition to be considered simultaneously, consisting of p_1, SCR_1, and OC_1 joined by associated meanings of a_1, b_1, and c_1.
- MC_2–On the right, the second triad cognition to be considered simultaneously, consisting of p_2, SCR_2, and OC_2 joined by associated meanings of a_2, b_2, and c_2.
- p_1, p_2–The perspective of the observed individual (i.e., person) in the cognitions, as distinguished from a third-party observer.
- SCR_1, SCR_2–The most likely social comparison referent (SCR) or external source of information at the instant of measurement for the cognition (e.g., media, attributed sources, or the researchers themselves). The SCR is the entity with which the observed individual's own perceptions are compared (i.e., Festinger's,

1957, physical, social, or psychological reality or a source of information about the object.)

- OC_1, OC_2–The object under consideration (OC) in the cognitions. The cognitions could have different objects, but the obverse of an object must follow logically or psychologically from the object in the other cognition (Festinger, 1957).
- a_1, a_2–Referent Meaning (RM). The meaning of the SCR or external source of information to the observed individual (p) in the cognitions, as measured by the average of the semantic differential scales (i.e., the meaning of Festinger's, 1957, physical, social, or psychological reality to the individual).
- b_1, b_2–Object Meaning (OM). The meaning of the object to the observed individual (p) in the cognitions, as measured by the average of the semantic differential scales. For example, not how an observed individual (p) feels about the object but what it means in relation to other objects (i.e., the assessment of the individual without consideration of individual perceptions of self.)
- c_1, c_2–Social Meaning (SM). The meaning of the object to the SCR or external source of information in the cognitions from the perspective of the observed individual (p), as measured by the average of the semantic differential scales (i.e., the meaning of the object to Festinger's, 1957, physical, social, or psychological reality).

Suppositions of the Described Measurement Model

Formula 1: Degree of Polarization (Partial Least Squares [PLS] β Coefficients)

In Figure 13, according to the congruity principle, the degree of polarization (i.e., associations of the scaled measurements) of the point of congruity resolution

between simultaneously decoded meanings determines the congruity or incongruity of source-object assertions (Osgood & Tannenbaum, 1955). There are three coordinates representing the degree of polarization of the point of meaning resolution for referent (a), object (b), and social (c) meanings for each cognition and in the evaluative, activity, and potency dimensions (e.g., three meaning combinations multiplied by three dimensions multiplied by two cognitions for 18 degrees of polarization of the points of meaning combination). The degree of polarization is estimated with the following weighted average equation (i.e., the congruity formula) restated by Osgood et al. (1957, p. 207), "$Pr = ((|p_1| / (|p_1| + |p_2|)) \times p_1) + ((|p_2| / (|p_1| + |p_2|)) \times p_2)$". The degree of polarization will be measured with the PLS β coefficients.

Formula 2: Center of Polarization (Changes in Partial Least Squares [PLS] β Coefficients)

In Figure 13, according to the suppositions of this dissertation and as defined by the author, the center of polarization (i.e., changes in associations of the scaled measurements) is the mathematical center of the importance of the system of coordinates representing the degrees of polarization of the points of meaning resolution for Cognitions MC_1 or MC_2 in each of the three hypothesized dimensions: evaluative, activity, and potency. For the described model of CD, the mathematical definition of the estimate of the center of polarization is the average of the absolute values of the degrees of polarization minus the average of the summated scales, which were measured with changes in significance of PLS β coefficients.

Suppositions Derived from Congruity Theory

Osgood and Tannenbaum (1955) proposed that the congruity formula (see Figure 2) measures the degree of polarization (i.e., associations of the scaled

measurements) of the point of congruity resolution of two meanings. The congruity principle represents semantic combination for a source and concept, but the algorithm holds for the described model depicted in Figure 13 given:

- Imbalance, incongruence, and CD were measured using the semantic differential in three hypothesized dimensions: evaluative, activity, and potency.
- The meaning of SCR (i.e., RM [a]), the meaning of the OC (i.e., OM [b]) and the meaning of the SCR's assessment of the OC (i.e., SM [c]) combine as in Figure 2 for the sample.
- The valence of the semantic differential for the scale is positively-trending when the average values are six (6) to ten (10). Moreover, the valence of the semantic differential is negatively-trending when the average values are one (1) to five (5).
- The order of the assessments of referent (a), object (b), and social meaning in the cognition is unimportant, but were asked in the order of object (b) meaning, social (c) meaning, social meaning; the order of paired combinations of meanings in the survey instrument are unimportant for formation of the degrees of polarization.
- The weighted average of the degrees of polarization that comprise the center of polarization for the cognition reflects equivalent perceived importance of the referent (a), object (b), and social (c) meanings, but it is possible for other psychological constructs to influence the weighting of the degrees of polarization.
- The incongruity, unbalancing, and CD induction processes are linear and equivalent in all three hypothesized dimensions: evaluative, activity, and potency.
- The congruity, balancing, and CD reduction processes are linear and equivalent in all three hypothesized dimensions: evaluative, activity, and potency.

With consideration of the above assumptions in Figure 2 and Figure 13, the following suppositions define the simultaneous interaction of referent (a), object (b), and social (c) meanings within an associative source-object assertion process (Osgood et al., 1957). Each unit of the cognitions in Figure 13 has meaning associated with it in the social context, and these meanings combine to form the meaning of the cognition in each of the three hypothesized dimensions. When the meaning of the social comparison referent (SCR) to the person (i.e., RM [a_1]) is considered simultaneously with the meaning of the object to the person (i.e., OM [b_1]), differences in the meaning of a_1 and b_1 will result in incongruity as measured by the degree of polarization of the points of meaning resolution. In any of the hypothesized dimensions, if the aggregate scale scores for RM (a_1) are negative or relatively different from OM (b_1), or if the aggregate scales for OM (b_1) are negative or relatively different from RM (a_1), then the incongruence will result in imbalance for the Cognition MC_1 in Figure 13.

- S_1, S_{10}, and S_{19} (Congruity Theory): As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in each dimension of Cognition MC_1, the PLS β coefficient for the combination of referent meaning (a) and object meaning (b) will increase.

When OM (b_1) is held constant, and RM (a_1) and SM (c_1) are considered simultaneously, differences in aggregated scales for a_1 and c_1 result in incongruity as measured by the degree of polarization and imbalance in the first Cognition MC_1 in Figure 13.

- S_2, S_{11}, and S_{20} (Congruity Theory): As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in

each dimension of Cognition MC_1, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase.

When RM (a_1) is held constant, and OM (b_1) and SM (c_1) are considered simultaneously, relative differences in aggregated scales for b_1 and c_1 result in incongruity as measured by the degree of polarization and imbalance in Cognition MC_1 in Figure 13.

- S_3, S_{12}, and S_{21} (Congruity Theory): As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in each dimension of Cognition MC_1, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase.

When SM (c_2) is held constant and RM (a_2) and OM (b_2) are considered simultaneously, relative differences in aggregated scales for a_2 and b_2 result in incongruity as measured by the degree of polarization and imbalance in Cognition MC_2 in Figure 13.

- S_4, S_{13}, and S_{22} (Congruity Theory): As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in each dimension of Cognition MC_2, the PLS β coefficients for the combination of referent meaning (a) and object meaning (b) will increase.

When OM (b_2) is held constant and RM (a_2) and when SM (c_2) are considered simultaneously, relative differences in aggregated scales for a_2 and c_2 result in incongruity as measured by the degree of polarization and imbalance in Cognition MC_2 in Figure 13.

- S_5, S_{14}, and S_{23} (Congruity Theory): As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in each dimension of Cognition MC_2, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase.

When RM (a_2) is held constant, and OM (b_2) and SM (c_2) are considered simultaneously, relative differences in aggregated scales for b_2 and c_2 result in incongruity as measured by the degree of polarization and imbalance in Cognition MC_2 in Figure 13.

- S_6, S_{15}, and S_{24} (Congruity Theory): As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in each dimension of Cognition MC_2, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase.

Suppositions Derived from Balance Theory

As depicted in Figure 5, the meanings within paired cognitions for the described model of CD in Figure 13 tend toward balance to form the center of polarization (see Formula 2), when the degrees of polarization (see Formula 1) of Cognitions MC_1 or MC_2 approach each other. In the hypothesized evaluative, activity, and potency dimensions, a balanced state in cognitions MC_1 or MC_2 exists:

1. If RM (a_1) is positive, OM (b) is positive, and SM (c) is positive (i.e., Cognition A: + + +);
2. If RM (a_1) is positive, OM (b) is negative, and SM (c) is negative (i.e., Cognition B: + - -);

3. If RM (a_1) is negative, OM (b) is positive, and SM (c) is negative (i.e., Cognition C: - + -);
4. If RM (a_1) is negative, OM (b) is negative, and SM (c) is positive (Cognition D: - - +).

- S_7, S_{16}, and S_{25} (Balance Theory): In each dimension of cognitions MC_1 or MC_2, if the three PLS β coefficients are significant, then the *center of polarization* will tend to move toward changing PLS β coefficients to become insignificant.

As depicted in Figure 6, the meanings within paired cognitions for the described model in Figure 13 tend toward imbalance to form the center of polarization (see Formula 2), when the degrees of polarization (see Formula 1) of Cognitions MC_1 or MC_2 move away from each other. In the hypothesized evaluative, activity, and potency dimensions, an unbalanced state in Cognitions MC_1 or MC_2 exists:

1. If RM (a_1) is negative, OM (b) is negative, and SM (c) is negative (i.e., Cognition E: - - -);
2. If RM (a_1) is negative, OM (b) is positive, and SM (c) is positive (i.e., Cognition F: - + +);
3. If RM (a_1) is positive, OM (b) is negative, and SM (c) is positive (i.e., Cognition G: + - +);
4. If RM (a_1) is positive, OM (b) is positive, and SM (c) is negative (Cognition H: + + -).

- S_8, S_{17}, and S_{26} (Balance Theory): In each dimension of cognitions MC_1 or MC_2, if the three PLS β coefficients are insignificant, then the *center of polarization* will tend to move toward the changing PLS β coefficients to become significant.

Postulates Derived from Balance Theory

The postulates of Balance Theory are shown in Table 2.2. Each of the resolution strategies for the balanced and unbalanced triad cognitions are depicted in 64 combinations without considering measurement in three hypothesized dimensions. Table 2.2 describes how cognitions can become cognitively equivalent to other cognitions through the resolution of each of the three meanings. The process of balancing the cognitions implies the simultaneous juxtaposition of cognitions in a CD-inducing relationship, a relationship that provides motivation to restore the balance and thereby reduce the CD.

Table 2.2: *Postulates of Balance Theory by Degree of Imbalance*

Postulates of Balance Theory	A (+ + +)	B (+ - -)	C (- + -)	D (- - +)	E (- - -)	F (- + +)	G (+ - +)	H (+ + -)
A (+ + +)	~ ~ ~	~ ^ ^	^ ~ ^	^ ^ ~	^ ^ ^	^ ~ ~	~ ^ ~	~ ~ ^
B (+ - -)	~ ^ ^	~ ~ ~	^ ^ ~	^ ~ ^	^ ~ ~	^ ^ ^	~ ~ ^	~ ^ ~
C (- + -)	^ ~ ^	^ ^ ~	~ ~ ~	~ ^ ^	~ ^ ~	~ ~ ^	^ ^ ^	^ ~ ~
D (- - +)	^ ^ ~	^ ~ ^	~ ^ ^	~ ~ ~	~ ~ ^	~ ^ ~	^ ~ ~	^ ^ ^
E (- - -)	^ ^ ^	^ ~ ~	~ ^ ~	~ ~ ^	~ ~ ~	~ ^ ^	^ ~ ^	^ ^ ~
F (- + +)	^ ~ ~	^ ^ ^	~ ~ ^	~ ^ ~	~ ^ ^	~ ~ ~	^ ^ ~	^ ~ ^
G (+ - +)	~ ^ ~	~ ~ ^	^ ^ ^	^ ~ ~	^ ~ ^	^ ^ ~	~ ~ ~	~ ^ ^
H (+ + -)	~ ~ ^	~ ^ ~	^ ~ ~	^ ^ ^	^ ^ ~	^ ~ ^	~ ^ ^	~ ~ ~

In Table 2.2, where "~" represents no difference in sign and "^" represents a difference in the sign of the referent (a), object (b), and social (c) meanings shown in Figure 2, the upper left hand quadrant represents the interaction of two balanced structures, which is the low CD condition. The lower left hand and upper right hand quadrants represent the interaction of one balanced structure and one unbalanced

structure, which are the high CD conditions. The lower right hand quadrant represents the interaction of two unbalanced structures, which is the highest CD condition.

Suppositions Derived from Cognitive Dissonance Theory

A consonant or dissonant relationship between the cognitions is experimentally supported under the following circumstances. The paired cognitions tend toward consonance, when the centers of polarization (see Formula 2) of Cognition MC_1 and Cognition MC_2 in Figure 13 approach each other. Moreover, the paired cognitions should tend toward CD, when the centers of polarization of the first and second cognition approach each other. In Table 2.2, the rows of the table represent the first cognition (MC_1) and the columns represent the second cognition (MC_2). The manner in which participants in CD experiments have engaged in CD reduction provides some insights into the structure of cognitions that can be affected by dissonant meanings. The simultaneous consideration of these cognitive combinations inevitably results in one or both of the compared cognitions being out of balance. When cognitions are psychologically (or logically linked through relevance), out of balance cognitions can generate psychological discomfort known as CD.

- S_9, S_{18}, and S_{27} (Dissonance Theory): In each dimension of cognitions MC_1 and MC_2, as the centers of polarization increase due to the manipulated factors, the level of cognitive dissonance will increase; and as the centers of polarization decrease due to the manipulated factors, the level of cognitive dissonance will decrease.

Postulates Derived from Cognitive Dissonance Theory

Cognitive Dissonance (CD) reduction strategies chosen by individuals provide the researcher with insights into how dissonant cognitive forms (DCF) are structured in semantic space. From balance theory, sixty four (64) possible instances of paired cognitions are postulated (see Table 2.2) in which CD is experienced, with sixteen (16) being no or low CD conditions, thirty two (32) being moderate CD conditions and sixteen (16) being high CD conditions.

The specific DCF of the CD differs depending on the configuration of the underlying cognitions. The variations in combinations of meanings and the magnitudes of the degrees of polarization results in differing manifestations of CD in the three hypothesized dimensions, as anticipated by the DCFs depicted in Appendix B Table B1. Sixteen of the combinations (i.e., shown in the upper left hand quadrant) are the result of interaction between the two balanced cognitions shown in Table 2.2, which are the low CD conditions. Thirty-two of the combinations involve the interaction of one balanced and one imbalanced condition (i.e., shown in the lower left hand and upper right hand quadrants), exhibit measurable levels of CD. Sixteen of the combinations are double-imbalanced conditions (i.e., shown in the upper right hand quadrant) that require more complex resolution strategies. For consumer behavior contexts (implied by the juxtapositions shown in Table 2.2), the following postulates are derived from CD theory and the juxtaposition of DCF enumerated in Appendix B Table B1 in the order of the DCFs, from highest CD to lowest:

- Low levels of CD exist when two balanced cognitions are considered simultaneously due to differences in magnitude of referent (a), object (b), and social (c) meanings.
- Low levels of CD exist when equivalent cognitions are considered simultaneously (e.g., Cognition A and Cognition A).
- Low levels of CD exist when balanced cognitions are considered simultaneously (e.g., Cognition A and Cognition B, Cognition C, or Cognition D).
- Medium levels of CD exist when a balanced cognition is considered simultaneously with an unbalanced cognition (e.g., Cognition A and Cognition G).
- High levels of CD exist when two unbalanced cognitions are considered simultaneously (e.g., Cognition F and Cognition G).
- The level of CD between cognitions increases when the strength of referent (a), object (b), or social (c) meaning shifts away from the other two meanings.
- The level of CD between cognitions decreases when the strength of referent (a), object (b), or social (c) meaning moves toward the other two meanings.
- CD results from one, two, or three meaning changes, to resolve the balance and decrease the CD.
- In the author's opinion, in the belief-disconfirmation paradigm, the order of the CD reduction strategies that are most efficacious are: (1) SM (c); (2) RM (a); and (3) OM (b). In the free-choice paradigm, the CD reduction strategies that are most efficacious are: (1) OM (b); (2) SM (c); and (3) RM (a).

The postulates of CD theory suggest that the interaction of balanced and unbalanced cognitive forms with the social context of endorsement create CD in predictable

patterns of meaning when individuals think about buying situations and that the CD may be reduced in predictable patterns. The existence of dissonant cognitive forms (DCF) suggests that different manifestations of CD may be reduced with the same CD reduction paths.

CHAPTER 3: METHODOLOGY

The purpose of this chapter is to describe the research methods chosen to investigate cognitive dissonance (CD) for the theoretical background presented in the literature review. The research design, measures, indicators, and variables (e.g., mediating and moderating variables) used to test the sensitivity of the instrument are described. The sample, research procedures, and data collection activities are outlined.

The belief-disconfirmation paradigm of CD was investigated by examining beliefs about global climate change, which has been marketed as an important environmental issue by supporters and as a social issue associated with *alarmist science* (Crichton, 2004) by detractors. Global climate change was chosen because of the availability of an informed sample that could experience CD uniformly; global climate change is an enormously complex topic but consumer product companies are increasingly basing decisions upon consumer beliefs about this subject, especially business-to-consumer firms that service food, clothing, housing, transportation, and recreation-based needs. Global climate change was explored by examining beliefs about global warming (GW), global cooling (GC), and no climate change (NC).

Zaichkowsky's (1985) steps[16] generally were used to assess the validity and to test the reliability of the scales in the survey instrument:

- The construct of CD was defined in Chapter 2 of this dissertation;
- The scale items in the survey instrument were defined relative to the measurement of referent (a), object (b), and social (c) meanings, and CD induced from the interaction of imbalanced meanings;

[16] Zaichkowsky's (1985) steps are a variant of the eight (8) steps outlined by Churchill (1979) to measure marketing constructs.

- The content validity of the scale items were evaluated by the author and the dissertation committee;
- The internal reliability of the scale items was determined from the sample data;
- The stability over time of the internally reliable scale items was determined using a test-retest research design;
- The content validity of the selected scale items was refined in the research process;
- The criterion-related validity of the scale to discriminate between CD arising from imbalances in referent (a), object (b), and social (c) meanings was measured;
- The construct validity of the scale was tested by gathering data from respondents.

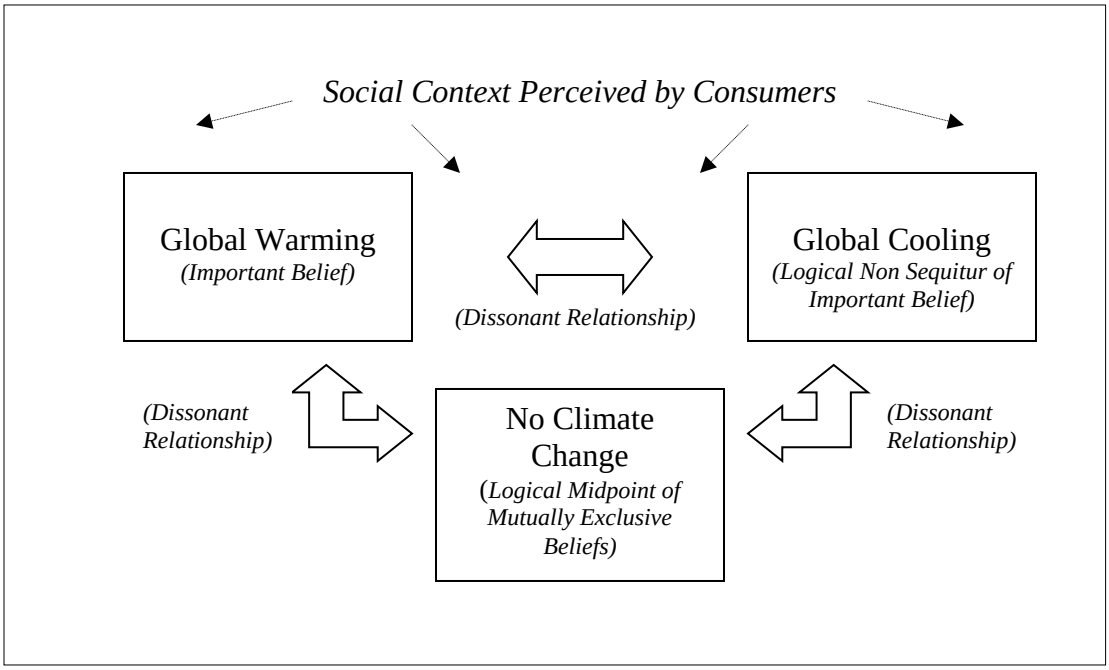
Research Design

To minimize threats to internal validity and order of effects bias, a randomized procedure (Shadish, Cook, & Campbell, 2002) in a 6-2 quarter fractional factorial design with sixteen (16) groups was used to examine belief-disconfirmation CD using simulated headlines about global climate change.[17] Figure 14 portrays the dissonant cognitive form (DCF) that is measured and tested for sensitivity with positive or negative headlines (see Appendix D Table D1). Friends, family members, groups, or society are often selected as likely SCRs for the evaluation of information about brands and consumer issues; however, the name of a significant SCR (i.e., Mr. Gore) was supplied in the survey instrument. The dissonant relationships of the beliefs

[17] The 6-2 provides an opportunity to test the instrument for test-retest reliability. The nomenclature of fractional factorial designs is derived from a 6 x 2 full factorial design that employs 64 runs due for two factor levels raised to the sixth power (Anderson & Whitcomb, 2000; Montgomery, 1984). However, the orthogonality of conducting an experiment with every conceivable combination of factors and levels is challenged by the expense of drawing such a large sample such as 30 x 64 = 1920 respondents. The 6-1 half fractional factorial design overlooks many unnecessary combinations of factors and levels in 32 runs. The chosen 6-2 quarter fractional factorial design tests in 16 runs (i.e., groups) the main effects the full 6 x 2 factorial design. The optional and less powerful 6-3 fractional factorial design in 8 runs tests some of the main effects of the full 6 x 2 factorial design.

shown in Figure 14 were altered for respondent groups by the simulated headlines (see Appendix D Table D1).

Figure 14: Belief-Disconfirmation–Dissonant Beliefs Associated with Global Climate Change in Perceived Social Context



Sample Size Estimation

An appropriate sample size was estimated to be 480 (i.e., sixteen [16] multiplied by thirty [30]). In estimating the sample size needed for using a power test, Hair, Anderson, Tatham, and Black (1998) recommended achieving at least the 0.80 power level. The size of the treatment groups was selected for the power (i.e., β or Type II error) of the most restrictive suppositions in this study (i.e., S7, S16, S25, S8, S17, and S26). Using the statistical power calculator found at DSS Research (Home page, n.d.) with a one-tailed test, significance level of 0.05, and sample sizes of thirty (30) for the first group and thirty (30) for the second group, the statistical power of the

test is estimated at 82.6%. Therefore, using a quarter fractional factorial design required thirty (30) times sixteen (16) = 480 respondents to complete this study.

Procedure for Collecting Data

The data collection procedure employed sixteen (16) groups of thirty (30) respondents each (i.e., 480 total respondents) in a 6-2 quarter fractional factorial design (Montgomery, 1984), as depicted in Table 3.1. Design-Expert (for designing experiments) from StatEase.com (Home page, n.d.) was used to construct the groups to test the sensitivity of the instrument (see Appendix E Table E4) based on headline interactions with multiple factors (Anderson & Whitcomb, 2000), as summarized in Table 3.1. The full texts of the simulated headlines containing the factor interactions to induce or reduce CD are shown in see Appendix D Table D1. Respondents were randomly assigned based on the initial degree of belief in the occurrence of global warming (GC) (i.e., initial position [IP]) to either an IPPro or IPCon group and the date the respondent enlisted in the research program (see Appendix F Table F1). In Table 3.1 and Appendix D Table D1, each group received a negative-information headline or a positive-information headline depending on the headline interaction shown in the headline effect column.

Table 3.1: *6-2 Quarter Fractional Factorial Research Design*[18]

Group / Run	Headline Effect (from Appendix D Table D1)	Factor 1 A:B1 Valence (Message Tone)	Factor 2 B:B1 Media Publication	Factor 3 C:B1 Attribution Source	Factor 4 D:B2 Valence (Message Tone)	Factor 5 E:B2 Media Publication	Factor 6 F:B2 Attribution Source
1	F & A	B1 Pro	B1 NE	B1 Russian	B2 Pro	B2 WSJ	B2 American
2	A & G	B1 Pro	B1 WSJ	B1 American	B2 Con	B2 WSJ	B2 Russian
3	G & C	B1 Con	B1 WSJ	B1 Russian	B2 Con	B2 WSJ	B2 American
4	H & H	B1 Con	B1 NE	B1 Russian	B2 Con	B2 NE	B2 Russian
5	E & F	B1 Pro	B1 WSJ	B1 Russian	B2 Pro	B2 NE	B2 Russian
6	C & H	B1 Con	B1 WSJ	B1 American	B2 Con	B2 NE	B2 Russian
7	F & G	B1 Pro	B1 NE	B1 Russian	B2 Con	B2 WSJ	B2 Russian
8	H & B	B1 Con	B1 NE	B1 Russian	B2 Pro	B2 NE	B2 American
9	B & D	B1 Pro	B1 NE	B1 American	B2 Con	B2 NE	B2 American
10	B & F	B1 Pro	B1 NE	B1 American	B2 Pro	B2 NE	B2 Russian
11	C & B	B1 Con	B1 WSJ	B1 American	B2 Pro	B2 NE	B2 American
12	A & A	B1 Pro	B1 WSJ	B1 American	B2 Pro	B2 WSJ	B2 American
13	G & E	B1 Con	B1 WSJ	B1 Russian	B2 Pro	B2 WSJ	B2 Russian
14	E & D	B1 Pro	B1 WSJ	B1 Russian	B2 Con	B2 NE	B2 American
15	D & E	B1 Con	B1 NE	B1 American	B2 Pro	B2 WSJ	B2 Russian
16	D & C	B1 Con	B1 NE	B1 American	B2 Con	B2 WSJ	B2 American

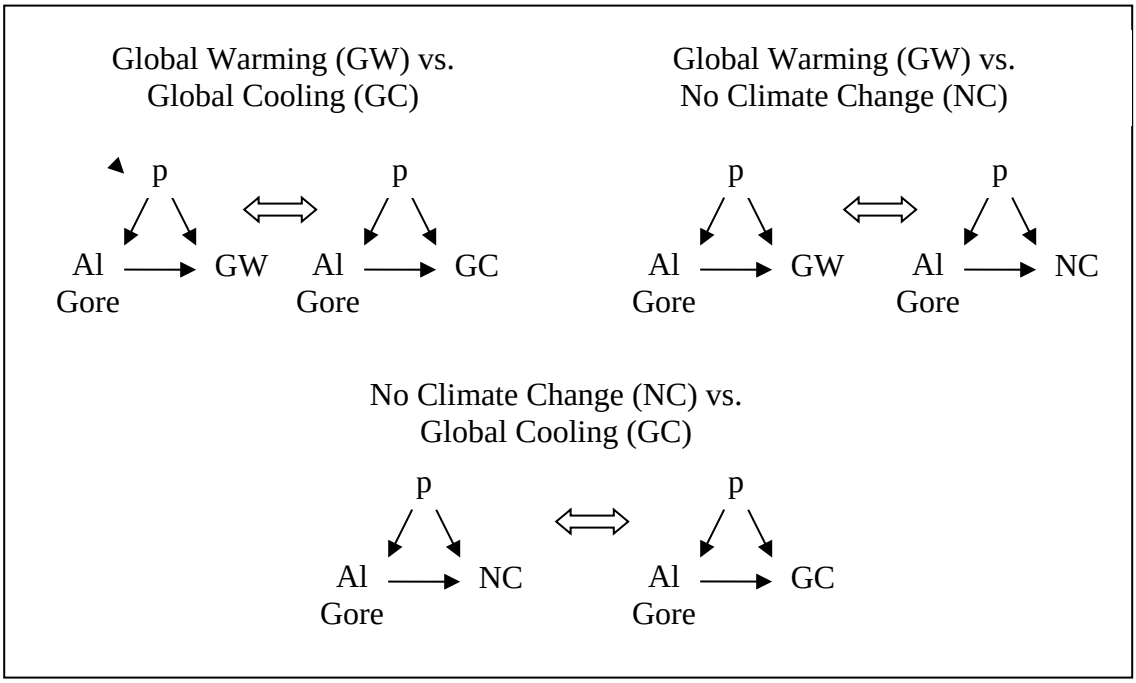
Data for three distinct beliefs associated with global climate change were collected to measure CD as objects under consideration (OC) (see Figure 14): GW, GC, and no climate change (NC). The OC were described with the procedure for diagramming dissonant cognitive forms (DCF) in Appendix C. The opposite of belief in GW for global climate change is belief in GC. A belief in GW is psychologically uncomfortable when compared to a belief in GC; the moderated position between the two extreme positions is a belief that NC is occurring (see Figure 14). That is, belief in GW is dissonant with belief in GC, and the logical midpoint between the two

[18] Table 3.1 describes the interaction between the simulated headlines and the factors being tested in the sample groups. The valence (tone) of the message was either supportive of Global Warming (i.e., Pro) or against Global Warming (i.e., Con). The Media Publication was either National Enquirer (i.e., NE) or Wall Street Journal (i.e., WSJ). The Attribution Source was either the fictitious Russian Academy of Environmental Science (i.e., RAES) or the fictitious American Academy of Environmental Science (i.e., AAES).

dissonant beliefs is belief in NC. Belief in NC is also dissonant with GW and GC. Data for GW were collected before a simulated headline was presented; data for GW, GC, and NC were collected after a simulated headline was presented. Data for GW, GC, and NC were then measured after a second simulated headline was presented.

This dissertation measures four sets of dissonant cognitions (see Figure 13 and Figure 15): GW at T0 vs. GW at T1 vs. GW at T2, GW vs. GC at T1 and T2, GW vs. NC at T1 and T2, and NC vs. GC at T1 and T2. Simulated headlines (see Appendix D Table D1) were shown to respondents to test the sensitivity of the instrument (see Appendix E Table E4), with the expectation of shifts in all three dissonant pairs of cognitions in three hypothesized dimensions of the semantic differential scales: evaluative, activity, and potency.

Figure 15: Belief-Disconfirmation–Measurement of Dissonant Beliefs Associated with Global Climate Change with former U.S. Vice President Al Gore as Social Comparison Referent (SCR)



A factorial repeated measures, experimental design made possible the opportunity to present respondents with a headline containing information comprised of manipulated factors that either induces CD, reduces CD, both or neither, with the smallest possible sample. Each headline in Appendix D Table D1 contains basic components of beliefs that are associated with global climate change. The components of the headline are the content, valence (i.e., tone of the message being pro/positive/supporting or con/negative/non-supporting), the media publication, and the attribution source. The factors valence, media publication, and media attribution source were controlled in the research design because the test and retest blocks comprised six factors (see Table 3.1).

The variations in content of the simulated headlines summarized in Table 3.1 induced or reduced CD via descriptions of fictitious temperature data over the last fifty years. The induction and reduction of CD was dependent on whether the headlines about temperature data were believed. While there are many sets of reported evidence in the news media regarding global climate change, the connection between temperatures and warming or cooling was judged by the author and the dissertation committee to be straightforward and requiring no special explanation to respondents. The positive or negative valence of the message represented either supporting or non-supporting information relative to respondents' initial belief. The media publication source of the message was either a high or low credibility publication; The Wall Street Journal (WSJ), a respected business publication, was used as the credible business media publication and the National Enquirer (NE), a supermarket tabloid, was used as the less credible media publication. The attribution source of the information in the research was either a high or low credibility third party; the fictitious *American Academy of Environmental Science* (AAES) served as the credible media attribution source, while the fictitious *Russian Academy of Environmental Science* (RAES) served as the less credible media attribution source.

The dissonant or consonant information presented in the research was presented in the introduction to the survey and in the simulated science news headlines as shown in Appendix D Table D1, with each group receiving varying combinations of the factors. The survey instrument shown in Appendix E Table E4 provided introductory information about, GW, GC, and NC. For example, when juxtaposing the beliefs of GW and GC with an SCR that supports respondents' views, CD was

expected to be low (see Figure 9). The dissonant cognitive form (DCF) was thought to resemble Cognition A (+ + +) (in the top left of Figure 9) and Cognition B (+ - -) (in the top right), where SCR_A was a chosen SCR (i.e., Mr. Gore), SCR_B was the same chosen SCR (i.e., Mr. Gore), OC_A was GW, OC_B was GC and both cognitions were balanced. The *Con* headline introduced negative information about GW. With indicated initial support for GW by the respondent, after the respondent received GW negative information, OM (b) was expected to shift and the high CD condition was expected to exist (see Figure 9). In the high CD condition, the DCF was thought to resemble Cognition G (+ - +) (in the lower left of Figure 9) and Cognition H (+ + -) (in the lower right of Figure 9), where the variables are identical to the low CD condition but, instead, both cognitions are imbalanced.

In Figure 9, the single-step changes in meaning for dissonance reduction in the high CD scenario are thought to be:

1. Social meaning (SM) (c): SCR_H -> OC_H (e.g., change person's perception of Mr. Gore's opinion of GC);
2. Social meaning (SM) (c): SCR_G +> OC_G (e.g., change person's perception of the Mr. Gore's opinion of GW);
3. Referent meaning (RM) (a): p_G -> SCR_G (e.g., discount the opinion of the Mr. Gore's opinion about GW);
4. Referent meaning (RM) (a): p_H -> SCR_H (e.g., discount the opinion of Mr. Gore's opinion about GC);
5. Object meaning (OM) (b): p_H +> OC_H (e.g., change the person's opinion to favoring GC);

6. Object meaning (OM) (b): p_G -> OC_G (e.g., change the person's opinion to disfavoring GW).

The positive-information headline introduced positive information about the possibility of GW. After the positive information was introduced, the low CD condition was thought to be restored (see Figure 9). In the low CD condition, the DCF was thought to resembled Cognition A (+ + +) and Cognition B (+ - -) in Figure 9, where the variables are identical to the high CD condition and both cognitions are balanced.

In Figure 16, where T represents time, the first data collected at T_0 measured initial assessment of MC_1. RM (a') of the media publication and attribution sources (a'') shown in the headline were measured in the survey instrument. For the belief-disconfirmation CD example described in Figure 9, the described CD model utilized Cognitions MC_1 and MC_2 described in Figure 13 for six general measurements of CD at T_1 and T_2, including GW at T0, T1, and T2.

In Figure 17, Figure 18, and Figure 19, the first group of three CD measurements for the first simulated headlines that introduced 2007 science news at T_1 (see Appendix D Table D1) are shown.

In Figure 20, Figure 21, and Figure 22, the second group of three CD measurements for the second simulated headline that introduced 2008 science news at T_2 are shown.

Figure 16: Before Headline (M_0) Global Warming (GW_{m0})–Cognitive Dissonance Measurement in hypothesized Evaluative, Activity, and Potency Dimensions

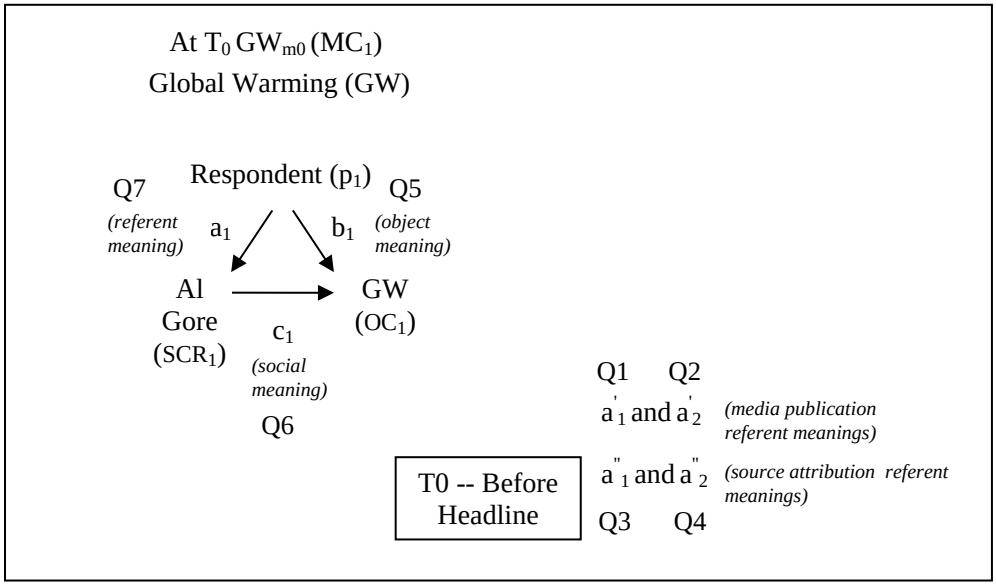


Figure 17: First Headline (2007) (M_1) Global Warming (GW_{M1}) vs. Global Cooling (GC_{M1})–Cognitive Dissonance Measurement in hypothesized Evaluative, Activity, and Potency Dimensions

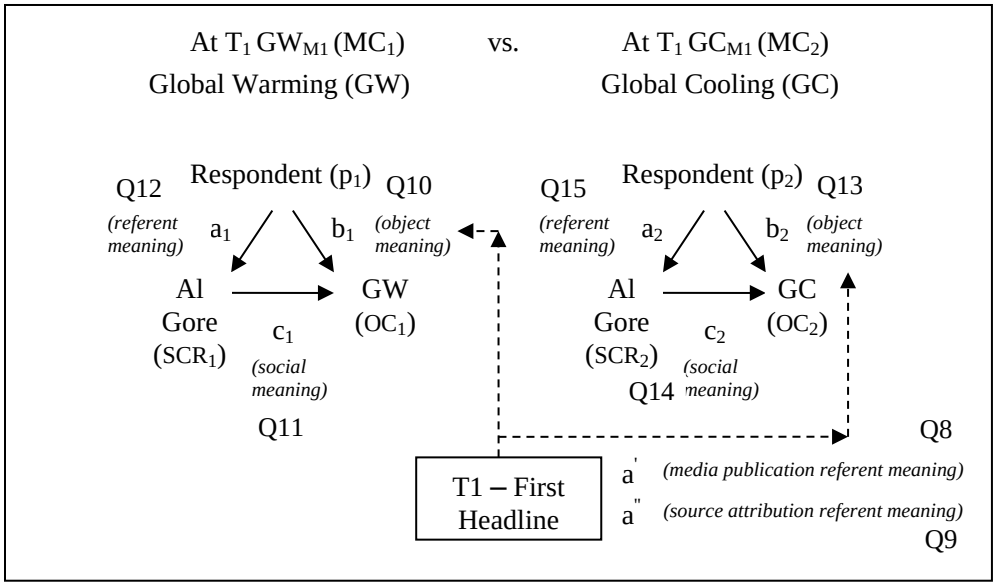


Figure 18: First Headline (2007) (M_2) Global Warming (GW_{M2}) vs. No Climate Change (NC_{M2})–Cognitive Dissonance Measurement in hypothesized Evaluative, Activity, and Potency Dimensions

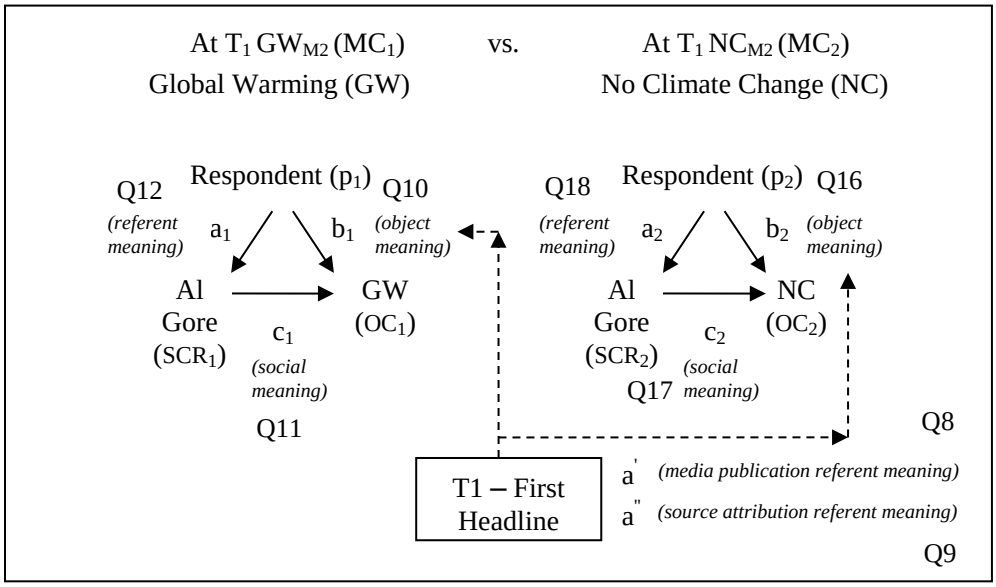


Figure 19: First Headline (2007) (M_3) No Climate Change (NC_{M3}) vs. Global Cooling (GC_{M3})–Cognitive Dissonance Measurement in hypothesized Evaluative, Activity, and Potency Dimensions

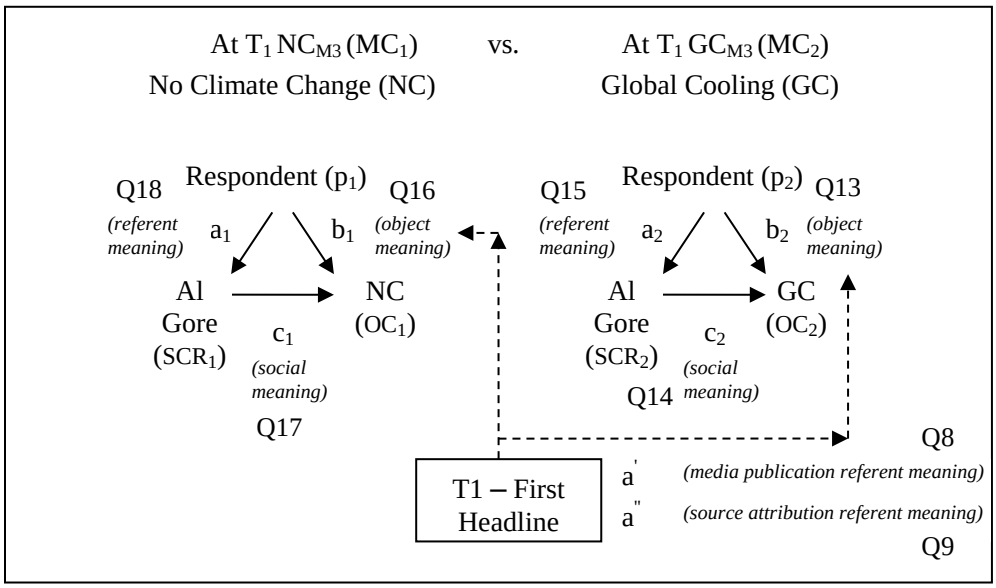


Figure 20: Second Headline (2008) (M_4) Global Warming (GW_{M4}) vs. Global Cooling (GC_{M4})–Cognitive Dissonance Measurement in hypothesized Evaluative, Activity, and Potency Dimensions

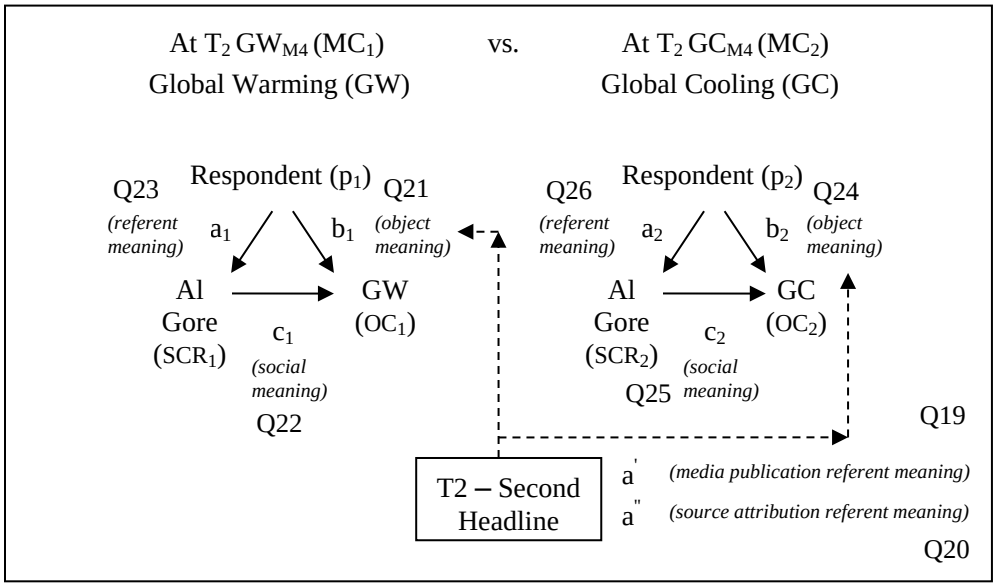


Figure 21: Second Headline (2008) (M_5) Global Warming (GW_{M5}) vs. No Climate Change (NC_{M5})–Cognitive Dissonance Measurement in hypothesized Evaluative, Activity, and Potency Dimensions

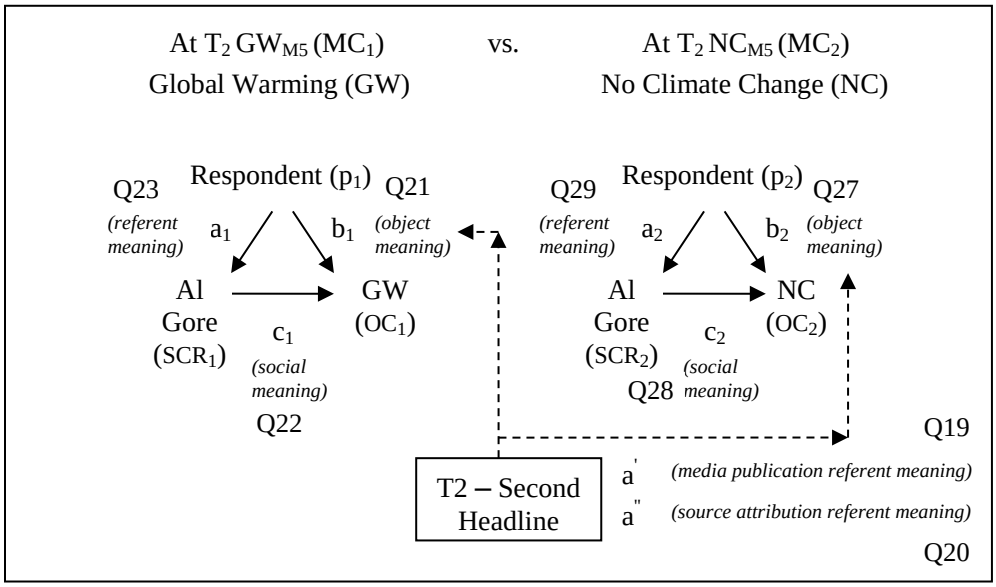
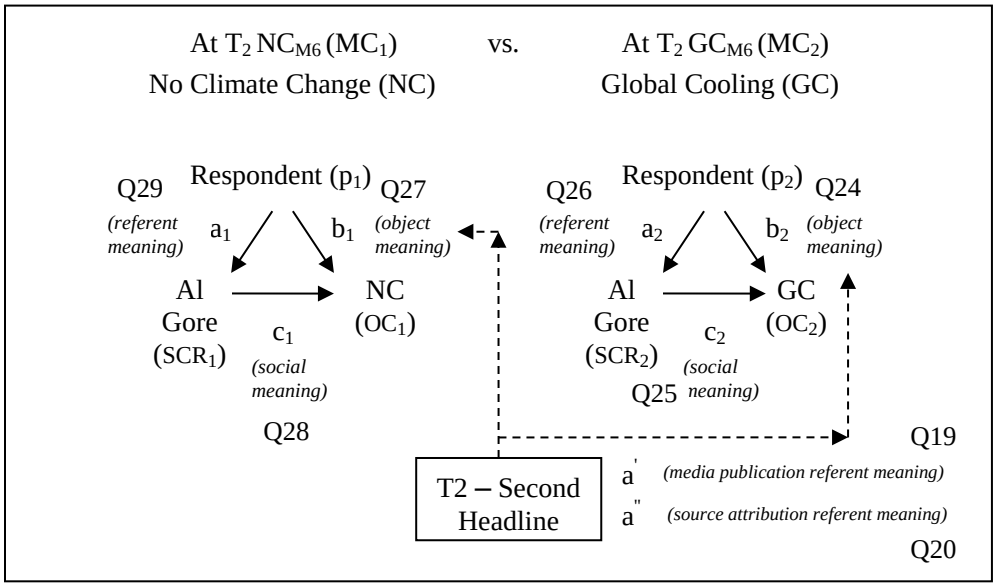


Figure 22: Second Headline (2008) (M_6) No Climate Change (NC_{M6}) vs. Global Cooling (GC_{M6})–Cognitive Dissonance Measurement in hypothesized Evaluative, Activity, and Potency Dimensions



Data Collection Procedures

Each respondent received an email invitation with a link to a hidden web survey hosted at MarketTools' Zoomerang® (Home page, n.d.) (See Appendix E Table E4). The links to the survey were distributed in accordance with the research design (see Table 3.1). The Zoomerang® survey website links consisted of a long string of characters; to prevent typographical errors and to support emailing to groups of randomly assigned respondents, the survey sixteen (16) links were hosted at Yahoo! Geocities (Home page, n.d.) with simplified filenames and respondents were redirected to the survey website links. A series of email accounts at different providers and the Boomerang.com (Home page, n.d.) emailing service was used to avoid *spam* filtering while distributing email survey invitations. The survey invitations included a basic human subject protection disclosure that described the nature of the study, stated

that the responses would remain confidential to the researcher, and that only aggregate statistics were to be reported.

The respondents to the full survey, who were assigned to one of the sixteen (16) groups, received a headline for the block T_1 and block T_2 questions (see Appendix D Table D1). The web survey software required a response to each question, except the comments. Questions were presented in a fixed order to each respondent. Question response items were presented in random order. The data from the survey were captured on the web server for downloading at the conclusion of the data collection process. As an incentive, the respondents earned $1.00 for an unrelated charity; a $1.00 token of appreciation for each of the first 480 complete surveys was sent to the American Heart Association (Homepage, n.d.) in the name of TUI University (i.e., the previous name of Trident University International).

The steps to induce CD and reduce CD with the headlines (see Appendix D Table D1) varied with the respondents' initial level of belief (i.e., IPPro or IPCon) in the probability of GW, the SCR (i.e., Mr. Gore), and the orientation (i.e., IPPro or IPCon) of the headline in block T_1 or block T_2.

Using group #13 in Appendix D Table D1 as an example for groups #1 through #16, the measurement of CD depicted in Figure 14 is described with steps 1 to 6 listed in of Table 3.2:

- Step 1: Send Qualification Survey to Recruit Respondent.
    - Step 1a: The respondent was identified through a convenience sample using a solicitation email message (see Appendix E Table E1). The message was sent to email list owners, discussion forum leaders, and organizational gatekeepers

of environmental, political, religious, and professional groups for distribution, and posted in Facebook™, Google™, and Yahoo!® groups.

  - Step 1b: The solicitation email message (see Appendix E Table E1) contained a link to the qualification survey instrument (see Appendix E Table E2).

- Step 2: Reject Respondent if Below 18 Years of Age. The respondent completed qualification survey (see Appendix E Table E2). The survey included basic human subject disclosure, asked whether the respondent was over 18, and measured the degree of belief in which GW is occurring or is not occurring.
  - Step 2a: Rejected respondent if below 18 years of age and ended the qualification survey and study participation.
  - Step 2b: If the respondent was 18 years of age or older, asked the respondent the degree of belief in the occurrence of GW.
- Step 3: Randomly Assigned to Group Based on Belief in GW. The respondents were randomly assigned to a group in Appendix D Table D1 according to the procedure described in the Sample Description section of this dissertation based on expressed belief in the occurrence of GW. For Group 13 in Table 3.2 at the time of assignment to a group, it was anticipated that OM (b) for GW is positive, OM (b) for GC is negative, and that OM (b) for NC was negative. RM and SM were not measured at this step.
- Step 4: (i.e., T_0 depicted in Figure 16) Sent Full Survey, Introduced SCR, and Assessed Believability of Publication and Attribution Sources. The respondent completed INTRODUCTION section (see Appendix E Table E3). In Step 4 of

Table 3.2, RM (a) of the SCR was anticipated to be positive as evidenced by selection for comparison relative to GW.

- Step 4a: Respondent was emailed the web address link to the full survey (see Appendix E Table E3). Basic human subject disclosure was displayed at the beginning of the survey. The survey remained open for at least two weeks.
- Step 4b: (Q1, Q2, Q3, and Q4) Measured the familiarity, believability, trustworthiness, credibility and importance of information published by The Wall Street Journal (i.e., Q1) and the National Enquirer (i.e., Q2). The respondent was asked the familiarity, believability, trustworthiness, credibility, and importance of information attributed to the American Academy of Environmental Science (AAES) (i.e., Q3) and the Russian Academy of Environmental Science (RAES) (i.e., Q4).
- Step 4c: (Q5, Q6, and Q7) Mr. Gore, the named SCR, was introduced for assessing the balance of meanings relative to the SCR, and GW, GC and NC. The respondents' view of GW (e.g., importance, and familiarity, etc.) (object meaning [b]), their estimate of what Mr. Gore thinks of GW (social meaning [c]) and their view or opinion of what they estimated Mr. Gore thinks about GW were measured (referent meaning [a]).

- Step 5: Present Headline to Induce CD and Block T_1 Questions (i.e., T_1 depicted in Figure 17, Figure 18, and Figure 19). The respondent completed survey sections ABOUT GLOBAL WARMING, 2007 SCIENCE NEWS, ABOUT GLOBAL COOLING, and ABOUT NO CLIMATE CHANGE. In Step 5 of Table 3.2, the valence of SM (c) was not known (i.e., +/-) but was measured. The valence of SM

(c) was expected to determine the nature of CD between the beliefs about GW vs. GC, GW vs. NC and GC vs. NC.

- Step 5a: Presented GW-Negative Headline from 2007 Science News to Example Group #13 in Appendix D Table D1.
- Step 5b: Q8 and Q9 assessed familiarity, believability, trustworthiness, credibility, and importance of Media Publication and Research Organization in the headline.
- Step 5c: Q10, Q11, and Q12 measured balance in the GLOBAL WARMING cognition and assessed OM (b) to the respondent of GW, RM (a) of SCR relative to GW, and SM (c) of SCR's opinion of GW.
- Step 5d: Q13, Q14, and Q15 measured balance in the GLOBAL COOLING cognition and assessed OM (b) to the respondent of GC, RM (a) of the SCR relative to GC, and SM (c) of the SCR's opinion of GC.
- Step 5e: Q16, Q17, and Q18 Measured balance in the NO CLIMATE CHANGE cognition and assessed OM (b) to the respondent of NC, RM (a) of the SCR relative to NC, and SM (c) of the SCR's opinion of NC.

- Step 6: Presented Headline to Reduce CD and Block T_2 Questions (i.e., T_2 depicted in Figure 20, Figure 21, and Figure 22). The respondent completed 2008 SCIENCE NEWS and ABOUT YOU sections of the survey. In Step 6 of Table 3.2, the valence of RM (a) was not known (i.e., +/-) but was measured. The valence of RM (a) was expected to determine the nature of CD between the beliefs about GW vs. GC, GW vs. NC and GC vs. NC.

- Step 6a: Presented GW-Positive Headline to Example Group #13 in Appendix D Table D1.
- Step 6b: Q19 and Q20 assessed familiarity, believability, trustworthiness, credibility, and importance of Publication and Research Organization in the headline.
- Step 6c: Q21, Q22, and Q23 measured balance in the GLOBAL WARMING cognition and assessed OM (b) to the respondent of GW, RM (a) of SCR relative to GW, and SM (c) of SCR's opinion of GW.
- Step 6d: Q24, Q25, and Q26 measured balance in the GLOBAL COOLING cognition and assessed OM (b) to the respondent of GC, RM (a) of the SCR relative to GC, and SM (c) of the SCR's opinion of GC.
- Step 6e: Q27, Q28, and Q29 measured balance in the NO CLIMATE CHANGE cognition and assessed OM (b) to the respondent of NC, RM (a) of the SCR relative to NC, and SM (c) of the SCR's opinion of NC.

- Step 7: Q30, Q31, Q32, Q33, and Q34 measured demographics that were used to describe the sample. The respondent completed ABOUT YOU section.
- Step 8: Remitted incentive of $1.00 donation to the American Heart Association (Homepage, n.d.) for each completed survey for the 480 respondents.

Table 3.2: *Data Collection Procedural Steps One to Six*

Data Collection Procedural Steps	Step 1: Send Qualification Survey to Recruit Respondent	Step 2: Rejected Respondent if Below 18 Years of Age	Step 3: Randomly Assigned to Group Based on Belief in Global Warming	Step 4: Sent Full Survey, Introduced SCR and Assessed Believability of Sources	Step 5: Presented Headline to Induce Dissonance and Block T_1 (Test) Questions	Step 6: Presented Headline to Reduce Dissonance and Block T_2 (Retest) Questions
GW	N/A	N/A	(?, +, ?)	(+/-, +, +)	(+/-, -, +)	(+/-, +, +)
GC	N/A	N/A	(?, -, ?)	(+/-, -, -)	(+/-, +, -)	(+/-, -, -)
NC	N/A	N/A	(?, -, ?)	(+/-, -, -)	(+/-, -, -)	(+/-, +, -)
Key:	*Example: (Referent [a], Object [b], Social [c] Meanings)*	*"+" = Positive Valence in combined scale scores for actual dimensions*	*"-" = Negative Valence in combined actual dimensions*	*"?" = Unknown Value at step*	*"+/-" = Known Value at Step but Not Predictable*	

Demographic and Measured Variables

Demographic variables and the dependent variables were measured as depicted in the survey instrument (see Appendix E Table E4). The dependent variables collected referent (a), object (b), and social (c) meaning with ten-point semantic differential (word pair) response scales (see Table 3.3 and Table 3.4). The scale scores were averaged to compute the score for referent (a), object (b), and social (c) meaning in each of the actual dimensions. All scales were analyzed as interval unless otherwise noted.

Operationalization of Variables Based on Data Collected:

- Email address (Nominal)—full survey invitation
- Country of Residence (Nominal)— used in sample description
- Gender (Nominal)—used in sample description
- Age (Scalar)—used in sample description
- Level of Education (Ordinal)—used in sample description
- Survey Comments (Nominal)

For MC_1 in GW_{M0} in Figure 16, GW_{M1} in Figure 17, GW_{M2} in Figure 18, NC_{M3} in Figure 19, GW_{M4} in Figure 20, GW_{M5} in Figure 21, NC_{M6} in Figure 22, and Table 3.3 and Table 3.4:

- Evaluative Referent (a_1) Meaning (S_1, S_2)
- Evaluative Object (b_1) Meaning (S_1, S_3)
- Evaluative Social (c_1) Meaning (S_2, S_3)
- Activity Referent (a_1) Meaning (S_{10}, S_{11})
- Activity Object (b_1) Meaning (S_{10}, S_{12})
- Activity Social (c_1) Meaning (S_{11}, S_{12})
- Potency Referent (a_1) Meaning (S_{19}, S_{20})
- Potency Object (b_1) Meaning (S_{19}, S_{21})
- Potency Social (c_1) Meaning (S_{20}, S_{21})
- Media Publication Referent (a') Meaning—Two media publication sources (WSJ and NE) are measured in GW_{m0}
- Source Attribution Referent (a'') Meaning—Two attribution sources (AAES and RAES) are measured in GW_{m0}

For data collection of MC_2 in GC_{M1} in Figure 17, NC_{M2} in Figure 18, GC_{M3} in Figure 19, GC_{M4} in Figure 20, NC_{M5} in Figure 21, GC_{M6} in Figure 22, and Table 3.3 and Table 3.4:

- Evaluative Referent (a_2) Meaning (S_4, S_5)
- Evaluative Object (b_2) Meaning (S_4, S_6)
- Evaluative Social (c_2) Meaning (S_5, S_6)
- Activity Referent (a_2) Meaning (S_{13}, S_{14})
- Activity Object (b_2) Meaning (S_{13}, S_{15})
- Activity Social (c_2) Meaning (S_{14}, S_{15})
- Potency Referent (a_2) Meaning (S_{22}, S_{23})
- Potency Object (b_2) Meaning (S_{22}, S_{24})
- Potency Social (c_2) Meaning (S_{23}, S_{24})
- Media Publication Referent (a') Meaning
- Source Attribution Referent (a'') Meaning

Table 3.3: *Word Pairs to Measure Referent Meaning (a)*

Hypothesized Measurement Dimension	Adjective Word Pair
Combined Evaluative, Activity, and Potency	Unfamiliar (View to You) / Familiar (View to You)
Combined Evaluative, Activity, and Potency	Unbelievable / Believable
Combined Evaluative, Activity, and Potency	Untrustworthy / Trustworthy
Combined Evaluative, Activity, and Potency	Not Credible / Credible
Combined Evaluative, Activity, and Potency	Unimportant / Important

Table 3.4: *Word Pairs to Measure Object Meaning (b) / Social Meaning (c)*

Hypothesized Measurement Dimension	Adjective Word Pair
Evaluative	Unfamiliar Topic to You (Al Gore) / Familiar Topic to You (Al Gore)
Potency	Decreasing / Increasing
Activity	Impossible / Possible
Activity	Not Occurring / Occurring or Stable Climate / Changing Climate
Evaluative	Bad for Future Generations / Good for Future Generations
Evaluative	Unimportant / Important
Potency	Will Not Have an Impact / Will Have an Impact
Evaluative	Not Real / Real
Evaluative	Not Inevitable / Inevitable

Operational Measures

The variables described are listed in Table 3.5 to test the sensitivity of the instrument. The operational definitions for the variables are:

Independent and Manipulated Variables.

Independent Variables – IP, T1A, T1P, T1V, T2A, T2P, T2V

IP – Initial Position of the Respondent on belief in Global Warming

T – Point in Time, 0 – Prior to Induced Effects, 1 – After first Induced Effect, 2 – After second Induced Effect, A – Attribution of the research (Russian Academy of Environmental Science or American Academy of Environmental Science), P –

Publication (National Enquirer or Wall Street Journal), V – Valence (Negative Tone or Positive Tone)

- IP – Initial Position of the respondent on belief in GW at T0
- T1A – Attribution of the research (Russian Academy of Environmental Science or American Academy of Environmental Science at T1
- T1P – Publication (National Enquirer or Wall Street Journal) at T1
- T1V – Valence (negative tone or positive tone) at T1
- T2A – Attribution of the research (Russian Academy of Environmental Science or American Academy of Environmental Science) at T2
- T2P – Publication (National Enquirer or Wall Street Journal) at T2
- T2V – Valence (negative tone or positive tone) at T2

Mediating Variables.

Hypothesized for MC_1 in GW_{M0} in Figure 16, GW_{M1} in Figure 17, GW_{M2} in Figure 18, NC_{M3} in Figure 19, GW_{M4} in Figure 20, GW_{M5} in Figure 21, NC_{M6} in Figure 22, and Table 3.3 and Table 3.4:

- Activity Center of Polarization (S_{16}, S_{17}, S_{18})
- Activity Object-Social Degree of Polarization (S_{12}, S_{16})
- Activity Referent-Object Degree of Polarization (S_{10}, S_{16})
- Activity Referent-Social Degree of Polarization (S_{11}, S_{16})
- Evaluative Center of Polarization (S_7, S_8, S_9)
- Evaluative Object-Social Degree of Polarization (S_3, S_7)
- Evaluative Referent-Object Degree of Polarization (S_1, S_7)
- Evaluative Referent-Social Degree of Polarization (S_2, S_7)
- Potency Center of Polarization (S_{25}, S_{26}, S_{27})
- Potency Object-Social Degree of Polarization (S_{21}, S_{25})
- Potency Referent-Object Degree of Polarization (S_{19}, S_{25})
- Potency Referent-Social Degree of Polarization (S_{20}, S_{25})

Hypothesized for MC_2 in GC_{M1} in Figure 17, NC_{M2} in Figure 18, GC_{M3} in Figure 19, GC_{M4} in Figure 20, NC_{M5} in Figure 21, GC_{M6} in Figure 22, and Table 3.3 and Table 3.4:

- Activity Center of Polarization (S_{16}, S_{17}, S_{18})
- Activity Object-Social Degree of Polarization (S_{15}, S_{17})
- Activity Referent-Object Degree of Polarization (S_{13}, S_{17})
- Activity Referent-Social Degree of Polarization (S_{14}, S_{17})

- Evaluative Center of Polarization (S_7, S_8, S_9)
- Evaluative Object-Social Degree of Polarization (S_6, S_8)
- Evaluative Referent-Object Degree of Polarization (S_4, S_8)
- Evaluative Referent-Social Degree of Polarization (S_5, S_8)
- Potency Center of Polarization (S_{25}, S_{26}, S_{27})
- Potency Object-Social Degree of Polarization (S_{24}, S_{26})
- Potency Referent-Object Degree of Polarization (S_{22}, S_{26})
- Potency Referent-Social Degree of Polarization (S_{23}, S_{26})

Suppositions and Mediating Variables.

Table 3.5: *Suppositions for Evaluative, Activity, and Potency Dimensions and Hypothesized Mediating Variables with* β *Coefficients*

	Suppositions for Evaluative, Activity, and Potency Dimensions	Hypothesized Variables with β Coefficients (Interval Level of Measurement)
S_1, S_{10}, S_{19}	As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in each dimension of Cognition MC_1, the partial least squares (PLS) β coefficient for the combination of referent meaning (a) and object meaning (b) will increase (Congruity Theory).	• S_1: Evaluative Referent Meaning (a), Evaluative Object Meaning (b), Evaluative Referent-Object Degree of Polarization (β coefficient); • S_{10}: Activity Referent Meaning (a), Activity Object Meaning (b), Activity Referent-Object Degree of Polarization (β coefficient); • S_{19}: Potency Referent Meaning (a), Potency Object Meaning (b), Potency Referent-Object Degree of Polarization (β coefficient).
S_2, S_{11}, S_{20}	As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in each dimension of Cognition MC1, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase (Congruity Theory).	• S_2: Evaluative Referent Meaning (a), Evaluative Social Meaning (c), Evaluative Referent-Social Degree of Polarization (β coefficient); • S_{11}: Activity Referent Meaning (a), Activity Social Meaning (c), Activity Referent-Social Degree of Polarization (β coefficient); • S_{20}: Potency Referent Meaning (a), Potency Social Meaning (c), Potency Referent-Social Degree of Polarization (β coefficient).
S_3, S_{12}, S_{21}	As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in each dimension of	• S_3: Evaluative Object Meaning (b), Evaluative Social Meaning (c), Evaluative Object-Social Degree of Polarization (β coefficient); • S_{12}: Activity Object Meaning (b), Activity Social Meaning (c), Activity Object-Social

	Suppositions for Evaluative, Activity, and Potency Dimensions	Hypothesized Variables with β Coefficients (Interval Level of Measurement)
	Cognition MC1, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase (Congruity Theory).	Degree of Polarization (β coefficient); • S_{21}: Potency Object Meaning (b), Potency Social Meaning (c), Potency Object-Social Degree of Polarization (β coefficient).
S_4, ***S_{13}***, ***S_{22}***	As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in each dimension of Cognition MC2, the PLS β coefficients for the combination of referent meaning (a) and object meaning (b) will increase (Congruity Theory).	• S_4: Evaluative Referent Meaning (a), Evaluative Object Meaning (b), Evaluative Referent-Object Degree of Polarization (β coefficient); • S_{13}: Activity Referent Meaning (a), Activity Object Meaning (b), Activity Referent-Object Degree of Polarization (β coefficient); • S_{22}: Potency Referent Meaning (a), Potency Object Meaning (b), Potency Referent-Object Degree of Polarization (β coefficient).
S_5, ***S_{14}***, ***S_{23}***	As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in each dimension of Cognition MC2, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase (Congruity Theory).	• S_5: Evaluative Referent Meaning (a), Evaluative Social Meaning (c), Evaluative Referent-Social Degree of Polarization (β coefficient); • S_{14}: Activity Referent Meaning (a), Activity Social Meaning (c), Activity Referent-Social Degree of Polarization (β coefficient); • S_{23}: Potency Referent Meaning (a), Potency Social Meaning (c), Potency Referent-Social Degree of Polarization (β coefficient).
S_6, ***S_{15}***, ***S_{24}***	As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in each dimension of Cognition MC2, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase (Congruity Theory).	• S_6: Evaluative Object Meaning (b), Evaluative Social Meaning (c), Evaluative Object-Social Degree of Polarization (β coefficient); • S_{15}: Activity Object Meaning (b), Activity Social Meaning (c), Activity Object-Social Degree of Polarization (β coefficient); • S_{24}: Potency Object Meaning (b), Potency Social Meaning (c), Potency Object-Social Degree of Polarization (β coefficient).
S_7, ***S_{16}***, ***S_{25}***	In each dimension of cognitions MC1 or MC2, if the three PLS β coefficients are significant, then the center of polarization will tend to move	• S_7: Evaluative Referent-Object Degree of Polarization (β coefficient), Evaluative Referent-Social Degree of Polarization (β coefficient), Evaluative Object-Social Degree of Polarization (β coefficient), Evaluative

	Suppositions for Evaluative, Activity, and Potency Dimensions	Hypothesized Variables with β Coefficients (Interval Level of Measurement)
	toward changing PLS β coefficients to become insignificant (Balance Theory).	Center of Polarization (change in β coefficients); • S_{16}: Activity Referent-Object Degree of Polarization (β coefficient), Activity Referent-Social Degree of Polarization, Activity Object-Social Degree of Polarization (β coefficient), Activity Center of Polarization (change in β coefficients); • S_{25}: Potency Referent-Object Degree of Polarization (β coefficient), Potency Referent-Social Degree of Polarization (β coefficient), Potency Object-Social Degree of Polarization (β coefficient), Potency Center of Polarization (change in β coefficients).
S_8*, *S_{17}*, *S_{26}	In each dimension of cognitions MC1 or MC2, if the three PLS β coefficients are insignificant, then the center of polarization will tend to move toward the changing PLS β coefficients to become significant (Balance Theory).	• S_8: Evaluative Referent-Object Degree of Polarization (β coefficient), Evaluative Referent-Social Degree of Polarization (β coefficient), Evaluative Object-Social Degree of Polarization (β coefficient), Evaluative Center of Polarization (change in β coefficients); • S_{17}: Activity Referent-Object Degree of Polarization (β coefficient), Activity Referent-Social Degree of Polarization (β coefficient), Activity Object-Social Degree of Polarization (β coefficient), Activity Center of Polarization (change in β coefficients); • S_{26}: Potency Referent-Object Degree of Polarization (β coefficient), Potency Referent-Social Degree of Polarization (β coefficient), Potency Object-Social Degree of Polarization (β coefficient), Potency Center of Polarization (change in β coefficients).
S_9*, *S_{18}*, *S_{27}	In each dimension of cognitions MC1 and MC2, as the centers of polarization increase due to the manipulated factors, the level of cognitive dissonance will increase; and as the centers of polarization decrease due to the manipulated factors, the	• S_9: MC_1 Evaluative Center of Polarization (change in β coefficients), MC_2 Evaluative Center of Polarization (change in β coefficients); • S_{18}: MC_1 Activity Center of Polarization (change in β coefficients), MC_2 Activity Center of Polarization (change in β coefficients); • S_{27}: MC_1 Potency Center of Polarization

	Suppositions for Evaluative, Activity, and Potency Dimensions	Hypothesized Variables with β Coefficients (Interval Level of Measurement)
	level of cognitive dissonance will decrease (Dissonance Theory).	(change in β coefficients), MC_2 Potency Center of Polarization (change in β coefficients).

Variables and Scales

The full GW survey instrument is shown in Appendix E and the response items grouped by measurement scales are shown Table 3.6, Table 3.7, Table 3.8 and Table 3.9. The content of the response items were judged valid by the researcher and the dissertation committee. The response items are grouped in this section by evaluative, activity, and potency scales, according to Table 3.3 and Table 3.4, but were presented in random order to respondents. As in Table 3.3, RM (a) was measured with combined scales in Q1, Q2, Q3, Q4, Q7, Q8, Q9, Q12, Q15, Q18, Q19, Q20, Q23, Q26, and Q29. As in Table 3.4, OM (b) was measured by Q5, Q10, Q13, Q16, Q21, Q24, and Q27. In Table 3.4, SM (c) was measured by Q6, Q11, Q14, Q17, Q22, Q25, and Q28. Q30 to Q35 gather demographical information and survey comments.

Table 3.6: *Q1 to Q7 with Measurement Dimensions (Before First Headline)*

Q1. What do YOU think of the publication THE WALL STREET JOURNAL?
Combined: Unfamiliar (1) <> Familiar (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q2. What do YOU think of the publication THE NATIONAL ENQUIRER?
Combined: Unfamiliar (1) <> Familiar (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q3. What do YOU think of the research organization the AMERICAN Academy of Environmental Science?

Combined: Unfamiliar (1) <> Familiar (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q4. What do YOU think of the research organization the RUSSIAN Academy OF Environmental Science?

Combined: Unfamiliar (1) <> Familiar (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q5. GLOBAL WARMING is to YOU:

Evaluative: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q6. In YOUR estimation, what is AL GORE's view of GLOBAL WARMING?

Eval.: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q7. AL GORE's VIEW of GLOBAL WARMING is to YOU:

Combined: An Unfamiliar View to You (1) <> A Familiar View to You (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

After Q7, the stimulus of the Block 1 headline was introduced after Q7 from Appendix D Table D1, which was determined by random assignment to groups. The stimulus was presented on multiple screens as indicated in Appendix E for Q8 through Q18, shown in Table 3.7. For GW, Q10 is a repeated measure of Q5, Q11 is a repeated measure of Q6, and Q12 is a repeated measure of Q7. Q8 is a repeated measure of the publication from either Q1 or Q2, which was in the first headline. Q9 is a repeated measure of the research organization from either Q3 or Q4, which was in the first headline.

Table 3.7: *Q8 to Q18 with Measurement Dimensions (After First Headline)*

Q8. Given the 2007 headline, what do YOU think of the PUBLICATION that reported the information?
- Combined: Unfamiliar (1) <> Familiar (10)
- Combined: Unbelievable (1) <> Believable (10)
- Combined: Untrustworthy (1) <> Trustworthy (10)
- Combined: Not Credible (1) <> Credible (10)
- Combined: Unimportant (1) <> Important (10)

Q9. Given the 2007 headline, what do YOU think of the RESEARCH ORGANIZATION that researched the information that was quoted by the publication?
- Combined: Unfamiliar (1) <> Familiar (10)
- Combined: Unbelievable (1) <> Believable (10)
- Combined: Untrustworthy (1) <> Trustworthy (10)
- Combined: Not Credible (1) <> Credible (10)
- Combined: Unimportant (1) <> Important (10)

Q10. After reading the 2007 headline, I now think that GLOBAL WARMING is
- Evaluative: An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)
- Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
- Evaluative: Unimportant (1) <> Important (10)
- Evaluative: Not Real (1) <> Real (10)
- Evaluative: Not Inevitable <> Inevitable (10)
- Activity: Impossible (1) <> Possible (10)
- Activity: Not Occurring (1) <> Occurring (10)
- Potency: Decreasing (1) <> Increasing (10)
- Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q11. After reading the 2007 headline, I now think that AL GORE thinks GLOBAL

WARMING is

Eval.: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q12. After reading the 2007 headline, I now think that AL GORE's VIEW of GLOBAL WARMING is

Combined: An Unfamiliar View to Me (1) <> A Familiar View to Me (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q13. After reading the 2007 headline, I now think that GLOBAL COOLING is

Evaluative: An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q14. After reading the 2007 headline, I now think that AL GORE thinks GLOBAL COOLING is

Eval.: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q15. After reading the 2007 headline, I now think that AL GORE's VIEW of GLOBAL COOLING is:

Combined: An Unfamiliar View to Me (1) <> A Familiar View to Me (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)

Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q16. After reading the 2007 headline, I now think that NO CLIMATE CHANGE is
Evaluative: An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Changing Climate (1) <> Stable Climate (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q17. After reading the 2007 headline, I now think that AL GORE thinks NO CLIMATE CHANGE is
Eval.: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Changing Climate (1) <> Stable Climate (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q18. After reading the 2007 headline, I now think that AL GORE's VIEW of NO CLIMATE CHANGE is
Combined: An Unfamiliar View to Me (1) <> A Familiar View to Me (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Before the questions in Table 3.8, the stimulus of the Block 2 headline was introduced in the survey instrument from Appendix D Table D1, which was determined by random assignment to groups. The stimulus was presented on multiple screens as indicated in Appendix E for Q19 through Q29. For the publication, Q19 is a repeated measure of Q8. For the research organization, Q20 is a repeated measure of Q9. For GW, Q21 is a repeated measure of OM (b) for Q10, Q22 is a repeated

measure of SM (c) in Q11, and Q23 is a repeated measure of RM (a) in Q12. For GC, Q24 is a repeated measure of OM (b) for Q13, Q25 is a repeated measure of SM (c) in Q14, and Q26 is a repeated measure of RM (a) in Q15. For NC, Q27 is a repeated measure of OM (b) for Q16, Q28 is a repeated measure of SM (c) in Q17, and Q29 is a repeated measure of RM (a) in Q18.

Table 3.8: *Q19 to Q29 with Measurement Dimensions (After Second Headline)*

Q19. Given the 2008 headline, NOW what do YOU think of the PUBLICATION that reported the information?
- Combined: Unfamiliar (1) <> Familiar (10)
- Combined: Unbelievable (1) <> Believable (10)
- Combined: Untrustworthy (1) <> Trustworthy (10)
- Combined: Not Credible (1) <> Credible (10)
- Combined: Unimportant (1) <> Important (10)

Q20. Given the 2008 headline, NOW what do YOU think of the RESEARCH ORGANIZATION that researched the information that was quoted by the publication?
- Combined: Unfamiliar (1) <> Familiar (10)
- Combined: Unbelievable (1) <> Believable (10)
- Combined: Untrustworthy (1) <> Trustworthy (10)
- Combined: Not Credible (1) <> Credible (10)
- Combined: Unimportant (1) <> Important (10)

Q21. Given the 2008 headline, GLOBAL WARMING is NOW to YOU:
- Evaluative: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
- Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
- Evaluative: Unimportant (1) <> Important (10)
- Evaluative: Not Real (1) <> Real (10)
- Evaluative: Not Inevitable <> Inevitable (10)
- Activity: Impossible (1) <> Possible (10)
- Activity: Not Occurring (1) <> Occurring (10)
- Potency: Decreasing (1) <> Increasing (10)
- Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q22. In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of GLOBAL WARMING?
- Eval.: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
- Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
- Evaluative: Unimportant (1) <> Important (10)
- Evaluative: Not Real (1) <> Real (10)
- Evaluative: Not Inevitable <> Inevitable (10)

Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q23. After reading the 2008 headline, AL GORE's VIEW of GLOBAL WARMING is NOW to YOU:
Combined: An Unfamiliar View to You (1) <> A Familiar View to You (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q24. Given the 2008 headline, GLOBAL COOLING is NOW to YOU:
Evaluative: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
Potency: Decreasing (1) <> Increasing (10)
Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)

Q25. In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of GLOBAL COOLING?
Eval.: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Not Occurring (1) <> Occurring (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q26. After reading the 2008 headline, AL GORE's VIEW of GLOBAL COOLING is NOW to YOU:
Combined: An Unfamiliar View to You (1) <> A Familiar View to You (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q27. Given the 2008 headline, NO CLIMATE CHANGE is NOW to YOU:
Evaluative: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)

Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Changing Climate (1) <> Stable Climate (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q28. In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of NO CLIMATE CHANGE?
Eval.: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)
Evaluative: Unimportant (1) <> Important (10)
Evaluative: Not Real (1) <> Real (10)
Evaluative: Not Inevitable <> Inevitable (10)
Activity: Impossible (1) <> Possible (10)
Activity: Changing Climate (1) <> Stable Climate (10)
Potency: Decreasing (1) <> Increasing (10)
Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)

Q29. After reading the 2008 headline, AL GORE's VIEW of NO CLIMATE CHANGE is NOW to YOU:
Combined: An Unfamiliar View to You (1) <> A Familiar View to You (10)
Combined: Unbelievable (1) <> Believable (10)
Combined: Untrustworthy (1) <> Trustworthy (10)
Combined: Not Credible (1) <> Credible (10)
Combined: Unimportant (1) <> Important (10)

Q30 through Q35 of the survey instrument gather demographical information.

Table 3.9: *Q30 to Q35 Demographics (After Second Headline)*

Q30. Please enter your complete email address for statistical purposes:

Q31. Select the country or region in which you reside: <<Dropdown List>>

Q32. Indicate the highest level of education you have completed:
Elementary School
Eighth Grade
Some High School
High School Diploma
Some College or University Courses
Associates Degree
Bachelors Degree
Masters Degree
Doctoral Degree

Other
Prefer not to answer

Q33. Indicate your age:
Under 13
13 to 17
18 to 24
25 to 34
35 to 44
45 to 54
55 to 64
65 or more

Q34. Indicate your gender:
Male
Female

Q35. Provide any comments you have about this survey:

CHAPTER 4: RESULTS

Pre-Test

The survey instrument was pre-tested using MarketTools' Zoomerang ® (Home page, n.d.) online web survey software. The test version of the full survey was opened on July 9, 2008. After two days of testing to observe how various web browsers, computers, and operating systems handled the web-based survey, the test version of the survey was converted into a finalized version. The finalized version of the survey was examined using Internet Explorer® under the Microsoft® Windows® XP and Microsoft® Windows Vista® operating systems to make sure that no differences in survey results might be due to operating system. Test responses were entered into the finalized version. Each of the responses was visually inspected to make certain that the survey website was requiring data for each response, was accepting data for each response, and that the correct values for the responses were being written in the survey database. Comments were examined to ensure that comments were being captured. The dissertation chairman during the data collection process, Dr. Flaschner, noticed some formatting issues using the Firefox™ browser on Microsoft® Windows®. Zoomerang® support was contacted regarding survey formatting and the problem was rectified. Following the posting of the revised version of the finalized survey for testing, the improperly formatted web pages of the survey were tested using Firefox™ on Microsoft® Windows® operating system and Safari® on Mac OS®. All test data were inspected and deleted.

The revised finalized version of the full survey in the Zoomerang® web survey software was copied into sixteen surveys representing each of the sixteen varying news headline conditions depicted in Appendix D Table D1. The respondents from the qualification survey were randomly divided into the initial position (IP) Pro Global Warming (GW) and IPCon GW initial position (in Appendix F Table F2 and Appendix F Table F3), based on their level of belief in the occurrence of global warming. The Group 2 survey was launched as a pre-test on July 11, 2008 to approximately thirty-four potential respondents. Four completed surveys were received within the first two hours; all response values for these four respondents were inspected using the Zoomerang® web interface to ensure that the survey software was requiring and accepting data for all of the response fields. Tests for reliability and validity were not conducted on the four responses received from the thirty-four potential respondents because it was deemed impractical.[19] The optional comments field for each case in Group 2 was examined for qualitative evidence that would undermine face validity or support a conclusion of respondent fatigue. No problems were indicated by respondents with regard to understanding the questions in the comments field and no problems with data integrity were detected, so the initial four

[19] Performing test-retest reliability estimates on the pretest response data was impossible because the cases could not be returned to the original state once the news headline conditions were introduced. Estimating split half reliability of the pretest data was also impossible because the sample size of the pretest data was not at least thirty cases and the minimum of 30 cases was not reached until the end of the data collection process. Tests for discriminant and convergent validity also were not possible due to the small pretest data sample size. The social comparison threat to internal validity was not examined, because the research was solely interested in one social comparison referent (i.e., Mr. Gore) and additional survey questions about other social comparison referents were not solicited. Comments (if given at all) in the pretest responses indicated that the respondents understood the meaning of the questions (e.g., face validity) and that respondents did not experience unusual levels of respondent fatigue when completing the survey.

responses were included in the final Group 2 data set. The remaining fifteen identical versions of the survey questionnaires with varied manipulated factors from Table 3.1 were deployed in random order at various times of the day, from July 11 to July 14, 2008; the first few cases from each survey group were examined when the survey was launched to make certain there were no irregularities with the data collection process. The optional comments for each case were examined, when available, to ascertain whether the questions were understood and the survey questionnaires were completed in each group.

Test

Sample Recruitment

A convenience (i.e., snowball) sample of 567 respondents to the full web survey were recruited from 1,711 respondents to the qualification web survey (from 5,748 visitors to the qualification web survey start page) who indicated acceptance of the human subjects protection disclosure and were 18 years of age or older.

To start the snowball sample, a solicitation email message (see Appendix E Table E1) was sent to the social media contacts of Democrat and Republican online communities and discussion boards, because their respective political parties ostensibly had differing views with regard to GW. Since these target groups did not participate in sufficient numbers; the solicitation email message was then sent to email list owners, discussion forum leaders, and organizational gatekeepers of student, environmental, political, religious, and professional groups for distribution, and posted on Facebook™, Google™, and Yahoo!® groups. Potential respondents, who

completed the qualification survey (see Appendix E Table E2), were invited to complete the full survey instrument (see Appendix E Table E3).

There were 5,478 visitors to the qualification survey (Appendix E Table E2) between April 25, 2008 and October 25, 2008. During the qualification survey, there were 1,854 completed qualification surveys and 611 partially completed. Of those 1,854 respondents, 47 respondents were under 18 years of age and, in accordance with TUI University's (i.e., formerly known as Trident University International) Institutional Review Board (IRB) requirements, were not permitted to continue to the full survey. Of the 1,807 respondents to the qualification survey who were 18 years of age or older; there were 96 invalid email addresses, leaving 1,711 respondents who were randomly assigned (see Appendix F Table F1) full surveys. Each qualification survey respondent invited to take the full survey (see Appendix E Table E4) with regard to GW, expressed an initial position (IP) of IPCon (i.e., the argument for GW is not supported) or IPPro (i.e., the argument for GW is supported), as evidenced by a scale of one to ten on Q2 in the qualification survey.

For the first 623 of the 1,711 respondents to the word pair for Q2: 'What do you think of GLOBAL WARMING?' in the qualification survey (see Appendix E Table E2), the median response to Not Occurring (1) <> Occurring (10) was 8.00, the mean was 7.10, and the standard deviation was 2.949. For this scale, respondents indicated that GW exists (*Xbar* = 7.10 on scale of 10.0). To make certain that the respondents were split proportionally between initial positions of IPPro and IPCon, those respondents indicating less likelihood of GW in Q2 (e.g., scores from 1 to 7) to the word pair were classified as having the IPCon GW initial position. IPCon

respondents were randomly assigned to one of the eight groups (i.e., 1, 2, 5, 7, 9, 10, 12, or 14) to receive a GW-positive headline (see Appendix D Table D1. Respondents indicating greater likelihood of GW in Q2 (e.g., scores from 8 to 10) to the word pair were classified as having the IPPro GW initial position. These IPPro respondents were randomly assigned to one of the opposing eight groups (i.e., 3, 4, 6, 8, 11, 13, 15, or 16) to receive the GW-negative headline (see Appendix D Table D1). Random assignment to the sixteen (16) groups was accomplished using the Microsoft® Excel® RAND function. For totals of respondents assigned to groups, see Appendix F Table F1, Appendix Table F2, and Appendix Table F3.

Sample Characteristics

A total of 567 of the 1,711 randomly assigned respondents completed the full survey between July 11, 2008 and October 31, 2008, resulting in a 33.13 % response rate. Of the 567 respondents to the full survey; for (1) residence (Q31), 95.06% resided in the USA; (2) gender (Q32), 41.80% were female, 58.20% were male; (3) age (Q33), 11.29% were aged 18 to 24 years, 19.22% were aged 25 to 34 years, 22.75% were aged 35 to 44 years, 25.75% were aged 45 to 54 years, 15.17% were aged 55 to 64 years, and 5.82% were aged 65 or more years; (4) education (Q32), 4.06% completed high school, 19.75% completed some college courses, 8.11% earned an associates degree, 34.74% earned a bachelors degree, 24.69% earned a masters degree, and 6.70% earned a doctoral degree.

Of the IPPro GW respondents (n = 251) who completed the full survey, for (1) residence (Q31), 92.03% resided in the USA, (2) gender (Q34), 51.79% were female, 48.21% were male, (3) age (Q33) 54.58% were below the age of 45, and (4) education

(Q32), 70.92% completed a bachelors, masters, or doctoral degree. Of the IPCon GW respondents (n = 316) who completed the full survey, for (1) residence (Q31), 97.47% resided in the USA, (2) gender (Q34), 33.86% were female, 66.14% were male, (3) age (Q33), 52.41% were below the age of 45 and (4) education (Q32), 62.34% completed a bachelors, masters, or doctoral degree.

Test-Retest Reliability

Of the total 1,807 respondents to the qualification survey (i.e., 1,711 with valid email addresses and 96 with invalid email addresses) to Q2 (What do you think of GLOBAL WARMING? Not Occurring [1] <> Occurring [10]) in the qualification survey (see Appendix E Table E2), the median was 7.00, the mean was 6.00, and the standard deviation was 3.451. By way of comparison, of the 567 respondents to the full survey (see Appendix E Table E4), the median response to word pair 4 of Q5: (GLOBAL WARMING is to YOU: Not Occurring [1] <> Occurring [10]) was also 7.00, but the mean was higher at 6.43, and the standard deviation was lower at 3.142.[20] To compute a test-retest reliability coefficient, a paired comparison test of the differences in the mean responses to Q2 in the qualification survey and word pair 4 of Q5 in the full survey was conducted for the 481 respondent cases that could be matched on email addresses. The responses to Q2 on the *qualification* survey significantly differed from the responses to word pair 4 of Q5 on the *test* survey (t = 2.966, sig. = 0.003). This matched-pair t-test indicates that the respondents to the full

[20] However, the mean of 6.43 for the subset of 481 email-matched respondents of the full survey was identical to the mean for the 567 completed responses to the full survey. The mean of Q2 in the qualification survey was 6.19 for the matched pair respondents, while the mean of word pair 4 for Q5 was 6.43 for those same respondents, indicating that the qualification survey respondents demonstrated a slightly higher belief that GW was occurring.

survey changed their positions (weeks to months after the qualification survey question was answered) when asked a similar question about GW: Q2 in the Qualification Survey (What do you think of GLOBAL WARMING? Not Occurring [1] <> Occurring [10]) vs. word pair 4 of Q5 Response 4 in the full survey (GLOBAL WARMING is to YOU: Not Occurring [1] <> Occurring [(10]).

A Spearman's rho for Q2 and word pair 4 of Q5 indicates that the ranking of the values (e.g., the relative positions of the respondents with regard to the occurrence of GW) did not change (Spearman's rho = 0.851, $p = .00$).

For the test-retest reliability tests note that:

1. Q2 (qualification survey) was a single question and word pair 4 of Q5 (full survey) was a statement amid eight other scaled attributes.
2. Q2 was asked without a definition of GW being provided, while word pair 4 of Q5 was asked after respondents were provided a definition of GW.
3. The increased belief in the occurrence of GW with little change in the relative position of the respondents is attributed to non-experimentally induced stimuli during the time between the qualification survey and the test survey.
4. Respondents were generally located in the Northern Hemisphere. Data collection for the qualification survey began in the spring season (April 25, 2008), while the data collection for the full survey began in the summer season (July 11, 2008).

Split Half Reliability

Using the Split Half Transform Procedure in SPSS®, the entire data set of 567 cases was split randomly into two groups. The SplitHalf procedure randomly selected cases without replacement until the approximate number of cases comprised 50% of

the cases in the data set. A variable entitled SplitHalf was created in the dataset to identify the respondents randomly placed in one group or the other. The result was two groups such that when SplitHalf = 0, *n* = 261 and when SplitHalf = 1, *n* = 306.

For gender (Q34), age (Q33), and education (Q32), ChiSq was used to test the split half reliability of the demographic variables. To ensure that the expected value for any cell was above 5% some demographic variable categories for age and education were collapsed. From the Yates ChiSq tests shown in Table 4.1, Table 4.2, and Table 4.3, it is concluded that the split halves for gender, age, and education did not significantly differ.

Table 4.1: *Split Half Reliability Test for the Gender of the Sample*

Gender	SplitHalf0	SplitHalf1	Total
Males (1)	149 / 152/26.81%	181 / 178/31.39%	330 58.20%
Females (0)	112 / 109/19.22%	125 / 128/22.05%	237 41.80%
Total	261 46%	306 54%	567 100%

Observed / Expected/% of Total
Yates *ChiSq* = 0.17; *p* = .6801

Table 4.2: *Split Half Reliability Test for the Age of the Sample*

Age	SplitHalf0	SplitHalf1	Total
18 to 24 years (21)	35 / 30/5.29%	29 / 34/6.00%	64 11.29%
25 to 34 years (30)	53 / 50/8.82%	56 / 59/10.41%	109 19.22%
35 to 44 years (40)	55 / 59/10.41%	74 / 70/12.35%	129 22.75%
45 to 54 years (50)	62 / 67/11.82%	84 / 79/13.93%	146 25.75%
55 or more years old (60)	56 / 55/9.70%	63 / 64/11.29%	119 20.99%
Total	261 46%	306 54%	567 100%

Observed / Expected/% of Total

Yates *ChiSq* = 3.62; *p* = .4599

Table 4.3: *Split Half Reliability Test for the Education of the Sample*

Education	SplitHalf0	SplitHalf1	Total
Some College, High School, Less than High School	92 / 89/15.78%	97 / 100/17.73%	189 33.51%
Bachelors Degree	89 / 90/15.96%	108 / 107/18.97%	197 34.93%
Masters Degree or more	80 / 82/14.54%	98 / 96/17.02%	178 31.56%
Total	261 46%	303 54%	564 100%

Observed / Expected/% of Total (Note: three cases marked 'Prefer not to Answer' were removed from the ChiSq Split Half Reliability Test).
Yates *ChiSq* = 0.66; *p* = .7189

A MANOVA was calculated to judge the reliability of the scalar variables that were collected before the introduction of the experimental stimulus. Since Q1 - Q4 had five (word pair) response scales each; Q5 - Q6 had nine (word pair) response scales each; Q7 had five (word pair) response scales; the total number the dependent variables included in the MANOVA was the 43 response items in Q1 – Q7 to which subjects responded before the first headline was presented to the subjects. As shown in Table 4.4, Wilks' Lambda for the first seven questions (i.e., the 43 items) before any conditions were introduced was 0.929 with $p < 0.593$, which indicates that there was no significant difference between the randomly split halves of the data set.

Table 4.4: *Wilks' Lambda Split Half Reliability Test before Stimulus*

Effect		Value	F	Hypothesis d.f.	Error d.f.	Sig.
Intercept	Wilks' Lambda	0.018	671.670[a]	43.000	523.000	0.000
SplitHalf	Wilks' Lambda	0.929	0.935[a]	43.000	523.000	0.593
a. Exact statistic						

Given that the Chi-Square (ChiSq) statistics on the demographic variables gender (Q34), age (Q33), and education (Q32) indicate no differences between the randomly split halves of the data set and given that the Wilks' Lambda indicated no differences in the randomly split halves for the first 43 response items in Q1 – Q7 before the test conditions were introduced; it is concluded that the data are reliable.

Describing the Respondents

For gender (Q34), age (Q33), and education (Q32), in Table 4.5, Table 4.6, and Table 4.7, ChiSq was used to test for demographic differences between the IPPro and IPCon groups at the 5% significance level, due to the nonparametric test. To ensure that the expected value for any cell was above 5% of the cases, as required for the ChiSq test, some demographic variable categories for age and education were collapsed, violating that rule in Table 4.6; note that the expected value in the cell for IPPro and Age 21 is 4.94%, which was accepted as meeting the 5% minimum. From the Yates ChiSq tests shown below Table 4.5, Table 4.6, and Table 4.7, at the 5% significance level, gender and age are significantly different between the IPPro and IPCon groups and the IPPro does not differ from the IPCon group for education. In the sample, females were more likely to feel that GW exists and males were more likely to feel that GW does not exist (Yates $ChiSq = 17.76$, $p < 0.0001$). The respondents who were younger than 25 years old and older than 54 years old were more likely to feel that GW does not exist; those who were 25 to 54 years old were more likely to feel that GW exists (Yates $ChiSq = 9.45$, $p = .0508$).

Table 4.5: *IPPro vs. IPCon Split Test for the Gender of the Sample*

Gender	IPPro	IPCon	Total
Males (1)	121 / 146/25.75%	209 / 184/32.44%	330 58.20%
Females (0)	130 / 105/18.52%	107 / 132/23.28%	237 41.80%
Total	251 44%	316 56%	567 100%

Observed / Expected/% of Total
Yates *ChiSq* = 17.76; *p* = <0.0001

Table 4.6: *IPPro vs. IPCon Split Test for the Age of the Sample*

Age	Pro	Con	Total
18 to 24 years (21)	23 / 28/4.94%	41 / 36/6.35%	64 11.29%
25 to 34 years (30)	56 / 48/8.47%	53 / 61/10.76%	109 19.22%
35 to 44 years (40)	58 / 57/10.05%	71 / 72/12.70%	129 22.75%
45 to 54 years (50)	72 / 65/11.46%	74 / 81/14.29%	146 25.75%
55 or more years old (60)	42 / 53/9.35%	77 / 66/11.64%	119 20.99%
Total	251 44%	316 56%	567 100%

Observed / Expected/% of Total
Yates *ChiSq* = 9.45; *p* = .0508

Table 4.7: *IPPro vs. IPCon Split Test for the Education of the Sample*

Education	IPPro	IPCon	Total
Some College, High School, Less than High School	72 / 84/14.89%	117 / 105/18.62%	189 33.51%
Bachelors Degree	96 / 87/15.43%	101 / 110/19.50%	197 34.93%
Masters Degree or more	82 / 79/14.01%	96 / 99/17.55%	178 31.56%
Total	251 44%	316 56%	564 100%

Observed / Expected/% of Total (Note: Three cases marked Prefer not to Answer and were removed from the ChiSq Split Half Reliability Test).
Yates *ChiSq* = 4.74; *p* = .0935

Tests of Normality

As shown in Table 4.8, Kolmogorov-Smirnov (K-S) and Shapiro-Wilk (S-W) tests of normality were conducted on the 43 word pair response items for Q1 to Q7. The K-S and S-W for all response items were significantly different from the normal distribution; therefore, that finding limits the use of analytic parametric statistics for drawing conclusions.

Table 4.8: *Tests of Normality for Responses to Q1 to Q7 Word Pairs*

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	d.f.	Sig.	Statistic	d.f.	Sig.
WSJQ1R1	0.154	567	0.000	0.919	567	0.000
WSJQ1R2	0.178	567	0.000	0.931	567	0.000
WSJQ1R3	0.177	567	0.000	0.934	567	0.000
WSJQ1R4	0.178	567	0.000	0.923	567	0.000
WSJQ1R5	0.160	567	0.000	0.926	567	0.000
NEQ2R1	0.097	567	0.000	0.931	567	0.000
NEQ2R2	0.247	567	0.000	0.762	567	0.000
NEQ2R3	0.269	567	0.000	0.743	567	0.000
NEQ2R4	0.270	567	0.000	0.738	567	0.000
NEQ2R5	0.259	567	0.000	0.758	567	0.000
AAESQ3R1	0.246	567	0.000	0.815	567	0.000
AAESQ3R2	0.238	567	0.000	0.910	567	0.000
AAESQ3R3	0.240	567	0.000	0.905	567	0.000

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	d.f.	Sig.	Statistic	d.f.	Sig.
AAESQ3R4	0.236	567	0.000	0.911	567	0.000
AAESQ3R5	0.222	567	0.000	0.917	567	0.000
RAESQ4R1	0.381	567	0.000	0.662	567	0.000
RAESQ4R2	0.306	567	0.000	0.850	567	0.000
RAESQ4R3	0.315	567	0.000	0.845	567	0.000
RAESQ4R4	0.301	567	0.000	0.861	567	0.000
RAESQ4R5	0.291	567	0.000	0.864	567	0.000
GWoT0Q5R1	0.210	567	0.000	0.808	567	0.000
GWoT0Q5R2	0.134	567	0.000	0.917	567	0.000
GWoT0Q5R3	0.182	567	0.000	0.871	567	0.000
GWoT0Q5R4	0.148	567	0.000	0.884	567	0.000
GWoT0Q5R5	0.168	567	0.000	0.892	567	0.000
GWoT0Q5R6	0.152	567	0.000	0.882	567	0.000
GWoT0Q5R7	0.157	567	0.000	0.876	567	0.000
GWoT0Q5R8	0.154	567	0.000	0.877	567	0.000
GWoT0Q5R9	0.100	567	0.000	0.935	567	0.000
GWsT0Q6R1	0.337	567	0.000	0.663	567	0.000
GWsT0Q6R2	0.394	567	0.000	0.547	567	0.000
GWsT0Q6R3	0.412	567	0.000	0.525	567	0.000
GWsT0Q6R4	0.410	567	0.000	0.506	567	0.000
GWsT0Q6R5	0.368	567	0.000	0.650	567	0.000
GWsT0Q6R6	0.409	567	0.000	0.509	567	0.000
GWsT0Q6R7	0.398	567	0.000	0.527	567	0.000
GWsT0Q6R8	0.414	567	0.000	0.503	567	0.000
GWsT0Q6R9	0.183	567	0.000	0.858	567	0.000
GWrT0Q7R1	0.201	567	0.000	0.799	567	0.000
GWrT0Q7R2	0.173	567	0.000	0.859	567	0.000
GWrT0Q7R3	0.187	567	0.000	0.848	567	0.000
GWrT0Q7R4	0.190	567	0.000	0.845	567	0.000
GWrT0Q7R5	0.170	567	0.000	0.863	567	0.000
a. Lilliefors Significance Correction						

Factor Analysis

In Table 4.9, a principal components extraction with Varimax rotation and Kaiser normalization (cf. Zaichowsky, 1985)[21] confirmatory factor analysis was

[21] Until this study, there was not an empirically established or theoretically justified factor rotation method for use with the semantic differential to measure cognitive dissonance. An orthogonal rotation method, Varimax, was chosen because Zaichowsky (1985) and Osgood, Suci, and Tannenbaum (1957) used orthogonal rotation. Probable interrelationships between the factors as shown in the correlations of

performed on all the items that made up each question (scale). As shown in Table 3.3, Table 3.4, and Table 3.5, three dimensions – evaluative, activity, and potency – had been anticipated but were not found according to the Eigenvalues in Table 4.9. Instead, as defined by the relatively large Cronbach's Alphas in Appendix F Table F4, no subcomponents were identified for the factors measuring referent (a), object (b), and social (c) meanings. Therefore, the anticipated dimensions were not explored as sub-factors, and the dimensions shown in Table 3.5 were analyzed as one dimension.

Table 4.9: *Total Variance Explained from Factor Analysis of Q1 to Q7 Word Pairs When Eigenvalue Set to 1.0*

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumula tive %	Total	% of Variance	Cumula tive %	Total	% of Variance	Cumula tive %
WSJ Q1 (5 items) Total Variance Explained									
1	3.695	73.904	73.904	3.695	73.904	73.904	N/A	N/A	N/A
2	0.752	15.037	88.941						
NE Q2 (5 items) Total Variance Explained									
1	3.534	70.675	70.675	3.534	70.675	70.675	N/A	N/A	N/A
2	0.986	19.724	90.399						
AAES Q3 (5 items) Total Variance Explained									
1	3.936	78.714	78.714	3.936	78.714	78.714	N/A	N/A	N/A
2	0.778	15.566	94.280						
RAES Q4 (5 items) Total Variance Explained									
1	3.805	76.109	76.109	3.805	76.109	76.109	N/A	N/A	N/A
2	0.885	17.699	93.808						
GWoT0 Q5 (9 items) Total Variance Explained									
1	5.670	63.004	63.004	5.670	63.004	63.004	5.660	62.886	62.886
2	1.044	11.606	74.609	1.044	11.606	74.609	1.055	11.723	74.609
3	0.849	9.434	84.043						
GWsT0 Q6 (9 items) Total Variance Explained									
1	5.768	64.089	64.089	5.768	64.089	64.089	5.718	63.533	63.533

Appendix F Table F5 and Appendix F Table F6 suggest that an oblique rotation method could be used in future analyses.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
2	1.054	11.710	75.799	1.054	11.710	75.799	1.104	12.266	75.799
3	0.842	9.357	85.156						
GWrT0 Q7 (5 items) Total Variance Explained									
1	3.753	75.070	75.070	3.753	75.070	75.070	N/A	N/A	N/A
2	0.968	19.356	94.426						

As shown in Appendix F Table F5, factor analysis of the word pair responses for each of the five response item questions identified one component for questions that measured RM (a): Q1, Q2, Q3, Q4, Q7, Q8, Q9, Q12, Q15, Q18, Q19, Q20, Q23, Q26, and Q29. As shown in Appendix F Table F6, factor analysis of the word pair responses for each of the nine response item questions identified two components for questions that measured OM (b) and SM (c): Q5, Q6, Q10, Q11, Q13, Q14, Q16, Q17, Q21, Q22, Q24, Q25, Q27, and Q28. As shown in Table 4.9 Total Variance Explained, factor analysis of the word pair responses for each of the underlying items identified one component for the first seven questions, when the Eigenvalue was set to one identified one component for questions measuring RM (a) (e.g., Q1, Q2, Q3, Q4, and Q7) and two components for questions measuring OM (b) (Q5) and SM (c) (Q6).

In Table 4.10 rotated components arranged in the order of the expected dimensions - evaluative, activity, and potency, indicate that the two components found for the nine word-pair response questions (i.e., Q5 and Q6) did not align with the expected dimensions.

Table 4.10: *Factor Analysis Rotated Component / Scale Matrices indicating Word Pair for 9 Item Scales*

Factor Analysis (9 Item)	R1	R5	R6	R8	R9	R3	R4	R2	R7
Q5: GLOBAL WARMING is to YOU:	Q5 R1. Evaluative: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)	Q5 R5. Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)	Q5 R6. Evaluative: Unimportant (1) <> Important (10)	Q5 R8. Evaluative: Not Real (1) <> Real (10)	Q5 R9. Evaluative: Not Inevitable (1) <> Inevitable (10)	Q5 R3. Activity: Impossible (1) <> Possible (10)	Q5 R4. Activity: Not Occurring (1) <> Occurring (10)	Q5 R2. Potency: Decreasing (1) <> Increasing (10)	Q5 R7. Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)
GWoT0Q5 (R2, R3, R4, R6, R7, R8, R9) Component / Scale 1	0.243	-0.390	0.895	0.950	0.710	0.870	0.939	0.885	0.905
GWoT0Q5 (R1, R5) Component / Scale 2	0.816	0.581	-0.110	-0.030	0.088	0.103	-0.062	-0.090	-0.089
Q6: In YOUR estimation, what is AL GORE's view of GLOBAL WARMING?	Q6 R1. Evaluative: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q6 R5. Evaluative: Bad for Future Generations (1) <> Good for Future Generations (10)	Q6 R6 Evaluative: Unimportant (1) <> Important (10)	Q6R8. Evaluative: Not Real (1) <> Real (10)	Q6 R9 Evaluative: Not Inevitable (1) <> Inevitable (10)	Q6 R3 Activity: Impossible (1) <> Possible (10)	Q6 R4 Activity: Not Occurring (1) <> Occurring (10)	Q6 R2 Potency: Decreasing (1) <> Increasing (10)	Q6 R7 Potency: Will Not Have an Impact (1) <> Will Have an Impact (10)
GWsT0Q6 (R1, R2, R3, R4, R6, R7, R8) Component / Scale 1	0.569	-0.184	0.934	0.945	0.307	0.938	0.946	0.932	0.925
GWsT0Q6 (R5, R9) Component / Scale 2	-0.116	0.857	0.071	0.119	0.547	0.096	0.109	0.104	0.075

In Table 4.10, for Q5-OM (b), the five word pairs that measured the evaluative dimension were split across the two components, with R1-Unfamiliar and R5-Bad Future being included in the second component and R6-Unimportant, R8-Not Real, and R9-Not Inevitable being included in the first component. Word pairs R3-Impossible, R4-Not Occurring, R2-Decreasing, and R7-Will Not Impact, which measured the activity and potency dimensions, were included in the first component.

In Table 4.10, for Q6-SM (c), the five word pairs that were measurements of the evaluative dimension were again split across the two components, with R1-Unfamiliar, R6-Unimportant, and R8-Not Real included in the first component and R5-Bad Future and R9-Not Inevitable included in the second component. Word pairs R3-Impossible, R4-Not Occurring, R2-Decreasing, and R7-Will Not Impact, which measured the activity and potency dimensions, were again included in the first component.

In Table 4.11, Cronbach's Alpha (CA) was calculated on all word pair response items for Q1 – Q7.[22] All of the CAs were above 0.7, indicating that internal consistency exists within these constructs.

[22] Confirmatory factor analysis and Cronbach's Alphas were performed on Q1 – Q7, because other questions in the survey addressing global warming have identical wording and scales. In Figure 19, Q5, Q6, and Q7 at T0, are identical to Q10, Q11, and Q12 at T1 in Figure 20 and Figure 21 and Q21, Q22, and Q23 at T2 in Figure 23 and Figure 24.

Table 4.11: *Cronbach's Alphas of Word Pair Items for Q1 to Q7 Word Pairs*

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*n* of Items	*N* of Cases
WSJQ1 (R1 – R5)	0.896	0.905	5	567
NEQ2 (R1 – R5)	0.782	0.855	5	567
AAESQ3 (R1 – R5)	0.914	0.922	5	567
RAESQ4 (R1 – R5)	0.902	0.903	5	567
GWoT0Q5 (R1 – R9)	0.918	0.908	9	567
GWsT0Q6 (R1 – R9)	0.860	0.902	9	567
GWrT0Q7 (R1 – R5)	0.906	0.886	5	567

In summary, in Appendix F Table F5, Appendix F Table F6, Table 4.9 and Table 4.10, sub-components were found for the constructs but these subcomponents do not support the analysis of the data using the three dimensions - evaluative, activity, and potency. Instead, the lack of support for the expected number of dimensions, reclassification of items into unexpected subcomponents, and the CAs that show cohesion of the components (see Table 4.10) call for combining the responses to the Word Pairs on each question into one component for those questions.

In Table 4.12, as would be expected based on the underlying variables (i.e., responses to the word pairs) not being normally distributed; according to the Kolmogorov-Smirnov statistics, which were all significant, none of the factors (i.e., questions) computed as un-weighted averages of the responses were normally distributed. Appendix F Table F7 shows the Kolmogorov-Smirnov statistics for all questions in the instrument.

Table 4.12: *Tests of Normality of Averaged Word Pair Scales*

Tests of Normality of Averaged Word Pair Scales Derived from Factor Analysis	Kolmogorov-Smirnov[a]		
	Statistic	d.f.	Sig.
WSJQ1 (R1 – R5) Q1Scale 1	0.096	567	0.000
NEQ2 (R1 – R5) Q2Scale1	0.135	567	0.000
AAESQ3 (R1 – R5) Q3Scale1	0.148	567	0.000
RAESQ4 (R1 – R5) Q4Scale1	0.215	567	0.000
GWoT0Q5 (R2, R3, R4, R6, R7, R8, R9) Q5Scale1	0.093	567	0.000
GWoT0Q5 (R1, R5) Q5Scale2	0.144	567	0.000
GWsT0Q6 (R1, R2, R3, R4, R6, R7, R8) Q6Scale1	0.296	567	0.000
GWsT0Q6 (R5, R9) Q6Scale2	0.180	567	0.000
GWrT0Q7 (R1 – R5) Q7Scale1	0.125	567	0.000
a. Lilliefors Significance Correction			

Convergent Validity[23] and Discriminant Validity of Factors (Scales)

Three dimensions were not found. In Table 4.9, the lack of identifiable sub-factors and the Cronbach Alphas in Table 4.11 across all the questions supports investigation of convergent and divergent (discriminant) validity of the factors (scales) without regard for their evaluative, activity, and potency dimensions.

SmartPLS™ (Ringle, et al., 2005) was used to examine convergent validity and divergent (i.e., discriminant) validity of the word pair responses for Q1 through Q7, which were administered before the headline conditions were presented in T1 and T2. Table 4.13 presents the SmartPLS™ calculated cross loadings (i.e., β coefficients) for the word pair responses to Q1 through Q7 in alphabetical order.

[23] The content validity of the items comprising the scales was judged to be high by the researcher and the dissertation committee.

Table 4.13: *SmartPLS™ Calculated Cross Loadings (or β Coefficients) for Responses to Q1 to Q7 Word Pairs*

	1	2	3	4	5	6	7
	AAESQ3	GWoT0Q5	GWrT0Q7	GWsT0Q6	NEQ2	RAESQ4	WSJQ1
AAESQ3R1	0.5098	0.1653	0.1882	0.0324	0.1321	0.2230	0.0654
AAESQ3R2	0.9748	0.4829	0.4630	0.2203	0.1604	0.6872	0.2272
AAESQ3R3	0.9713	0.4747	0.4702	0.1944	0.1684	0.6869	0.2029
AAESQ3R4	0.9725	0.4559	0.4521	0.1881	0.1563	0.6749	0.1935
AAESQ3R5	0.9140	0.4880	0.4463	0.1792	0.1513	0.6528	0.1890
GWoT0Q5R1	0.0928	0.2016[1a]	0.1399	0.2696[1b]	0.0474	0.0656	0.0947
GWoT0Q5R2	0.4862	0.8925	0.8059	0.2690	0.0554	0.3617	0.1537
GWoT0Q5R3	0.3815	0.8623	0.6366	0.2685	0.0768	0.3098	0.2399
GWoT0Q5R4	0.4507	0.9414	0.7679	0.2204	0.0385	0.3435	0.1985
GWoT0Q5R5	-0.1719	-0.4075[2a]	-0.4498[2b]	-0.0875	0.0368	-0.1554	0.0051
GWoT0Q5R6	0.4676	0.9013	0.7952	0.2291	0.0672	0.3427	0.2110
GWoT0Q5R7	0.4342	0.9087	0.7447	0.2471	0.0653	0.3357	0.2186
GWoT0Q5R8	0.4318	0.9498	0.7536	0.2473	0.0351	0.3271	0.2361
GWoT0Q5R9	0.3409	0.7041	0.4365	0.1131	0.0275	0.2708	0.2337
GWrT0Q7R1	0.0774	0.2124	0.2168[3a]	0.3466[3b]	-0.0253	0.0958	0.1098
GWrT0Q7R2	0.4584	0.7964	0.9753	0.2913	0.0725	0.3587	0.1636
GWrT0Q7R3	0.4575	0.7936	0.9802	0.2720	0.0650	0.3525	0.1656
GWrT0Q7R4	0.4673	0.7937	0.9798	0.2819	0.0711	0.3587	0.1646
GWrT0Q7R5	0.4364	0.7504	0.9133	0.2612	0.1123	0.3435	0.1791
GWsT0Q6R1	0.2026	0.2915	0.3619	0.6265	0.0736	0.2093	0.1858
GWsT0Q6R2	0.1288	0.2451	0.2430	0.9193	0.0150	0.1324	0.1869
GWsT0Q6R3	0.1782	0.2269	0.2523	0.9285	0.0058	0.1819	0.1472
GWsT0Q6R4	0.1686	0.2267	0.2366	0.9367	0.0007	0.1560	0.1675
GWsT0Q6R5	0.0689[4b]	0.0076	-0.0030	-0.0276[4a]	0.0469[4c]	0.0030	0.0227
GWsT0Q6R6	0.1469	0.2461	0.2548	0.9135	-0.0167	0.1506	0.1928
GWsT0Q6R7	0.1068	0.1932	0.2097	0.9027	0.0202	0.1309	0.1935
GWsT0Q6R8	0.1510	0.2146	0.2470	0.9348	0.0281	0.1595	0.1763
GWsT0Q6R9	0.1334	0.0467	0.0922	0.4186	-0.0286	0.0962	0.0277
NEQ2R1	0.1107	0.1159	0.1309	0.1291	0.2659	0.0370	0.1292
NEQ2R2	0.1507	0.0161	0.0457	-0.0048	0.9448	0.2068	0.0765
NEQ2R3	0.1158	-0.0003	0.0323	-0.0089	0.9457	0.1749	0.0668
NEQ2R4	0.1417	0.0038	0.0294	0.0088	0.9469	0.1777	0.0639
NEQ2R5	0.1753	0.1154	0.1123	0.0032	0.8576	0.1864	0.0961
RAESQ4R1	0.2611	0.0720	0.1071	-0.0230	0.1513	0.3805	0.0694
RAESQ4R2	0.6682	0.3548	0.3509	0.2106	0.1931	0.9732	0.2190

	1	2	3	4	5	6	7
	AAESQ3	GWoT0Q5	GWrT0Q7	GWsT0Q6	NEQ2	RAESQ4	WSJQ1
RAESQ4R3	0.6616	0.3596	0.3582	0.1954	0.1960	0.9777	0.2167
RAESQ4R4	0.6740	0.3515	0.3503	0.1982	0.1955	0.9774	0.2162
RAESQ4R5	0.6344	0.3871	0.3624	0.1688	0.1517	0.8957	0.2009
WSJQ1R1	0.1117	0.1347	0.1260	0.1871	0.1050	0.0367	0.5473
WSJQ1R2	0.1909	0.1957	0.1444	0.1710	0.0916	0.2214	0.9504
WSJQ1R3	0.2037	0.2038	0.1391	0.1694	0.0878	0.2189	0.9464
WSJQ1R4	0.2060	0.2296	0.1842	0.1627	0.0647	0.2440	0.9541
WSJQ1R5	0.1578	0.2360	0.1839	0.2043	0.1155	0.1561	0.8230

In Table 4.13 column 1, the five word pair responses underlying Q3 (attitude toward the latent American Academy of Environmental Science factor) in the outlined column block (i.e., AAESQ3 R1 through R5) have the highest coefficients in their respective rows. The AAESQ3 R1 through R5 responses converge on the expected factor, AAESQ3, and diverge by not converging on the non-expected factors in other columns.

In Table 4.13 column 2, seven of the nine word pair responses underlying Q5 (OM [b] of GW at T0, before the first headline was introduced) in the outlined column block (i.e., GWoT0Q5 R2, R3, R4, R6, R7, R8, and R9) have the highest coefficients in their respective rows. GWoT0Q5 R2, R3, R4, R6, R7, R8, and R9 converge on the expected factor, GWoT0Q5, and diverge by not converging on the non-expected factors. However, 0.2016[1a] (coefficient of the word pair for GWoT0Q5R1 [An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)]) is lower than 0.2696[**1b**] (coefficient of the same word pair for GWsT0Q6) indicating that GWoT0Q5 R1 is not converging on the expected factor, GWoT0Q5, and not diverging from the non-expected factors by converging on a non-expected factor, GWsT0Q6. Moreover, the absolute of -0.4075[**2a**] (coefficient of the word pair for GWoT0Q5 R5 [Bad for Future

Generations (1) <> Good for Future Generations (10)]) is lower than the absolute of -0.4498[2b] (coefficient of the same word pair for GWrT0Q7) indicating that GWoT0Q5R5 is not converging on the expected factor, GWoT0Q5, and not diverging from non-expected factors by converging on a non-expected factor, GWrT0Q7.

In Table 4.13 column 3, four of the five word pair responses underlying Q7 (RM [a] of GW at T0, before the first headline was introduced) in the outlined column block (i.e., GWrT0Q7 R2, R3, R4, and R5) have the highest coefficients in their respective rows. GWrT0Q7 R2, R3, R4, and R5 converge on the expected factor, GWrT0Q7, and diverge by not converging on the non-expected factors. However, 0.2168[3a] (coefficient of the word pair for GWrT0Q7R1 [An Unfamiliar View to You (1) <> A Familiar View to You (10)]) is lower than 0.3466[3b] (coefficient of a similar word pair for GWsT0Q6) indicating that GWrT0Q7R1 is not converging on the expected factor, GWrT0Q7, and not diverging from the non-expected factors by converging on a non-expected factor, GWsT0Q6.

In Table 4.13 column 4, eight of the nine word pair responses underlying Q6 (SM [c] of GW at T0, before the first headline was introduced) in the outlined column block (i.e., GWsT0Q6 R1, R2, R3, R4, R6, R7, R8, and R9) have the highest coefficients in their respective rows. GWsT0Q6 R1, R2, R3, R4, R6, R7, R8, and R9 converge on the expected factor, GWsT0Q6, and diverge by not converging on the non-expected factors. However, the absolute of -0.0276[4a] (coefficient of the word pair for GWsT0Q6R5 [Bad for Future Generations (1) <> Good for Future Generations (10)]) is lower than 0.0689[4b] (coefficient of the same word pair for AAESQ3) and is lower than 0.0469[4c] (coefficient of the same word pair for NEQ2) indicating that

GWsT0Q6R5 is not converging on the expected factor, GWsT0Q6, and not diverging from the non-expected factors by converging on non-expected factors, AAESQ3 and NEQ2.

In Table 4.13 column 5, the responses to the five word pairs underlying Q2 (attitude toward the latent National Enquirer factor) in the outlined column block (i.e., NEQ2 R1 through R5) have the highest coefficients in their respective rows. The NEQ2 R1 through R5 responses converge on the expected factor, NEQ2, and diverge by not converging on the non-expected factors.

In Table 4.13 column 6, the five word pair responses underlying Q4 (attitude toward the latent Russian Academy of Environmental Science factor) in the outlined column block (i.e., RAESQ4 R1 through R5) have the highest coefficients in their respective rows. The RAESQ4 R1 through R5 responses converge on the expected factor, RAESQ4, and diverge by not converging on the non-expected factors.

In Table 4.13 column 7, the five word pair responses underlying Q1 (attitude toward the latent Wall Street Journal factor) in the outlined column block (i.e., WSJQ1 R1 through R5) have the highest coefficients in their respective rows. The WSJQ1 R1 through R5 responses converge on the expected factor, WSJQ1, and diverge by not converging on the non-expected factors.

The word pair responses with weak convergent validity and weak divergent validity shown in Table 4.13 at superscripts 1a, 2a, 3a, and 4a were not removed from the scales analyzed in this research, because the scales were *balanced* with the same (word pair) responses relative to other questions. According to the application of congruity (Osgood & Tannenbaum, 1955), balance (Heider, 1946, 1958), and CD

(Festinger, 1957) theories discussed in this dissertation, the responses in the scales that do not conform to convergent / divergent validity should not be removed in the analysis of the results. This means that if the non-convergent responses were removed from the factors on which they do not converge but remain in the analysis in the factors on which they converge, the factors would no longer be *balanced* with questions that measure the social context. Lacking balance, the interaction among the responses making up the factors would not be consistent.

The balancing of the factors with the social context is indicated in the evaluation of the comparison of the responses for the adjectives Unfamiliar / Familiar and Bad / Good. In Table 4.13, with superscripts 1a and 1b, GWoT0Q5R1, Unfamiliar / Familiar, loads higher on GWsT0Q6 than GWoT0Q5, suggesting that interaction with the social context of the opinions of the identified social comparison referent (SCR), Mr. Gore. With superscripts 2a and 2b, GWoT0Q5R5, Bad / Good, loads higher on GWrT0Q7 than GWoT0Q5, suggesting interaction with the social context of the evaluation of the identified SCR, Mr. Gore. With superscripts 3a and 3b, Unfamiliar / Familiar, GWrT0Q71 loads higher on GWsT0Q6 than on GWrT0Q7, suggesting interaction with the social context of the evaluation of the identified SCR, Mr. Gore. With superscripts 4a, 4b, and 4c, Bad / Good, loads higher on GWsT0Q6R5 loads higher on AAESQ3 and NEQ2 than on GWsT0Q6, suggesting that interaction with the social context of the opinions of the identified SCR, Mr. Gore. In addition, since the respondents responded to all of the word pair items together, removal of some of the items from the analysis does not support the conclusion that the respondents would have answered the remaining items in the way that they answered

those items. In other words, if word pairs not conforming to convergent and divergent validity analysis are removed, the balancing of the subfactors discussed in this dissertation are masked in the analysis.

Data Manipulation

Table 4.14 lists the manipulated factors (i.e., T1A, T1P, T1V, T2A, T2P, and T2V) that were contained in the content of the headlines shown to respondents. The conditions reflected in the headlines in Table 4.14 were shown to 567 respondents, each assigned to one of 16 groups. Respondents were randomly assigned to groups 1 to 16, according to an initial position of *Pro* GW (i.e., it was occurring: IPPro) or *Con* GW (i.e., it was not occurring: IPCon). At T1, the respondents received headlines that expressed a message valence (tone) that was the opposite of their initial views. The publication and attributed research organization were varied for each group as shown in Table 4.14. For example, the variable T1V represents the valence (tone) of the message, which was the inverse of the initial position of respondents' views on the occurrence of GW. Effects involving T1V represent the manipulated valence of the message and opposite the initial position of the respondent on the issue. A respondent assigned to Group 1 initially expressed an opinion that GW was not occurring. Accordingly, at T1 the respondent viewed a headline published in the National Enquirer attributing information collected by the Russian Academy of Environmental Science that GW was occurring (T1V = 1). At T2, the same Group 1 respondent viewed a headline published in the Wall Street Journal attributing information collected by the American Academy of Environmental Science that GW was occurring (T2V = 1). The media publication and attribution source shown in Table 4.14 were

varied along with valence according to the design of the experimental procedure described in Table 3.14.

Table 4.14: *Manipulated Valence, Attribution, and Publication Factors Presented in Simulated Headlines*

Group	Initial Position (IP) on Global Warming (IPCon = 0, IPPro = 1)	Headline Effect (from Appendix D Table D1)	Valence (T1V) (Con = 0, Pro = 1)	Media Publication (T1P) (NE = 0, WSJ = 1)	Attribution Source (T1A) (Russian = 0, American = 1)	Valence (T2V) (Con = 0, Pro = 1)	Media Publication (T2P) (NE = 0, WSJ = 1)	Attribution Source (T2A) (Russian = 0, American = 1)
1	IPCon (0)	F & A	Pro (1)	NE (0)	Russian (0)	Pro (1)	WSJ (1)	American (1)
2	IPCon (0)	A & G	Pro (1)	WSJ (1)	American (1)	Con (0)	WSJ (1)	Russian (0)
3	IPPro (1)	G & C	Con (0)	WSJ (1)	Russian (0)	Con (0)	WSJ (1)	American (1)
4	IPPro (1)	H & H	Con (0)	NE (0)	Russian (0)	Con (0)	NE (0)	Russian (0)
5	IPCon (0)	E & F	Pro (1)	WSJ (1)	Russian (0)	Pro (1)	NE (0)	Russian (0)
6	IPPro (1)	C & H	Con (0)	WSJ (1)	American (1)	Con (0)	NE (0)	Russian (0)
7	IPCon (0)	F & G	Pro (1)	NE (0)	Russian (0)	Con (0)	WSJ (1)	Russian (0)
8	IPPro (1)	H & B	Con (0)	NE (0)	Russian (0)	Pro (1)	NE (0)	American (1)
9	IPCon (0)	B & D	Pro (1)	NE (0)	American (1)	Con (0)	NE (0)	American (1)
10	IPCon (0)	B & F	Pro (1)	NE (0)	American (1)	Pro (1)	NE (0)	Russian (0)
11	IPPro (1)	C & B	Con (0)	WSJ (1)	American (1)	Pro (1)	NE (0)	American (1)
12	IPCon (0)	A & A	Pro (1)	WSJ (1)	American (1)	Pro (1)	WSJ (1)	American (1)
13	IPPro (1)	G & E	Con (0)	WSJ (1)	Russian (0)	Pro (1)	WSJ (1)	Russian (0)
14	IPCon (0)	E & D	Pro (1)	WSJ (1)	Russian (0)	Con (0)	NE (0)	American (1)
15	IPPro (1)	D & E	Con (0)	NE (0)	American (1)	Pro (1)	WSJ (1)	Russian (0)
16	IPPro (1)	D & C	Con (0)	NE (0)	American (1)	Con (0)	WSJ (1)	American (1)

Multivariate Analysis

In Table 4.15, the summed means of the within subjects data for GW referent meaning RM (a), GW object meaning OM (b), and GW social meaning SM (c) were analyzed and compared to the relationships anticipated in Figure 9 to determine the best fitting dissonant cognitive form (DCF) from Appendix B Figure B1. In the IPPro column of Table 4.15, the respondents who supported GW before the first headline

was administered experienced DCF Cognition A at T0; Cognition A was also experienced at T1 and T2 by the IPPro respondents. In the IPCon column of Table 4.15, the respondents who did not support GW before the first headline, experienced DCF Cognition D at T0; Cognition D was also experienced at T1 and T2 by the IPCon respondents. Unlike the high dissonance scenario depicted in Figure 9, the Cognition G was not exhibited in the data at T0, T1, or T2 relative to GW. Respondents who expressed an initial position of non-support for GW maintained a low rating of RM at T0, T1, and T2. The hypothesized balancing and congruency were therefore examined with multivariate analysis to determine the significant relationships.

Table 4.15: *Summed Means for Referent (a), Object (b), and Social (c) Meanings with postulated Dissonant Cognitive Forms across Repeated Measures (Significance in Appendix F Table F8)*

Summed Means for Referent (a), Object (b), and Social (c) Meanings with postulated Dissonant Cognitive Forms	Groups IPPro (n = 251)	Groups IPCon (n = 316)	Groups All (N = 567)
	Mean	Mean	Mean
Q5. Object Meaning (b) (9 scales GWoT0)	8.46	5.14	6.61
Q6. Social Meaning (c) (9 scales GWsT0)	8.83	8.12	8.44
Q7. Referent Meaning (a) (5 scales GWrT0)	7.72	3.81	5.54
T0 DCF:	A	F	D
Q10. Object Meaning (b) (9 scales GWoT1)	8.10	4.95	6.34
Q11. Social Meaning (c) (9 scales GWsT1)	8.68	8.30	8.48
Q12. Referent Meaning (a) (5 scales GWrT1)	7.77	4.11	5.73
T1 DCF:	A	F	D
Q21. Object Meaning (b) (9 scales GWoT2)	7.92	4.79	6.17
Q22. Social Meaning (c) (9 scales GWsT2)	8.46	7.93	8.17
Q23. Referent Meaning (a) (5 scales GWrT2)	7.53	3.75	5.42
T2 DCF:	A	F	D

The within subjects design was examined using r correlations, SmartPLS™, and SPSS® GLM Repeated Measures. As first approach to the analysis, a MANOVA test of differences between the variables was conducted, but SPSS was incapable of

drawing the paths and normalizing the scales. Moreover, Amos by SPSS (Home page, n.d.) was incapable of analyzing a model with the large number of paths that were suggested by this analysis. SmartPLS™ was used to analyze the β coefficients at the 10% significance level. Multivariate analysis using SmartPLS™ and SPSS® was confined to beliefs about GW shown in #M0 (Figure 16), #M1 (Figure 17), #M4 (Figure 19), because it was noted during factor analysis that the induction of CD is evidenced by the repeated measures design of the GW questions.

The significant and non-significant β coefficients of the SmartPLS™ analysis are shown in Appendix F Table F8. All β coefficients are stated before bootstrapping; the β coefficients were strengthened with a bootstrapping procedure of 567 cases that was drawn 300 times. From the bootstrapping β column in Appendix F Table F8, the bootstrapping procedure had a small effect on the β coefficients, so the β coefficients calculated on the original sample values were used. The hypothesized effects of message headlines on positively worded and negatively worded beliefs about GW shown in Table 4.5 were examined at times T0, T1, and T2. At T0, referent (a) (GWrT0), object (b) (GWoT0), and social (c) (GWsT0) meanings were measured before the first headline was shown to respondents. At T1, GWrT1, GWoT1, and GWsT1 were measured after the first headline was shown. At T2, GWrT2, GWoT2, and GWsT2 were measured after the second headline was shown.

Analysis of GW Path Relationships

Figure 23 (see figure key) depicts an analysis of 100 GW path relationships with SmartPLS™. The three triads shown at the top depict the postulated juxtaposition of RM (a) (i.e., evaluations of Mr. Gore's views on GW), OM (b) (i.e., perceptions of

GW), and SM (c) (i.e., perceptions of Mr. Gore's views on GW) as described in this dissertation. Referent (a), object (b) and social (c) meanings are grouped, respectively, at time period T0 (GWrT0, GWoT0, and GWsT0), time period T1 (GWrT1, GWoT1, and GWsT1), and time period T2 (GWrT2, GWoT2, and GWsT2). Near the upper left hand corner of Figure 23, the independent variable initial position (IP) represents the initial position of respondents' views of the occurrence of GW during data collection for the qualification survey, before time period T0. The nine variables in the middle of the diagram represent the β coefficients of the changes in referent (a), object (b), and social (c) meanings manifest variables between times T0, T1, and T2 (GWo…, GWr… and GWs…). The change variables for beliefs about GW are the calculated differences between the responses to the word pairs at Time 0 (before the first headline was shown), Time 1 (after the first headline), and Time 2 (after the second headline). For example, these differences are represented for OM (b) by the latent variables GWoT1T0, GWoT2T1, and GWoT2T0, etc. These differences were used as the dependent variables in the subsequent analysis to ascertain whether there was a direction or magnitude of a shift in the directions. At the bottom of the diagram, the manipulated factors T1A, T1P, T1V, T2A, T2P, and T2V that are described in Table 4.14 depict the manipulated factors that were introduced to respondents at times T1 and T2.

Figure 23: SmartPLS™ Analysis of GW Path Relationships

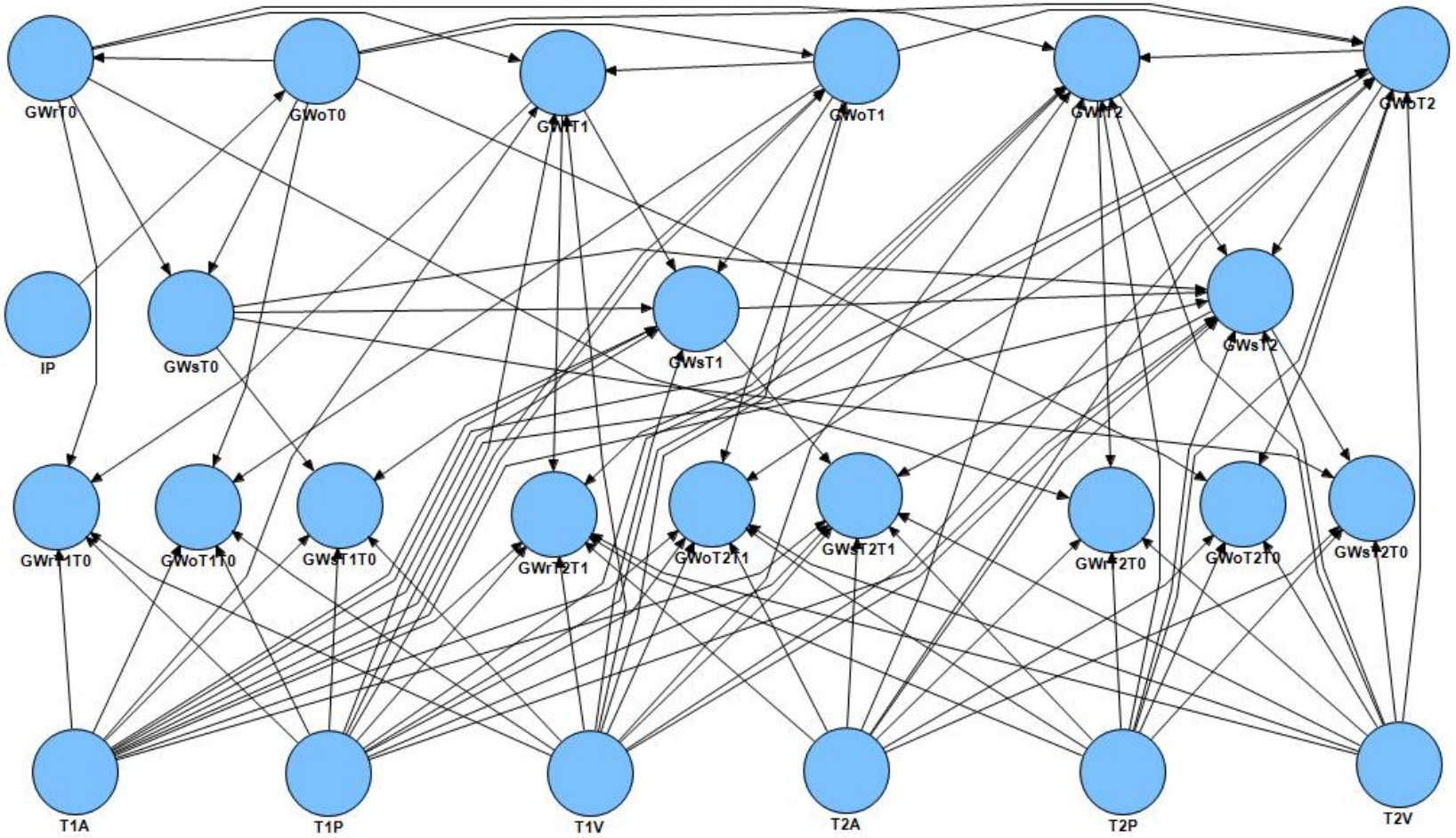


Figure 23 Key (Results in Appendix F Table F8)
Independent Variables – IP, T1A, T1P, T1V, T2A, T2P, T2V
IP – Initial Position of the Respondent on belief in Global Warming
T – Point in Time, 0 – Prior to Induced Effects, 1 – After first Induced Effect, 2 – After second Induced Effect, A – Attribution of the research (Russian Academy of Environmental Science or American Academy of Environmental Science), P – Publication (National Enquirer or Wall Street Journal), V – Valence (Negative Tone or Positive Tone)
Dependent Variables – GWrT0 (Q7), GWrT1 (Q12), GWrT2 (Q23), GWrT1T0, GWrT2T1, GWrT2T0, GWoT0 (Q5), GWoT1 (Q10), GWoT2 (Q21), GWoT1T0, GWoT2T1, GWoT2T0, GWsT0 (Q6), GWsT1 (Q11), GWsT2 (Q22), GWsT1T0, GWsT2T1, GWsT2T0.
GWr – referent meaning (a), T0 – Meaning at T0, T1 – Meaning at T1, T2 – Meaning at T2, T1T0 – Change in meaning between T0 and T1 (e.g., GWoT1 – GWoT0 = GWoT1T0), T2T1 – Change in meaning between T1 and T2, T2T0 – Change in meaning between T0 and T2
GWo – object meaning (b), T0 – Meaning at T0, T1 – Meaning at T1, T2 – Meaning at T2, T1T0 – Change in meaning between T0 and T1, T2T1 – Change in meaning between T1 and T2, T2T0 – Change in meaning between T0 and T2
GWs – social meaning (c), T0 – Meaning at T0, T1 – Meaning at T1, T2 – Meaning at T2, T1T0 – Change in meaning between T0 and T1, T2T1 – Change in meaning between T1 and T2, T2T0 – Change in meaning between T0 and T2
* - moderated by e.g., - T??*T?? – Effect of ? of message given at Time ? moderated by ? of message given at Time ?.

When considering the main effects from times T0 to T2 shown in Figure 23, the headlines constructed from Table 4.14 had multiple significant effects on the relationships between opinions of GW (i.e., OM [b]) and evaluations of Mr. Gore's views (i.e., RM [a]) and perceptions of Mr. Gore's views on GW (i.e., SM [c]). The twenty-two significant path relationships found in Figure 23 based on a 10% significance level are marked with a superscript in Table 4.16.[24]

[24] In Appendix F Table F8, the 100 SmartPLS™ paths examined are listed. Both the path relationships with significant and insignificant effects (and beta coefficients) are shown in Appendix F Table F8. The Original Sample column value is the normalized beta coefficients that were extracted from an initial use of SmartPLS™ for reliability and validity testing from the original manifest variables; and then the beta coefficients were imported back into SmartPLS™ for additional analysis. The beta coefficients for each case represent normalized, individual shifts in evaluation for each respondent; hence, averaging these values does not provide the magnitude of the shift in evaluation. The Sample Mean was derived from

Table 4.16: β *Coefficients of Important Paths in Appendix F Table F8*

	SmartPLS™ Path	β calculated on Original Sample β	Stand. Dev.	*t* Statistic	Two-Tailed Prob-ability (d.f. 565, sig. level 10%)
1	GWoT0 -> GWoT1	0.8153	0.0308	26.4580	<0.0001 [a]
2	GWoT0 -> GWoT2	0.3543	0.0686	5.1615	<0.0001 [b]
3	GWoT0 -> GWrT0	0.7705	0.0175	43.9789	<0.0001 [c]
4	GWoT0 -> GWsT0	0.0677	0.0758	0.8932	0.3721 [d]
5	GWoT1 -> GWoT2	0.5044	0.0739	6.8273	<0.0001 [e]
6	GWoT1 -> GWrT1	0.1927	0.0440	4.3838	<0.0001 [f]
7	GWoT1 -> GWsT1	0.1707	0.0728	2.3445	0.0194 [g]
8	GWoT2 -> GWrT2	0.1185	0.0370	3.2024	0.0014 [h]
9	GWoT2 -> GWsT2	0.1254	0.0494	2.5365	0.0115 [i]
10	GWrT0 -> GWrT1	0.7610	0.0420	18.1023	<0.0001 [j]
11	GWrT0 -> GWrT2	0.4118	0.0628	6.5591	<0.0001 [k]
12	GWrT0 -> GWsT0	0.2588	0.0636	4.0707	0.0001 [l]
13	GWrT1 -> GWrT2	0.4554	0.0652	6.9851	<0.0001 [m]
14	GWrT1 -> GWsT1	0.0286	0.0602	0.4753	0.6348 [n]
15	GWrT2 -> GWsT2	0.0224	0.0475	0.4717	0.6373 [o]
16	GWsT0 -> GWsT1	0.4467	0.0577	7.7478	<0.0001 [p]
17	GWsT0 -> GWsT2	0.0850	0.0596	1.4271	0.1541 [q]
18	GWsT1 -> GWsT2	0.6088	0.0587	10.3774	<0.0001 [r]
19	IP -> GWoT0	0.7232	0.0191	37.8247	<0.0001 [s]
20	T1V -> GWoT1	-0.0861	0.0359	2.3986	0.0168 [v]
21	T1V -> GWoT2	-0.0582	0.0362	1.6054	0.1090 [x]
22	T1V -> GWsT1	0.1477	0.0637	2.3184	0.0208 [y]

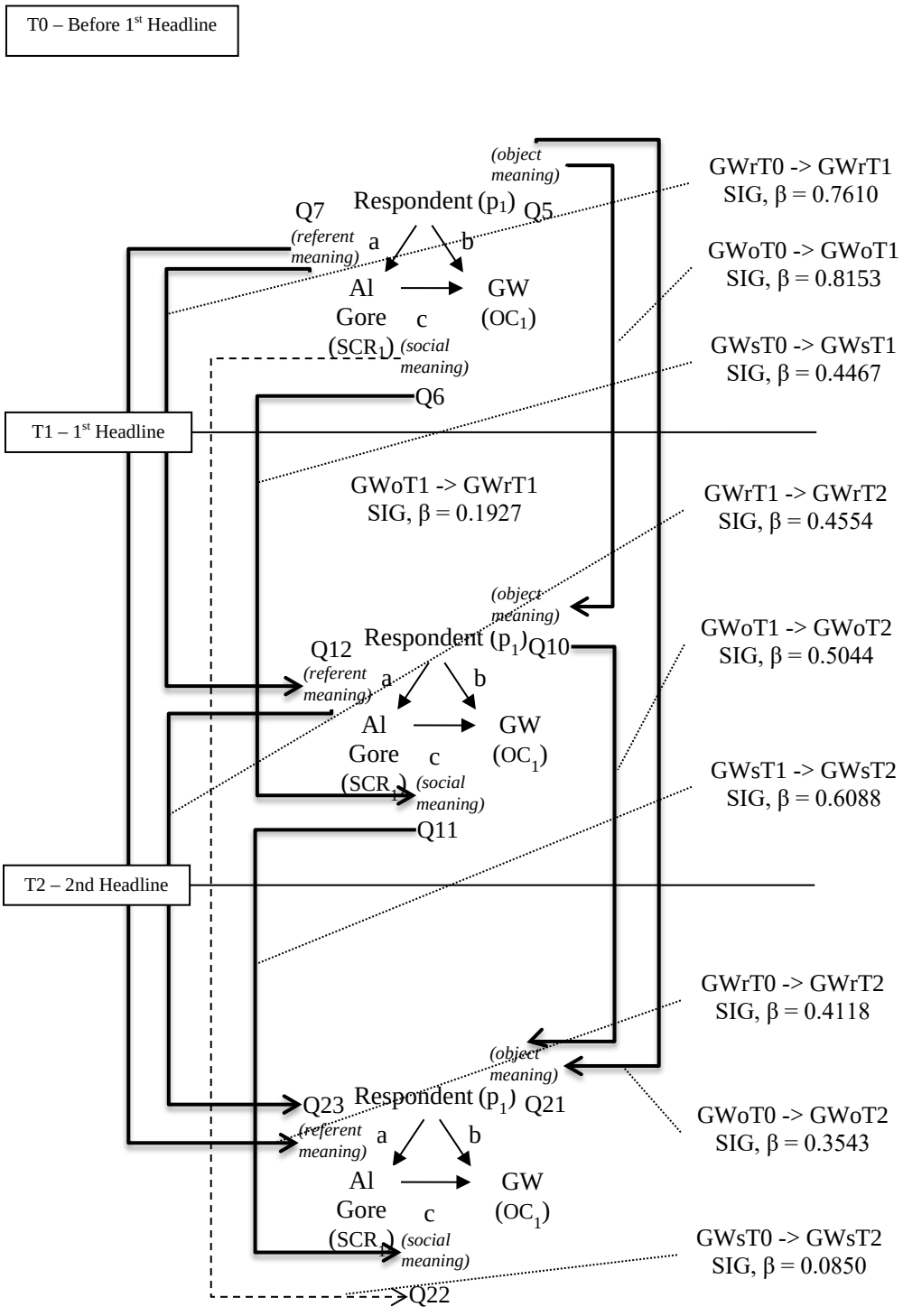
In row 19 of Table 4.16 and in Figure 23, the path of initial position (IP) to OM (b) at T0 before information was presented was large, positive, and significant (IP -> GWoT0; β = 0.7232; p = <0.0001 [s]). IP is the belief of respondent during Qualification Survey of either *Pro* GW (i.e., the respondent indicating that GW was

bootstrapping 567 cases with 300 samples, which produced a slight improvement in the beta coefficients. The T statistic column was produced from the Original Mean and the Standard Error. The two-tailed probabilities were produced from Microsoft Excel's TDIST function using 565 degrees of freedom.

occurring or *IPPro*) or *Con* GW (i.e., the respondent indicating that GW was not occurring or *IPCon*).

Figure 24 depicts the consistency of evaluations from T0 to T2 listed in Table 4.16. In row 1, row 5, and row 2 of Table 4.16, as depicted in Figure 24, there are significant relationships between OM (b) paths (e.g., familiarity of the topic, bad/good for future generations, importance, realness, inevitability, possibility, level of occurrence, and level of increase), at times T0, T1, and T2. In row 1, OM (b) at T0 had a large, positive, and significant effect on OM (b) at T1 (GWoT0 -> GWoT1; β = 0.8153; p = <0.0001 [a]). In row 5, OM (b) at T1 had a large, positive, and significant effect on OM (b) at T2 (GWoT1 -> GWoT2; β = 0.5044; p = <0.0001 [e]). In row 2, OM (b) at T0 had a large, positive, and significant effect on OM (b) at T2 (GWoT0 -> GWoT2; β = 0.3543; p = <0.0001 [b]). These results support consistency in responses between OMs (b) while attribution, publication, and valence (tone) factors were manipulated with the headlines. Respondents who were high on GWoT0 were high on GWoT1 and GWoT2 and those that were low on GWoT0 were low on GWoT1 and GWoT2, indicating that respondents' relative positions were consistent, regardless of the informational content of the varying factors presented in headlines. However, the magnitude of β coefficients of OM (b) relationships (GWoT0 -> GWoT1 [a]; GWoT1 -> GWoT2 [e]; and GWoT0 -> GWoT2 [b]) were progressively smaller after T1 and T2.

Figure 24: GW Path Relationships across Repeated Measures



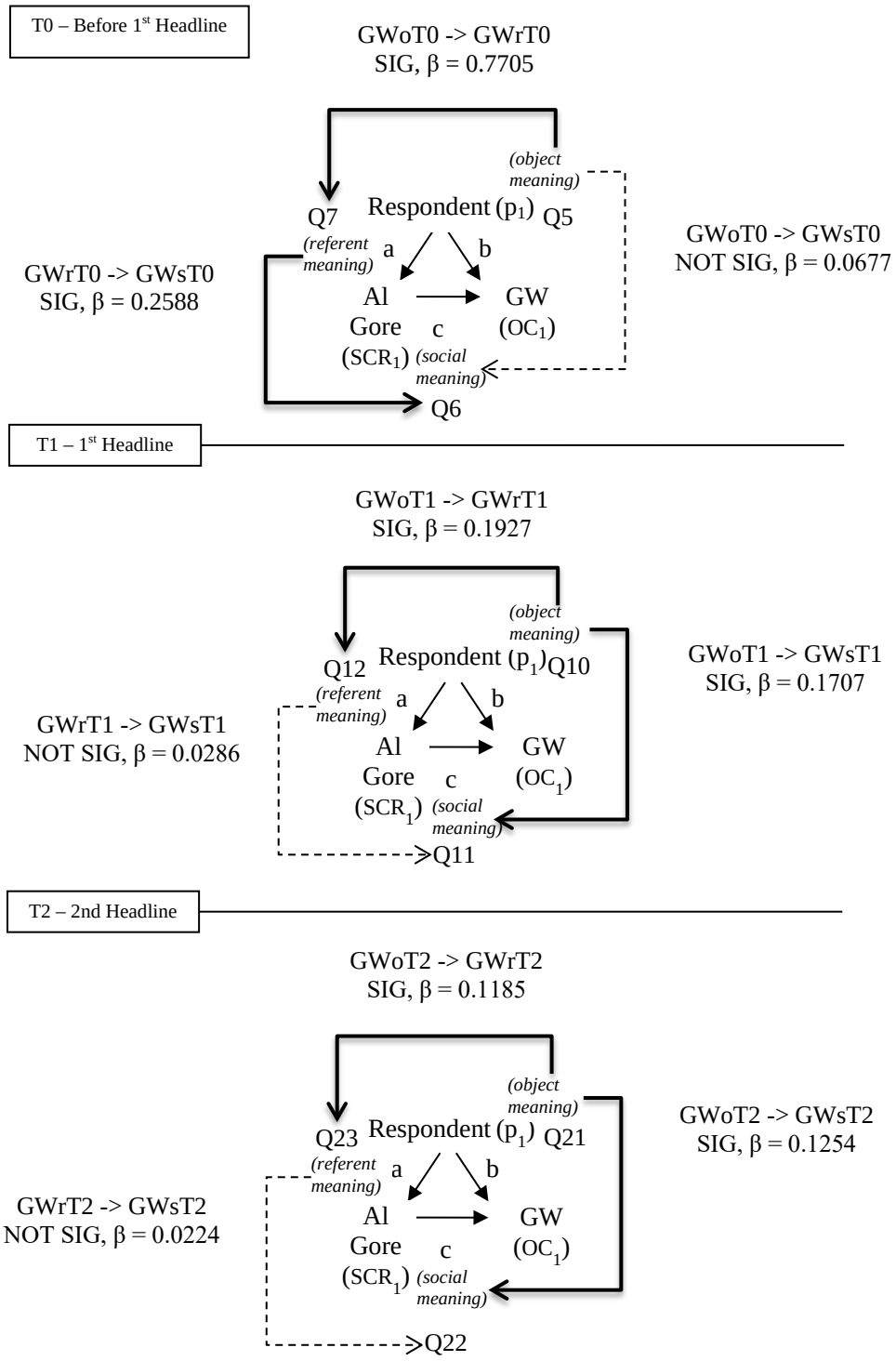
In row 10, row 13, and row 11 of Table 4.16, as shown in Figure 24, there were significant relationships between evaluations of RM (a). In row 10, RM (a) at T0 had a large, positive, and significant effect on RM (a) at T1 (GWrT0 -> GWrT1; β = 0.7610; p = <0.0001 [j]). In row 13, RM (a) at T1 had a large, positive, and significant effect on RM (a) at T2 (GWrT1 -> GWrT2; β = 0.4554; p = <0.0001 [m]). In row 11, RM (a) at T0 had a large, positive, and significant effect on RM (a) at T2 (GWrT0 -> GWrT2; β = 0.4118; p = <0.0001 [k]). These results indicate that respondents' relative positions were consistent on evaluations of Mr. Gore's views (e.g., familiarity, believability, trustworthiness, credibility, and importance), between T0 and T1, but the β coefficient after T2 of GWrT2 is substantially less than GWrT1.

In row 16, row 18, and row 17 of Table 4.16, as shown in Figure 24, not all of the β coefficients for the paths for SM (c) at T0, T1, and T2 were significant, as in the case of OM (b) and RM (a). In row 16, SM (c) at T0 had a large, positive, and significant effect on SM (c) at T1 (GWsT0 -> GWsT1; β = 0.4467; p = <0.0001 [p]). In row 18, SM (c) at T1 had a large, positive, and significant effect on SM (c) at T2 (GWsT1 -> GWsT2; β = 0.6088; p = <0.0001 [r]). However, in row 17, SM (c) at T0 did not have a significant effect on SM (c) at T2, indicating that respondents' perceptions of Mr. Gore's views on GW (i.e., SM [c]) were largely inconsistent at T2 when compared to T0, after the manipulated factors in the headlines were applied at T1 and T2. Those respondents who rated SM (c) (e.g., familiarity of the topic, bad/good for future generations, importance, realness, inevitability, possibility, level of occurrence, and level of increase) high at T0 did not rate it high at T2 and those respondents who rated SM (c) low at T0 did not rate it low at T2.

Shifts in GW Path Relationships across Repeated Measures

In Table 4.16 and Figure 25, there is additional evidence about the insignificant relationship in SM (c) path from T0 to T2 shown in row 17 (GWsT0 -> GWsT2; β = 0.0850; *p* = .1541 [q]). In row 3 of Table 4.16, at T0, the path of OM (b) and RM (a) (GWoT0 -> GWrT0; β = 0.7705; *p* = <0.0001 [c]) is large, positive, and significant, but in row 4 the path of OM (b) and SM (c) at T0 (GWoT0 -> GWsT0; β = 0.0677; *p* = .3721 [d]) is not significant; however, in row 12 the path of RM (a) and SM (c) (GWrT0 -> GWsT0; β = 0.2588; *p* = <0.0001 [l]) is significant. The path relationships between OM (b), RM (a), and SM (c) at T0 indicate that a significant relationship between OM (b) and SM (c) was not found, before the first headline (2007) headline was presented.

Figure 25: Shifts in GW Path Relationships across Repeated Measures



At T1, after the first headline (2007) was presented, in row 6 of Table 4.16 and in Figure 25 the path of OM (b) and RM (a) (GWoT1 -> GWrT1; β = 0.1927; *p* = <0.0001 [f]) was large, positive, and significant. In row 7 the path of OM (b) and SM (c) (GWoT1 -> GWsT1; β = 0.1707; *p* = .0194 [g]) became large, positive, and significant, when compared to row 4. In row 14 the path of RM (a) and SM (c) (GWrT1 -> GWsT1; β = 0.0286; *p* = .6348 [n]) became not significant, when compared to row 12. OM (b) at T1 had a significant effect on RM (a) at T1. RM (a) at T1 did not have a significant effect on SM (c) at T1. (However, at T0, RM [a] had a significant effect on SM [c]. This effect is a change from T0 to T1.) OM (b) at T1 had a significant effect on SM (c) at T1. (However, at T0, OM [b] did not have a significant effect on SM [c]. This effect is a change from T0 to T1.) After the first headline (2007) in Figure 25, the paths of the relationships between OM (b), RM (a), and SM (c) indicate that significant relationship between OM (b) and SM (c) was strengthened and became significant. However, after the first headline (2007), the strength of the relationship between RM (a) and SM (c) was weakened and became insignificant.

At T2, after the second headline (2008), in row 8 of Table 4.16 and in Figure 25 the path of OM (b) and RM (a) (GWoT2 -> GWrT2; β = 0.1185; *p* = .0014 [h]) remained large, positive, and significant, although the β was slightly smaller when compared to row 6 (GWoT1 -> GWrT1; β = 0.1927; *p* = <0.0001 [f]) and considerably smaller when compared to row 3 (GWoT0 -> GWrT0; β = 0.7705; *p* = <0.0001 [c]). In row 9 the path of OM (b) and SM (c) (GWoT2 -> GWsT2; β = 0.1254; *p* = .0115 [i]) remained large, positive, and significant, when compared to row 7. In row 15 the path of RM (a) and SM (c) (GWrT2 -> GWsT2; β = 0.0224; *p* = .6373 [o]) remained

insignificant, when compare to row 14. OM (b) at T2 had a significant effect on RM (a) at T2. After the second headline (2008) in Figure 25, OM (b) at T2 had a significant effect on SM (c) at T2, which remained the same from T1 to T2. RM (a) at T2 did not have a significant effect on SM (c) at T2. At T1, RM (a) did not have a significant effect on SM (c). This effect is not a change from T0 to T1. After the second headline (2008), the relationship between OM (b) and SM (c) was strengthened with a higher β and remained significant.

Between T0 and T2 in Figure 25, and the presenting of the two sets of headlines to the 16 groups of respondents, the significance and strength of the relationships between RM (a) and SM (c) and OM (b) and SM (c) were inverted the first headline at T1 and the second headline at T2. Moreover, the relationship between RM (a) and SM (c) was decreased and made not significant at T1. The relationship between OM (b) and SM (c) was not significant at T0 but it became significant at T1 and remained so at T2. Finally, the relationship between OM (b) and RM (a) in T2 was significantly weaker than the relationship between OM (b) and RM (a) at T0.

Additional examination of the manipulated factors helps explain how these changes were affected by the headlines. At T1, in row 20 of Table 4.16, the path of the positive or negative valence of the message (T1V -> GWoT1; β = -0.0861; *p* = .0168 [v]) and in row 22 (T1V -> GWsT1; β = 0.1477; *p* = .0208 [y]) were significant relationships, indicating that the valence of the message had a significant negative effect on OM (b) and a significant positive effect on SM (c), respectively. The positive or negative valence (tone) of the headline at T1 had a significant effect on OM (b) at T1. The positive or negative valence (tone) of the headline at T1 had a significant

effect on SM (c) at T1. At T2, in row 21 the T1 valence had a small, negative, and significant effect on OM (b) (T1V -> GWoT2; β = -0.0582; *p* = .1090 [x]). The valence (tone) of the headline at T1 had a significant effect on OM (b) at T2.

Average Changes in Meaning Evaluations across Repeated Measures

The total effect of the differences in change variables shown in Figure 23 are listed in Table 4.17. The values are the differences calculated from the SmartPLS™ β coefficients for referent (a), object (b), and social (c) meanings at times T0, T1, and T2. The differences in meanings are shown in columns 1, 2, and 3 of Table 4.17: GWrT1T0 – change in RM (a) from T0 to T1 (e.g., GWrT1 – GWrT0 = GWrT1T0); GWoT1T0 – change in OM (b) from the T0 to T1; GWsT1T0 – change in SM (c) from T0 to T1, GWrT2T1 – change in RM (a) evaluations from T1 to T2; GWoT2T1 – change in OM (b) evaluations from T1 to T2; GWsT2T1– change in SM (c) evaluations from T1 to T2; GWrT2T0 – change in RM (a) evaluations from T0 to T2; GWoT2T0 – change in OM (b) evaluations from T0 to T2; GWsT2T0 – change in SM (c) evaluations from T0 to T2. Due to normalization of the SmartPLS™ β coefficients, the averages of changes for referent (a), object (b), and social (c) meanings in columns 1, 2, and 3 are zero.

Table 4.17: *Average Changes in* β *Coefficients of Meaning Evaluations across Repeated Measures*

Average Changes in B Coefficients of Meaning Evaluations across Repeated Measures		*Xbar* of Meaning (e.g., GWoT1T0)			Percentage Change in *Xbar* of Meaning (e.g., *XbarGWoT1-XbarGWoT0*) / *XbarGWoT0*		
		1	2	3	4	5	6
		GW?T1T0	GW?T2T1	GW?T2T0	GW?T1T0	GW?T2T1	GW?T2T0
1	Referent Meaning (r)	0.0000	0.0000	0.0000	1.5571	-0.1586	-0.6094
2	Object Meaning (o)	0.0000	0.0000	0.0000	-0.8656	-0.3831	1.5068
3	Social Meaning (s)	0.0000	0.0000	0.0000	-9.2952	-0.4890	-10.8445

In Table 4.17, with all other manipulations held constant, the rate of mean change was calculated by averaging the differences of the individual case β coefficients. In row 1, from T0 to T1, the rate of change in RM (a) increased, but it decreased from T1 to T2 and decreased from T0 to T2. The negative shift in RM (a) was expected. In row 2, the rate of mean change of OM (b) decreased from T0 to T1, and decreased from T1 to T2, but increased from T0 to T2. The positive shift in OM (b) from T0 to T2 was not expected. In row 3, from T0 to T1, the rate of change in SM (c) strongly decreased. From T1 to T2, SM (c) decreased. From T0 to T2, the rate of change in SM (c) strongly decreased. The negative shift in the rate of change for SM (c) was expected.

Analysis of Induced Changes in GW Path Relationships

When considering the large percentage changes in evaluations of meanings, it is helpful to examine the effects of the manipulated factors on the change variables,

including the moderating effect of some of the manipulated factors.[25] Figure 26 depicts path relationships for the shifts in meaning of the data collected at times T0, T1, and T2. The effects of comments (valence or tone of the message was varied between positive and negative tones) by Mr. Gore were quoted in a high-credibility publication or low-credibility publication, and the *science facts* about GW were attributed to either domestic or foreign research organizations. The shifts in GW meaning (rT1T0, oT1T0, sT1T0, rT2T1, oT2T1, sT2T1, rT2T0, oT2T0, and sT2T0) about GW in Figure 26 are changes in assessments of RM (a) (i.e., the respondents' evaluations of Mr. Gore's views on GW), OM (b) (i.e., the respondents' perceptions of GW), and SM (c) (i.e., the respondents' perceptions of Mr. Gore's views on GW). Recall that in Table 4.14, the varying attribution, publication, and valence (tone) factors (e.g., T1A, T1P, T1V, T2A, T2P, and T2V) were presented to respondents to induce balancing and CD effects.

[25] A second analysis in SmartPLS was required because some of relationships cancel each other out. A comparison of Appendix F Table F8 and Appendix F Table F9 indicated that the change variables (e.g., GWrT1T0) are mathematically associated with the measured variables GWrT0 and GWrT1 (e.g., GWrT0 in row 17 of Appendix F Table F8 and GWrT1 in row 19 of Appendix F Table F8 have significant relationships with GWrT1T0, as expected). However, the comparison highlights the need to examine the effect of the moderating relationships of the manipulated factors (T1A, T1P, T1V, T2A, T2P, and T2V) on the measured variables separate from the effects of the manipulated factors on the change variables. For example, in row 17 of Table F8, there is a large, negative and significant effect of referent meaning at T0 on the change in referent meaning from T1 to T0 (GWrT0 -> GWrT1T0); in row 19, there is a large, positive and significant effect of referent meaning on the change in referent meaning from T1 to T0 (GWrT1 -> GWrT1T0; in row 43 attribution had a small, negative, and insignificant relationship with GWrT1T0; in row 55 publication had a small, negative, and significant relationship with GWrT1T0; and in row 67 publication had a small, positive, and insignificant relationship with GWrT1T0. In Appendix F Table F9, the path relationships are different from Table F8.

Figure 26: Analysis of Induced Changes in GW Path Relationships

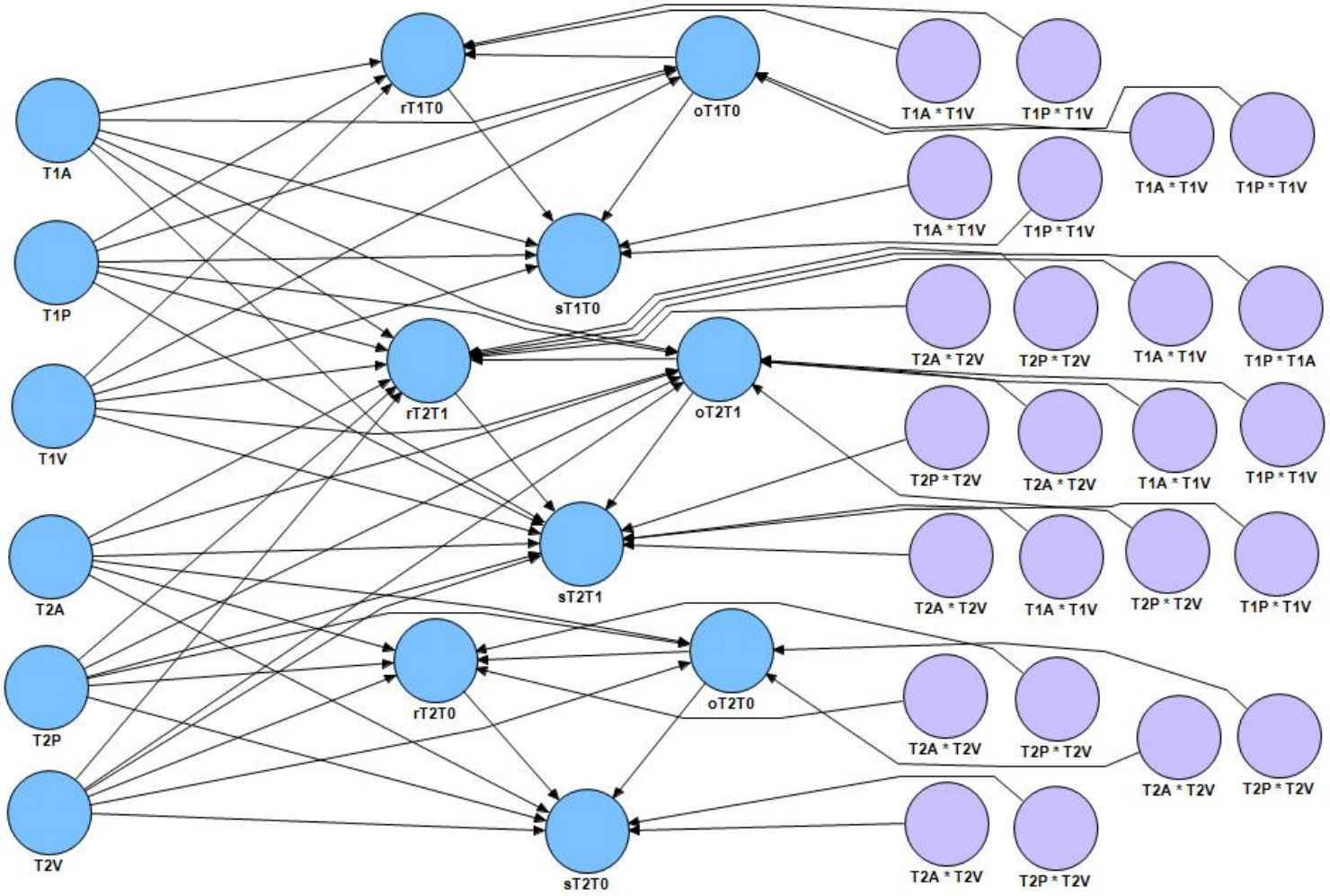


Figure 26 Key (Results in Appendix F Table F9)
Independent and Moderating Variables -- T1A, T1P, T1V, T2A, T2P, T2V
T – Point in Time, 0 – Prior to Induced Effects, 1 – After first Induced Effect, 2 – After second Induced Effect, A – Attribution of the research (Russian Academy of Environmental Science or American Academy of Environmental Science), P – Publication (National Enquirer or Wall Street Journal), V – Valence (Negative Tone or Positive Tone)
Dependent Variables (GW) – rT1T0, rT2T1, rT2T0, oT1T0, oT2T1, oT2T0, sT1T0, sT2T1, sT2T0. (e.g., GWoT1 – GWoT0 = GWoT1T0)
GWr – referent meaning (a)
T1T0 – Change in meaning between T0 and T1
T2T1 – Change in meaning between T1 and T2
T2T0 – Change in meaning between T0 and T2
GWo – object meaning (b)
T1T0 – Change in meaning between T0 and T1
T2T1 – Change in meaning between T1 and T2
T2T0 – Change in meaning between T0 and T2
GWs – social meaning (c)
T1T0 – Change in meaning between T0 and T1
T2T1 – Change in meaning between T1 and T2
T2T0 – Change in meaning between T0 and T2
* - moderated by
e.g., - T1A*T1V – Effect of Attribution of message given at Time 1 moderated by Valence of message given at Time 1.

Table 4.18 lists the significant effects of the manipulated factors: the attribution of the facts in the simulated headlines to a research organization (i.e., T1A, T2A), the publication in which the headline was to have appeared (i.e., T1P, T2P) and the valence (i.e., tone) of the message (i.e., T1V, T2V). The effects of the manipulated factors on the dependent variables along with moderating effects are shown in Figure 27. The entire set of results is listed in Appendix F Table F9.

As shown in Table 4.18, and Figure 27, holding all of the other effects constant: In row 1 of Table 4.18, the valence (tone) of the message at T1 (T1V) had a small, positive, and significant effect on change in OM (b) from T0 to T1 (T1V -> GWoT1T0; $\beta = 0.0862$; $p = .0260$ [e]). For respondents ($n = 251$) who received the

headline that GW is not occurring according to Table 4.14 (i.e., they first held the belief that GW is occurring at T0), in row 1 of Table 4.19 there was a decrease in OM (b) (Table 4.14 T1V = 0) ($Xbar_{Con}$ = -0.047425). For respondents (n = 316) who received the headline that GW is occurring according to Table 4.14 (i.e., they first held the belief that GW is not occurring at T0), in row 1 of Table 4.19 there was an increase in OM (b) (Table 4.14 T1V = 1) ($Xbar_{Pro}$ = 0.037672). This result verifies that respondents' beliefs in GW were affected by the messages in the directions anticipated, because the means were not zero and the sign of mean matched the direction of the anticipated shift. In Table 4.19 row 1, after the first headline, when holding other effects constant, the total effect of T1V tone, on the change in OM (b) was a shift in means of 0.085097.

Table 4.18: β *Coefficients of Induced Changes in GW Path Relationships*

	SmartPLS™ Path	β Calculated on Original Sample β	Stand. Dev.	*t* Statistic	Two-Tailed Probability (d.f. 565, sig. level 10%))
1	T1V -> GWoT1T0	0.0862	0.0386	2.2322	0.0260 [e]
2	T1P * T1V -> GWoT1T0	0.0872	0.0407	2.1417	0.0326 [c]
3	T1V -> GWrT1T0	0.1287	0.0332	3.8725	0.0001 [f]
4	T1P * T1V -> GWrT1T0	0.0918	0.0362	2.5397	0.0114 [b]
5	T1V -> GWsT1T0	0.0706	0.0347	2.0330	0.0425 [g]
6	T1P -> GWoT2T1	-0.0679	0.0378	1.7954	0.0731 [a]
7	T1P * T1V -> GWoT2T1	-0.0989	0.0453	2.1845	0.0293 [d]
8	T2A * T2V -> GWoT2T1	0.0982	0.0402	2.4415	0.0149 [h]
9	T2P * T2V -> GWrT2T1	0.1080	0.0401	2.6970	0.0072 [i]
10	T2P * T2V -> GWsT2T1	0.0764	0.0386	1.9777	0.0484 [j]
11	T2V -> GWrT2T0	0.0788	0.0388	2.0324	0.0426 [k]

Figure 27: Induced Changes in GW Path Relationships across Repeated Measures

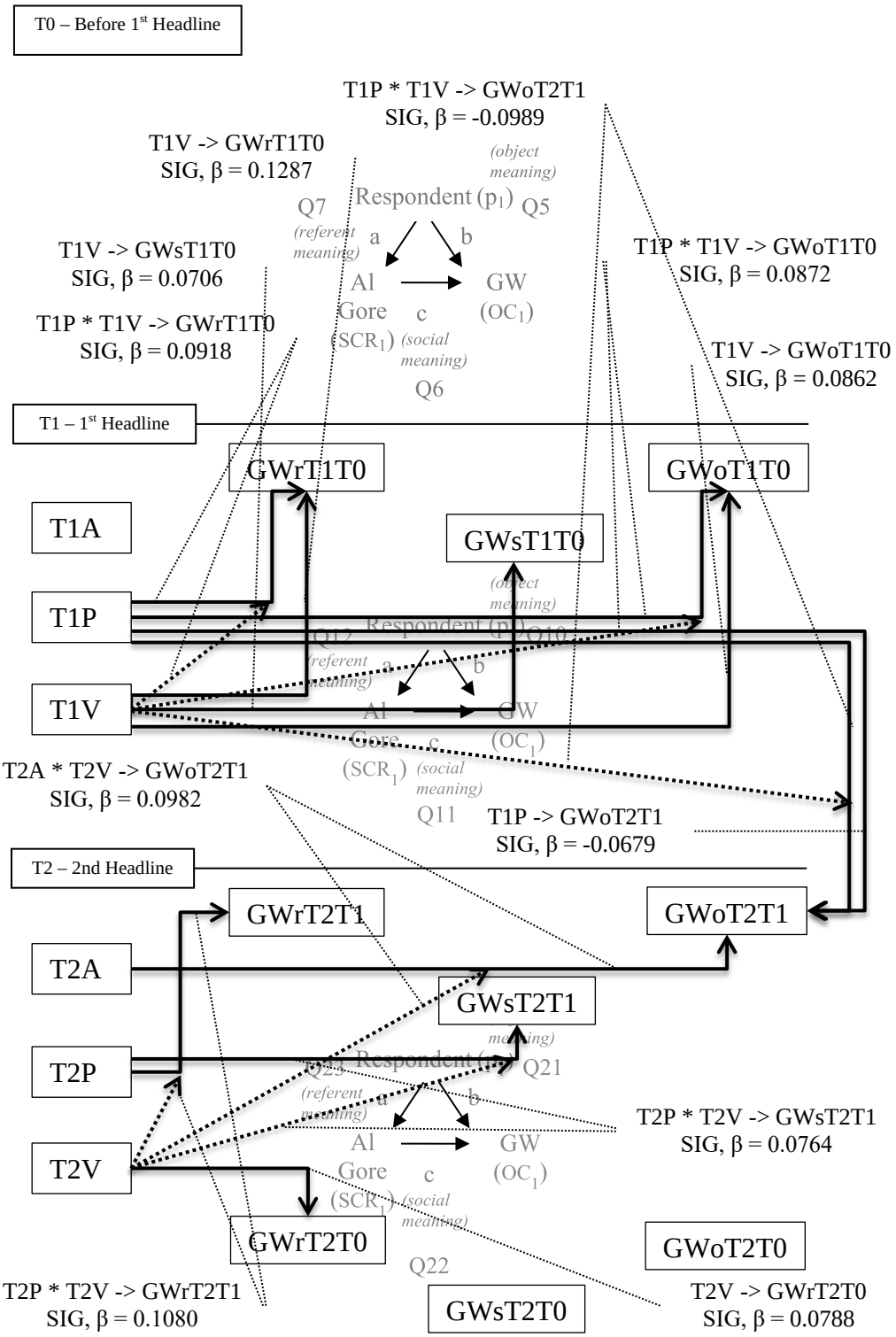


Table 4.19: β *Coefficient Means of Induced Changes in GW Path Relationships across Repeated Measures holding Other Effects Constant*

	Path	First Manipulated Factor	Second Manipulated Factor	Total Effect
1	T1V -> GWoT1T0	$Xbar_{Con}$ = -0.047425	$Xbar_{Pro}$ = 0.037672	0.085097
2	T1P * T1V -> GWoT1T0	$Xbar_{NE}$ = -0.024666	$Xbar_{WSJ}$ = 0.024236	0.048902
3	T1V -> GWrT1T0	$Xbar_{Con}$ = -0.077351	$Xbar_{Pro}$ = 0.061450	0.138801
4	T1P * T1V -> GWrT1T0	$Xbar_{NE}$ = -0.008799	$Xbar_{WSJ}$ = 0.008657	0.017456
5	T1V -> GWsT1T0	$Xbar_{Con}$ = -0.111775	$Xbar_{Pro}$ = 0.088795	0.200570
6	T1P -> GWoT2T1	$Xbar_{NE}$ = 0.036538	$Xbar_{WSJ}$ = -0.035899	0.072437
7	T1P * T1V -> GWoT2T1	$Xbar_{NE}$ = 0.036538	$Xbar_{WSJ}$ = -0.035899	0.072437
8	T2A * T2V -> GWoT2T1	$Xbar_{RAES}$ = 0.024484	$Xbar_{AAES}$ = -0.025095	0.049579
9	T2P * T2V -> GWrT2T1	$Xbar_{NE}$ = -0.004605	$Xbar_{WSJ}$ = 0.004604	0.009209
10	T2P * T2V -> GWsT2T1	$Xbar_{NE}$ = 0.021248	$Xbar_{WSJ}$ = -0.021327	0.042575
11	T2V -> GWrT2T0	$Xbar_{Con}$ = -0.028979	$Xbar_{Pro}$ = 0.028266	0.057245

In Table 4.18 row 2, and Figure 27, the valence (tone) of the message at T1 (T1V) had a small, positive, and significant moderating effect on the relationship between the effect of T1P publication on change in OM (b) from T0 to T1 (T1P * T1V -> GWoT1T0; β = 0.0872; p = .0326 [c]). For respondents (n = 281) who read a headline from the National Enquirer, in row 2 of Table 4.19 there was occurring decrease in OM (b) (Table 4.14 T1P = 0) ($Xbar_{NE}$ = -0.024666). For respondents (n = 286) who read a headline from the Wall Street Journal, in row 2 of Table 4.19 there was an increase in OM (b) (Table 4.14 T1P = 1) ($Xbar_{WSJ}$ = 0.024236). This result verifies that respondents' beliefs in GW were affected by the messages in the directions anticipated, because respondents believed the messages according to the perceived credibility in the publication source of the message. In Table 4.19 row 2, after the first headline and when holding other effects constant, the total effect of the T1P publication factor, when moderated by T1V tone on the change in OM (b) was a shift in means of 0.048902.

In Table 4.18 row 3, and Figure 27, the valence (tone) of the message at T1 (T1V) had a large, positive, and significant effect on change in RM (a) from T0 to T1 (T1V -> GWrT1T0; β = 0.1287; $p < 0.0001$ [f]). For respondents ($n = 251$) who read in the headline that GW is not occurring (i.e., they held the belief that GW is occurring at T0), in row 3 of Table 4.19 there was lesser belief in the evaluations of Mr. Gore's views on GW, RM (a) (Table 4.14 T1V = 0) ($Xbar_{Con}$ = -0.077351). For respondents ($n = 316$) who received the headline that GW is occurring (i.e., they held the belief that GW is not occurring), in row 3 of Table 4.19 there was a greater belief in the evaluations of Mr. Gore's views on GW, RM (a) (Table 4.14 T1V = 1) ($Xbar_{Pro}$ = 0.061450). This result verifies that respondents' beliefs in RM (a) were affected by the messages in the directions anticipated. In Table 4.19 row 3, after the first headline and when holding other effects constant, the total effect of the T1V tone on the change in RM (a) was a shift in means of 0.138801.

In Table 4.18 row 4, and Figure 27, the valence (tone) of the message at T1 (T1V) had a small, positive, and significant moderating effect on the relationship between the effect of T1P publication on change in RM (a) from T0 to T1 (T1P * T1V -> GWrT1T0; β = 0.0918; $p = .0114$ [b]). For respondents ($n = 281$) who read a headline from the National Enquirer, in row 4 of Table 4.19 there was a decrease in RM (a) (Table 4.14 T1P = 0) ($Xbar_{NE}$ = -0.008799). For respondents ($n = 286$) who read a headline from the Wall Street Journal in row 4 of Table 4.19 there was an increase in RM (a) (Table 4.14 T1P = 1) ($Xbar_{WSJ}$ = 0.008657). This result verifies that respondents' beliefs in RM (a) were affected by the messages in the directions anticipated because respondents believed the messages according to the perceived

credibility of the publication source of the message. In Table 4.19 row 4, after the first headline and when holding other effects constant, the total effect of the T1P publication, when moderated by T1V tone, on the change in RM (a) was a shift in means of 0.017456.

In Table 4.18 row 5, and Figure 27, the valence (tone) of the message at T1 (T1V) had a small, positive, and significant effect on change in SM (c) from T0 to T1 (T1V -> GWsT1T0; β = 0.0706; p = .0425 [g]). For respondents (n = 251) who read the headline that GW is not occurring (i.e., they held the belief that GW is occurring at T0), in row 5 of Table 4.19 there was a decrease in SM (c) (Table 4.14 T1V = 0) ($Xbar_{Con}$ = -0.111775). For respondents who received the headline that GW is occurring (i.e., they held the belief that GW is not occurring), in row 5 of Table 4.19 there was an increase in SM (c) (Table 4.14 T1V = 1) ($Xbar_{Pro}$ = 0.088795). This result verifies that respondents' beliefs in SM (c) were affected by the messages in the directions anticipated. In Table 4.19 row 5, after the first headline and when holding other effects constant, the total effect of the T1V tone on the change in SM (c) was a shift in means of 0.200570.

In Table 4.18 row 6, and Figure 27, the publication attributed to the message at T1 (T1P) had a small, negative, and significant effect on change in OM (b) from T1 to T12 (T1P -> GWoT2T1; β = -0.0679; p = .0731 [a]). For respondents (n = 281) who were presented a message from the National Enquirer in T1, in row 6 of Table 4.19 there was an increase in OM (b) (Table 4.14 T1P = 0) during the time period T1 to T2 ($Xbar_{NE}$ = 0.036538). For respondents (n = 286) who were presented a message from the Wall Street Journal in T1, in row 6 of Table 4.19 there was an decrease in OM (b)

(Table 4.14 T1P = 1) during the time period T1 to T2 ($Xbar_{WSJ}$ = -0.035899). This result verifies that respondents' beliefs in OM (b) were affected by the messages, but in the opposite direction that was expected after the message was presented in T2; because respondents did not believe the messages according to the perceived credibility of the publication source of the message. This is a reversal of the publication factor. In Table 4.19 row 6, after the second headline when holding the other effects constant, the total effect of the T1P publication on the change in OM (b) was a shift in means of 0.072437.

In Table 4.18 row 7, and Figure 27, the valence (tone) of the message at T1 (T1V) had a small, negative, and significant moderating effect on the relationship between the effect of T1P publication on change in OM (b) from T1 to T2 (T1P * T1V -> GWoT2T1; β = -0.0989; p = .0293 [d]). For respondents (n = 281) who read a headline from the National Enquirer, in row 7 of Table 4.19 there was increase in OM (b) (Table 4.14 T1P = 0) ($Xbar_{NE}$ = 0.036538). For respondents (n = 286) who read a headline from the Wall Street Journal, in row 7 of Table 4.19 there was a decrease in OM (b) (Table 4.14 T1P = 1) ($Xbar_{WSJ}$ = -0.035899). This result verifies that respondents' beliefs in OM (b) were affected by the messages, but in the opposite direction that was expected after the message was presented in T2, when considering the message presented at T1 and the publication as moderated by the valence of the message; because respondents did not believe the messages according to the perceived credibility of the publication source of the message. This is a reversal of the publication factor. In Table 4.19 row 7, after the second headline and when holding

other effects constant, the total effect of the T1P publication, moderated by T1V tone, on the change in OM (b) was a shift in means of 0.072437.

In Table 4.18 row 8, and Figure 27, the valence (tone) of the message at T2 (T2V) had a small, positive, and significant moderating effect on the relationship between the effect of T2A attribution (i.e., attribution of the scientific organization) on change in OM (b) from T1 to T2 (T2A * T2V -> GWoT2T1; β = 0.0982; p = .0149 [h]). For respondents (n = 287) who read a headline attributed to a foreign research organization (i.e., Russian Academy of Environmental Science), in row 8 of Table 4.19 there was an increase in OM (b) (Table 4.14 T2A = 0) ($Xbar_{RAES}$ = 0.024484). For respondents (n = 280) who read in a headline attributed to a domestic research organization (i.e., American Academy of Environmental Science), in row 8 of Table 4.19 there was occurring a decrease in OM (b) (Table 4.14 T2A = 1) ($Xbar_{AAES}$ = -0.025095). This result verifies that respondents' beliefs in OM (b) were affected by the headlines, but in the opposite direction that was expected after the headline was presented in T2, when considering the attributed research organization as moderated by the valence of the headline; because respondents did not believe the messages according to the perceived credibility of the attribution source of the message. This is a reversal of the attribution factor. In Table 4.19 row 8, after the second headline and when holding other effects constant, the total effect of the T2A attribution, moderated by the T2V tone factor, on the change in OM (b) was a shift in means of 0.049579.

In Table 4.18 row 9, and Figure 27, the valence (tone) of the message at T2 (T2V) had a large, positive, and significant moderating effect on the relationship between the effect of T2P publication on change in RM (a) from T1 to T2 (T2P * T2V

-> GWrT2T1; β = 0.1080; p = .0072 [i]). For respondents (n = 281) who read a headline from the National Enquirer, in row 9 of Table 4.19 there was a decrease in RM (a) (Table 4.14 T2P = 0) ($Xbar_{NE}$ = -0.004605). For respondents (n = 286) who read a headline from the Wall Street Journal, in row 9 of Table 4.19 there was an increase in RM (a) (Table 4.14 T2P = 1) ($Xbar_{WSJ}$ = 0.004604). This result verifies that respondents' beliefs in RM (a) were affected by the headlines, but in the opposite direction that was expected after the headline was presented in T2, when considering the publication as moderated by the valence of the headline. In Table 4.19 row 9, after the second headline and when holding other effects constant, the total effect of the T2P publication factor, when moderated by T2V tone, on the change in RM (a) was a shift in means of 0.009209.

In Table 4.18 row 10, and Figure 27, the valence (tone) of the headline at T2 (T2V) had a small, positive, and significant moderating effect on the relationship between the effect of T2P publication on change in SM (c) from T1 to T2 (T2P * T2V -> GWsT2T1; β = 0.0764; p = .0484 [j]). For respondents (n = 284) who read a headline from the National Enquirer, in row 10 of Table 4.19 there was an increase in SM (c) (Table 4.14 T1P = 0) ($Xbar_{NE}$ = 0.021248). For respondents (n = 283) who read a headline from the Wall Street Journal, in row 10 of Table 4.19 there was a decrease in SM (c) (Table 4.14 T1P = 1) ($Xbar_{WSJ}$ = -0.021327). This result verifies that respondents' beliefs in SM (c) were affected by the headlines, but in the opposite direction that was expected after the headline was presented in T2, when considering the publication as moderated by the valence of the headline, because respondents did not believe the messages according to the perceived credibility of the publication

source of the message. This is a reversal of the publication factor. In Table 4.19 row 10, after the second headline, the total effect of the T2P publication, when moderated by the T2V tone factor and holding other effects constant, on the change in SM (c) was a shift in means of 0.042575.

In Table 4.18 row 11, and Figure 27, the valence (tone) of the headline at T2 (T2V) had a small, positive, and significant effect on change in RM (a) from T0 to T2 (T2V -> GWrT2T0; β = 0.0788; p = .0426 [f]). For respondents (n = 280) who read the headline that GW is occurring or not occurring at T2, in row 11 of Table 4.19 there was a decrease in RM (a) (Table 4.14 T2V = 0) ($Xbar_{Con}$ = -0.028979). For respondents (n = 287) who received the headline that GW is occurring or not occurring, in row 11 of Table 4.19 there was an increase in RM (a) (Table 4.14 T2V = 1) ($Xbar_{Pro}$ = 0.028266). This result verifies that respondents' beliefs in RM (a) were affected by the headlines in the directions anticipated. In Table 4.19 row 11, after the second headline, the total effect of the T2V tone factor, when holding other effects constant, on the change in RM (a) from T0 to T2 was a shift in means of 0.057245.

Shifts in Changes in GW Path Relationships across Repeated Measures

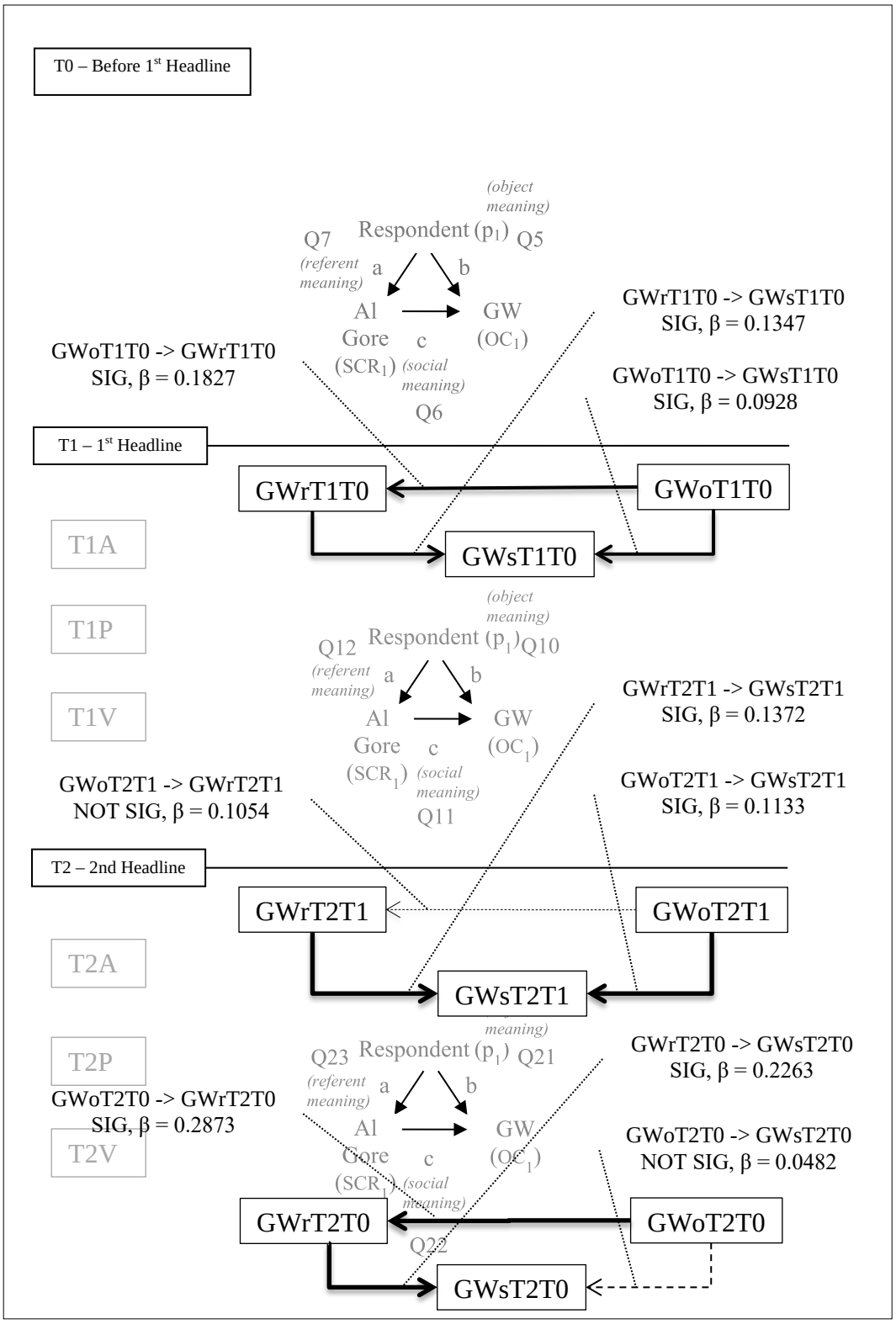
In Table 4.20, the interaction between changes in referent (a), object (b), and social (c) meanings at T0, T1, and T2 are indicated. The congruency effects (or balancing effects if considered across repeated measures) listed in Table 4.20 are depicted in Figure 28.

Table 4.20: *Shifts in Changes in GW Path Relationships across Repeated Measures*

	SmartPLS™ Path	β Calculated on Original Sample β	Stand. Dev.	*t* Statistic	Two-Tailed Probability (d.f. 565, sig. level 10%))
1	GWoT1T0 -> GWrT1T0	0.1827	0.0656	2.7835	0.0056 [l]
2	GWrT1T0 -> GWsT1T0	0.1347	0.0674	1.9983	0.0462 [r]
3	GWoT1T0 -> GWsT1T0	0.0928	0.0505	1.8380	0.0666 [m]
4	GWoT2T1 -> GWrT2T1	0.1054	0.0765	1.3781	0.1687 [p]
5	GWoT2T1 -> GWsT2T1	0.1133	0.0498	2.2765	0.0232 [q]
6	GWrT2T1 -> GWsT2T1	0.1372	0.0597	2.2970	0.0220 [t]
7	GWoT2T0 -> GWrT2T0	0.2873	0.0534	5.3754	<0.0001 [n]
8	GWrT2T0 -> GWsT2T0	0.2263	0.0652	3.4719	0.0006 [s]
9	GWoT2T0 -> GWsT2T0	0.0482	0.0566	0.8512	0.3950 [o]

In row 1 of Table 4.20, and Figure 28, change in OM (b) from T0 to T1 (GWoT1T0 -> GWrT1T0; β = 0.1827; *p* = .0056 [l]) had a large, positive, and significant effect on change RM (a) from T0 to T1. In row 2, change in RM (a) from T0 to T1 (GWrT1T0 -> GWsT1T0; β = 0.1347; *p* = .0462 [r]) had a large, positive, and significant effect on change in SM (c) from T0 to T1. In row 3, change in OM (b) from T0 to T1 (GWoT1T0 -> GWsT1T0; β = 0.0928; *p* = .0666 [m]) had a small, positive, and significant effect on change in SM (c) from T0 to T1. From T0 to T1, change in OM (b) had a significant effect on changes in RM (a) and SM (c). Moreover, change in RM (a) had a significant effect on change in SM (c).

Figure 28: Shifts in Changes in GW Path Relationships across Repeated Measures



In row 4 of Table 4.20, and Figure 28, change in OM (b) from T1 to T2 (GWoT2T1 -> GWrT2T1; β = 0.1054; *p* = .1687 [p]) did not have a significant effect on change in RM (a) from T0 to T2. In row 5, change in OM (b) from T1 to T2 (GWoT2T1 -> GWsT2T1; β = 0.1133; *p* = .0232 [q]) had a large, positive, and significant effect on change in SM (c) from T1 to T2. In row 6, change in RM (a) from T1 to T2 (GWrT2T1 -> GWsT2T1; β = 0.1372; *p* = .0220 [t]) had a large, positive, and significant effect on SM (c) from T1 to T2. From T1 to T2, unlike from T0 to T1, change in OM (b) did not have a significant effect on change in RM (a). However, change in OM (b) had a significant effect on change in SM (c) and change in RM (a) had a significant effect on change in SM (c).

In row 7 of Table 4.20, and Figure 28, change in OM (b) from T0 to T2 (GWoT2T0 -> GWrT2T0; β = 0.2873; *p* = <0.0001 [n]) had a large, positive, and significant effect on change in RM (a) from T0 to T2. In row 8, change in RM (a) from T0 to T2 (GWrT2T0 -> GWsT2T0; β = 0.2263; *p* = .0006 [s]) had a large, negative, and significant effect on change in SM (c) from T0 to T2. In row 9, change in OM (b) T0 to T2 (GWoT2T0 -> GWsT2T0; β = 0.0482; *p* = .3950 [o]) did not have a significant effect on change in SM (c) from T0 to T2. From T0 to T2, change in OM (b) had a significant effect on change in RM (a) and change in RM (a) had a significant effect on change in SM (c); however, change in OM (b) did not have a significant effect on change in SM (c) after the presentation of the T1 and T2 headlines. The significant path relationships of changes in meaning and the relationship between changes in meaning at T0, T1, and T2, indicate that respondents

were balancing their evaluations between referent (a), object (b), and social (c) meanings.

Results Summary

For external validity, the convenience sample was not shown to be sufficient to support generalization to other samples and settings. Changes in congruency, balance, and CD that were anticipated were generally found, given the differences in initial attitude toward GW and subsequent information presented; any exceptions were discussed. Several measures of association and measures of difference were used to examine statistically the data and indicate that the survey instrument is sensitive to changes caused by information and conditions presented to the sample. The results indicate good adherence to principles of construct, internal, and conclusion validity.

CHAPTER 5: CONCLUSIONS

In this chapter, the author applied the findings from the statistical analysis in Chapter 4: Results to address the research questions RQ1, RQ2, and RQ3 about the proposed model of cognitive dissonance (CD). Additionally, limitations of the research, implications on future research, implications for marketing practice, and overall conclusions are presented.

Discussion of Findings for All Research Questions

Dissonant cognitive forms (DCFs) (see Appendix B Table B1) were anticipated as the interaction of the RM (a), OM (b), and SM (c) for pairs of dissonant beliefs or choices. However, support for the evaluative, activity, and potency dimensions that were expected in the semantic differential scales measuring the DCF was not found. A confirmatory factor analysis of the scales for global warming (GW), shown in Table 3.3, Table 3.4, and Table 3.5, indicated that the three anticipated dimensions – evaluative, activity, and potency – should be examined as a single combined dimension, according to the Eigenvalues in Table 4.9. The finding of a single dimension in the scales precluded the examination of the individual suppositions in Table 3.5 and the resulting DCF that were stated in the form of separate dimensions.

Discussion of Findings for Research Question 1

In Chapter 1, the research questions addressed a general procedure for measuring dissonance, the role of information in increasing cognitive dissonance, and whether induced cognitive dissonance generate attempts to reduce it. In RQ1, it was

asked: “Is there a generalizable procedure for measuring cognitive dissonance within a social context for a social marketing issue that is experienced by potential consumers? If so, what is the procedure?” Yes, as was asked in RQ1, cognitive dissonance can be examined for GW and the examination can be generalized for other beliefs and social comparison referents (SCR) by adapting the scales shown in Table 3.6, Table 3.7, Table 3.8, and Table 3.9.

The semantic differential scales developed in Chapter 3 and used in Chapter 4 were derived using a general procedure for examining DCF that is outlined in Appendix C. The procedure for diagramming the DCF outlines a procedure for examining the effect of the SCR (e.g., endorser) that is most commonly associated with a belief or product; consumers are often confronted with a choice between contradictory beliefs or similar products of which only one can be selected.

Support for research suppositions stated in Chapter 2 and operationalized in Chapter 3 Table 3.5 (and shown in Table 5.1) were found, along with the hypothesized balancing relationships between RM (a), OM (b), and SM (c) within the DCF; balancing relationships were found between respondents’ evaluations of Mr. Gore’s opinion (i.e., RM [a]), respondents’ opinions of GW (i.e., OM [b]), and their estimation of Mr. Gore’s opinion of GW (i.e., SM [c]).

In Table 3.5, when the hypothesized evaluative, activity, and potency dimensions are combined into one dimension, support for suppositions 1, 2, 3, 4, 5, and 6 in Table 5.1 were found. The binary (i.e., two at a time) combinations of RM (a), OM (b), and SM (c) had significant relationships during at least T0, T1, or T2, excluding the 2nd and 3rd dimensions expressed in suppositions 10, 11, 12, 13, and 15,

and suppositions 19, 20, 21, 22, 23, and 24 in Table 3.5. In Table 4.16 and Figure 25, there were shifts in GW path relationships across repeated measures. Suppositions 1, 2, 3, 4, 5, and 6 in Table 5.1 were supported such that the respondents experienced a relationship consistent with congruency theory between the RM (a), OM (b), and SM (c) before (i.e., T0) and after the headlines were presented (i.e., T2).

Table 5.1: Multivariate Suppositions to measure CD in a Single Dimension

	Multivariate CD Measurement Suppositions in a Single Dimension
S_1 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in the first triad cognition, the PLS β coefficient for the combination of referent meaning (a) and object meaning (b) will increase.
S_2 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in the first triad cognition, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase.
S_3 (Congruity Theory)	As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in the first triad cognition, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase.
S_4 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and object meaning (b) increases in the second triad cognition, the PLS β coefficients for the combination of referent meaning (a) and object meaning (b) will increase.
S_5 (Congruity Theory)	As the positive or negative strength of the association between the referent meaning (a) and social meaning (c) increases in the second triad cognition, the PLS β coefficients for the combination of referent meaning (a) and social meaning (c) will increase.
S_6 (Congruity Theory)	As the positive or negative strength of the association between the object meaning (b) and social meaning (c) increases in the second triad cognition, the PLS β coefficients for the combination of object meaning (b) and social meaning (c) will increase.
S_7 (Balance Theory)	In the first and second triad cognitions, if the three PLS β coefficients are significant, then the center of polarization will tend to move toward changing PLS β coefficients to become insignificant.
S_8 (Balance Theory)	In the first and second triad cognitions, if the three PLS β coefficients are insignificant, then the center of polarization will tend to move toward the changing PLS β coefficients to become significant.
S_9	For the first and second triad cognitions, as the centers of polarization

	Multivariate CD Measurement Suppositions in a Single Dimension
(Dissonance Theory)	increase due to the manipulated factors, the level of cognitive dissonance will increase; and as the centers of polarization decrease due to the manipulated factors, the level of cognitive dissonance will decrease.

Support for suppositions 7 and 8 in Table 3.5 were found, as the RM (a), OM (b), and SM (c) path relationships of changes in β coefficients were significant during at least T0, T1, or T2 in Figure 25, excluding the 2nd and 3rd dimensions expressed in suppositions 16 and 17, and 25 and 26. In Table 4.20, the congruency interaction between changes in RM (a), OM (b), and SM (c) at T0, T1, and T2 are indicated. The congruency effects within a time period listed in Table 4.20, which can be considered to be balancing effects if considered across time periods, are depicted in Figure 28.

Support for supposition 9 in Table 3.5 was found as the path relationships were each significantly related to each other at T0, but not all three were significant after T2 in Figure 28, excluding the 2nd and 3rd dimensions expressed in suppositions 18 and 27. Moreover, in Figure 28 the shifts in changes in GW path relationships across repeated measures are indicative of the co-occurrence of balancing effects and evidence of cognitive dissonance.

The generalizable model of CD measurement in this dissertation differs from traditional attitude measurement and other approaches to measuring CD (cf. Cassel & Chow, 2002; Elliot & Devine, 1994; Hausknecht, Sweeney, Soutar, & Johnson, 1998; Sakai, 1999; Shultz & Lepper, 1996; Sweeney, Hausknecht, & Soutar, 2000; and Sweeney, Soutar, & Johnson, 1996;) in the manner in which it considers the patterns or structures of the perceptual relationships between objects within the attributed,

relevant social context as defined by the DCF. Historically, attitudes have been measured with scales for the evaluative characteristics of the objects separate from the social context. The findings of this dissertation suggest that CD is induced in situations in which attitude change and interaction with the social context is possible, such as consumer decision-making and brand/product extension-related advertising, etc., especially in buying situations involving third-party recommenders, corporate spokespersons, or product endorsers. In addition to belief-disconfirmation effects, free-choice CD or post-decision CD influences consumer intentions after a buying decision has been made. According to the results, CD reduction behaviors included respondents viewing unfavorable and favorable information that reduced the belief-disconfirmation CD associated with GW. For example, extrapolating from the results, the presence of CD inducing information along with greater intention to try to consume a product increases the magnitude of free-choice CD. Because of the CD reduction process, the development of the described CD model suggests a moderating effect on the variables of trying to consume (Bagozzi & Warshaw, 1990) or behavioral intention that were considered in past attitude research.

Discussion of Findings for Research Question 2

In RQ2, it was asked: “Does the introduction of involuntary, unfavorable information about a social marketing issue increase or decrease belief-disconfirmation cognitive dissonance that is experienced by potential consumers?” Yes, the introduction of information in the form of simulated headlines increased and decreased belief-disconfirmation CD, depending on the initial position of the respondents on the occurrence of GW.

In the headlines, respondents were shown simulated headlines that were favorable toward GW and unfavorable toward GW, purportedly published in a low-credibility publication or a high-credibility publication, and attributed to a low-credibility research organization or a high-credibility research organization. After the first headline, for respondents who believed in GW, there were statistically significant shifts in SM (c), RM (a), and OM (b), in that order, and for respondents who did NOT believe in GW, there were similar but converse shifts in SM (c), RM (a), and OM (b), also in same order, both of which are evidence of CD.[26]

The increase in CD that occurred upon introduction of headline containing contrary information was met with attempts by respondents' to decrease the level of CD. This finding suggests a hierarchy of change to attitude measures to resolve the overall CD; respondents first adjusted SM (c), second they adjusted RM (a), according to the T1P publication factor, and finally they adjusted their belief in OM (b), according to the T1P publication factor. As a result, in Table 4.19, the respondents' first changed their evaluations of what Mr. Gore thought of GW (i.e., SM [c]), second they changed what they thought of Mr. Gore's opinion (i.e., RM [a]), and finally they

[26] After the first headline, holding other effects constant, there is evidence of CD induction and reduction. For respondents who believed that GW was occurring at T0, there were shifts in the means for SM (c) of $Xbar_{Con}$ = -0.111775 (row 5), RM (a) of $Xbar_{Con}$ = -0.077351 (row 3), and OM (b) of $Xbar_{Con}$ = -0.047425 (row 1). For respondents who believed that GW was NOT occurring at T0, there were shifts in SM (c) of $Xbar_{Pro}$ = 0.088795 (row 5), RM (a) of $Xbar_{Pro}$ = 0.061450 (row 3), and OM (b) $Xbar_{Pro}$ = 0.037672 (row 1). The order of the CD reduction effect for the total effect was identical within either segment of the sample: SM (c) 0.200570 (row 5), RM (a) 0.138801 (row 3), and OM (b) 0.085097 (row 1).

changed their belief in GW (i.e., OM [b]). Moreover, the publication was a significant factor in the change of RM (a)[27] and OM (b).[28]

Overall, the findings of this study for RQ2 indicate that the resulting attitude toward the object, or OM (b), was dependent on balancing of the attitudes about the SCR (i.e., RM [a]) and the endorser SCR's perceived opinion (i.e., SM [c]), which were not measured in attempts to examine CD (e.g., Cassel & Chow, 2002; Elliot & Devine, 1994; Hausknecht, Sweeney, Soutar, & Johnson, 1998; Sakai, 1999; Shultz & Lepper, 1996; Sweeney, Hausknecht, & Soutar, 2000; and Sweeney, Soutar, & Johnson, 1996).

Discussion of Findings for Research Question 3

In RQ3, it was asked: "Does the induction of belief-disconfirmation cognitive dissonance about a social marketing issue result in attempts (either directly or through social interaction) to reduce dissonance through voluntarily seeking consonant information and avoiding dissonant information?" Yes, the findings in this dissertation indicate that dissonant information was avoided and that consonant information in the headlines was associated with a change in evaluations of SM (c), RM (a), and OM (b).

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[27] In Table 4.19, the publication had a moderating effect on the relationship between the valence of the headline and RM (a), with one segment of the sample believing the National Enquirer and experiencing a shift in RM (a) of $Xbar_{NE}$ = -0.008799 (row 4), which was 11.38% of the shift (-0.008799 / -0.077351 = 11.38%). The other segment of the sample believing the Wall Street Journal and experiencing a shift in RM (a) of $Xbar_{WSJ}$ = 0.008657 (row 4), which accounted for 14.88% of the shift (0.008657 / 0.061450 = 14.88%).

[28] In Table 4.19, the publication had a moderating effect on the relationship between the valence of the headline and OM (b), one segment of the sample believed the National Enquirer and experienced a shift in OM (b) of $Xbar_{NE}$ = -0.024666 (row 2), which was 52.01% of the shift (-0.024666 / -0.047425 = 52.01%). The other segment of the sample believed the Wall Street Journal and experienced a shift in OM (b) of $Xbar_{WSJ}$ = 0.024236 (row 2), which accounted for 64.33% of the shift (0.024236 / 0.037672 = 64.33%).

In Table 4.16 and Figure 25 and Table 4.18 and Figure 27, respondents reported a significant, strong relationship between OM (b) and RM (a) before the first headline was presented, but this relationship was significantly weakened by presenting a contradictory headline to the respondents' initial belief. After the second headline, the statistically significant arithmetic values of the means in Table 4.19 remained largely unchanged, suggesting that substantial changes in opinions occurred while the balancing process masked the changes with significant dissonance reduction.

After the first and second headlines were presented, there was a partial reversal of the effect on OM (b) by the T1P publication factor in Table 4.19 row 6 and row 7, according to the T1V valence (tone) factor.[29] Furthermore, there was a shift in OM (b), RM (a), and SM (c), according to the effect of the T2A attribution factor and T2P publication factor as moderated by the T2V valence factor. After the second headline, publication factors and attribution factors indicate that reversals of opinions occurred from CD induction after T1 that were consistent with CD reduction after T2. As a result, in Table 4.19 row 7, row 4, and row 9/10, the respondents first changed their belief in GW (i.e., OM [b]), second they changed their evaluations of what Mr. Gore

[29] In Table 4.19 row 6 and row 7, holding all other effects constant, there are residual effects of CD reduction. Respondents voluntarily accepted consonant information and avoided dissonant information, after the second headline was introduced at T2. The largest residual effects were seen with the publication in the T1 headline, shifting OM (b) for the National Enquirer of $Xbar_{NE}$ = 0.036538 (row 6) and the Wall Street Journal of $Xbar_{WSJ}$ = -0.035899 (row 6), which were counter-intuitive results that produced the opposite of expected effects: the headline in the National Enquirer increased OM (b) and the headline in the Wall Street Journal decreased OM (b). The total effect of the T1P publication factor in the second headline, on the change in OM (b) was a shift in means of 0.072437 (row 6), an effect that in row 7 is moderated by T1V; this reconsideration of the first headline after the second headline is evidence of CD reduction and avoidance of dissonant information. Respondents who saw a headline from the National Enquirer increased OM (b) while those who saw the headline from WSJ decreased OM (b); respondents changed their opinion of GW (i.e., OM [b]) depending on the whether the publication aligned with the positive or negative tone of the message.

thought of GW (i.e., SM [c]), and finally they changed what they thought of Mr. Gore's opinion (i.e., RM [a]); respondents changed their evaluation of OM (b) after the second headline, but they changed their evaluations SM (c) and RM (a) in the same order as after the first headline.

In Table 4.19 row 8, row 9, and row 10, when holding other effects constant, T2V valence was a moderating factor on T2A attribution and T2P publication. T2A attribution was a secondary effect considered by respondents after the publication was considered; the attribution of the message changed what respondents thought of GW (i.e., OM [b]).[30]

In Table 4.19 row 9 and row 10, when holding other effects constant, T2V valence was a moderating factor on T2P publication, which caused shifts in the means for RM (a) and SM (c). RM (a) decreased for those respondents who read the headline in the National Enquirer and RM (a) increased for those who read the headline from the Wall Street Journal, but the publication factor T2P as moderated by T2V valence factor changed what respondents thought of Mr. Gore's opinion of GW (i.e., RM [a]).[31]

In Table 4.19 row 10, a counter-balancing of the effect in row 9 occurred. SM (c) increased when respondents viewed the headline in the National Enquirer and

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[30] In row 8, a headline attributed to the Russian Academy of Environmental Science increased OM (b) of $Xbar_{RAES}$ = 0.024484 (row 8) and a headline attributed to the American Academy of Environmental Science decreased OM (b) of $Xbar_{AAES}$ = -0.025095 (row 8); the total effect of T2A attribution factor in the second headline, when moderated by T2V valence on the change in OM (b) was a shift in means of 0.049579 (row 8).

[31] In row 9, headlines that were shown in the National Enquirer decreased RM (a) of $Xbar_{NE}$ = -0.004605 (row 9) and headlines that were shown in the Wall Street Journal increased RM (a) of $Xbar_{WSJ}$ = 0.004604 (row 9); the total effect of T2P publication factor in the second headline, when moderated by T2V valence factor on the change in RM (a) was a shift in means of 0.009209 (row 9).

decreased when respondents viewed the headline in the Wall Street Journal; the publication factor at T2 as moderated by the valence factor at T2 changed evaluations of what Mr. Gore thought of GW (i.e., SM [c]).[32]

In Table 4.19 row 11, for respondents who held the belief that GW is occurring at T0, after the second headline, T2V valence changed RM (a); the positive or negative tone of the message changed what respondents thought of Mr. Gore's opinion of GW (i.e., RM [a]); this re-alignment of RM (a) after the second headline is evidence of CD reduction.[33]

Given the size of the shifts of the means shown in Table 4.19, the order of CD reduction in the findings indicated that there are significant balancing effects between RM (a), OM (b), and SM (c), after the headlines were presented. At the 10% significance level, the headlines generated statistically significant changes to RM (a), OM (b), and SM (c) shown in Table 4.16 and Appendix F Table F8 and large percentage of change shown in changes in RM (a), OM (b), and SM (c) in Table 4.17 indicating that the headlines were believed.

The shifts in changes in GW path relationships, after the T1 and T2 headlines were presented, and across repeated measures for OM (b) to RM (a) and RM (a) to SM (c) in Table 4.20 and Figure 28 were significant, but the changes in relationship between OM (b) and SM (c) were insignificant and weakened, indicating balancing

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[32] Headlines that were shown in the National Enquirer increased SM (c) of $Xbar_{NE}$ = 0.021248 (row 10) and decreased SM (c) $Xbar_{WSJ}$ = -0.021327 (row 10); the total effect of the T2P publication factor in the second headline, when moderated by T2V valence on the change in SM (c) was a shift in means of 0.042575 (row 10).

[33] After the second headline, holding all other effects constant, headlines that were shown decreased RM (a) of $Xbar_{Con}$ = -0.028979 (row 11) from T0 to T2. For respondents who held the belief that GW is NOT occurring at T0, after the first headline, headlines that were shown increased RM (a) of $Xbar_{Pro}$ = 0.028266 (row 11) from T0 to T2; the total effect of T2V valence factor in the second headline, on the change in RM (a) from T0 to T2 was a shift in means of 0.057245 (row 11).

effects that are additional evidence of avoidance information and seeking of consonant information. There were significant changes in the relationship between what respondents thought of GW (i.e., OM [b]) and respondents' evaluations of Mr. Gore's opinion of GW (i.e., RM [a]) and changes in the relationship between respondents' evaluations of Mr. Gore's opinion of GW (i.e., RM [a]) and respondents' evaluations of what Mr. Gore thought of GW (i.e., SM [c]); but the changes in the relationship between what respondents thought of GW (i.e., OM [b]) and respondents' evaluations of what Mr. Gore thought of GW (i.e., SM [c]) was weakened and made inconsistent.

Overall, the finding for this study for RQ3 is that although there were significant changes in β coefficients after the headlines were presented, the balancing actions by respondents tended to maintain the averages in the respective groups shown in Table 4.15. In Table 4.15, RM (a), OM (b), and SM (c) balanced at times T0, T1, and T2 in the dissonant cognitive form (DCF) of Cognition A for the IPPro condition, Cognition F for the IPCon condition or Cognition D for all respondents combined (defined in Appendix B), indicating support for the DCF. As predicted by balance theory (Heider, 1946), dissonance theory (Festinger, 1957), and postulated in this dissertation, respondents attempted to reduce CD that had been induced.

Discussion of Additional Findings

In addition to answering the research questions, other statistically significant relationships were found. Universal belief in the occurrence of GW was not found in the sample, which is counterintuitive given the prominence of GW had as an environmental topic in American society in Year 2008. For the 1,807 respondents to the qualification survey, the mean belief that GW is occurring (i.e., single scale) was

6.00, indicating that overwhelmingly strong belief in the GW phenomenon was not found.[34] Moreover, for the 567 respondents to the full survey, the mean belief that GW is occurring (i.e., single scale) was 6.43, indicating that stronger beliefs in GW were found in respondents in the sample who completed the full survey. However, if the existence of GW was considered science fact, when the sample was drawn in 2008, a large percentage of the respondents were counter-intuitively not strong believers.

Respondents' initial beliefs in the existence of GW during the qualification survey had a strong and significant relationship with their belief in GW before the first headline was presented in the full survey (see Table 4.16 and Figure 23). If respondents supported GW or did not support GW in the qualification survey, they generally maintained their original position at the beginning of the full survey, before the first and second headlines were introduced. Therefore, respondents tended to maintain their original positions during the months that elapsed between the qualification and full surveys.

At the 5% significance level, before the simulated headlines were presented, females and respondents who were between the ages of 26 and 54 years of age in the sample were more likely to believe that GW exists (see Table 4.5, Table 4.6, and Table 4.7). However, males and respondents who were either younger than 26 or older

[34]

Not Occurring (1)	2	3	4	5	6	7	8	9	Occurring (10)	Rating Average	Response Count
292	168	135	66	133	109	129	159	102	514	6.00	1807

than 54, were less likely to believe that GW exists, before the simulated headlines were presented.

The social comparison referent (SCR), Mr. Gore, a spokesperson and endorser for the fight against global warming, interacted with the measurement scales. The word pair responses for Unfamiliar / Familiar and Bad / Good in Table 4.13 demonstrated weak convergent and weak divergent validity for questions involving the social context of the identified SCR, Mr. Gore. This suggests a *social comparison threat to internal validity* for attitude measurement in which an unknown or unidentified SCR is considered by the respondent when responding to attitude measurement scales.

In Figure 25, the shift in relationships, with OM (b) becoming associated with SM (c) and RM (a) becoming not associated with SM (c), is evidence that CD was increased by the headline and then decreased during the responses given to the scales for the three meanings. Before the first headline, OM (b) was associated with RM (a) and RM (a) was associated with SM (c). Respondents' evaluations of GW were associated with what they thought of Mr. Gore's opinion. What respondents thought of Mr. Gore's opinion (i.e., RM [a]) was associated with what they thought was Mr. Gore's opinion of GW (i.e., SM [c]). After the presentation of the first headline in Figure 25, OM (b) became associated with SM (c) and RM (a) became not associated with SM (c). Respondents' evaluations of GW (i.e., OM [b]) changed after the first headline and became associated with what they thought was Mr. Gore's opinion of GW (i.e., SM [c]) and what they thought of Mr. Gore's opinion (i.e., RM [a]) became not associated with what they thought was Mr. Gore's opinion of GW (i.e., SM [c]).

In Figure 25, CD was increased by the presentation of information and decreased by the respondent balancing their evaluations after the second headline, resulting in the respondents' evaluations indicating that they still held the position that Mr. Gore's opinion was valuable, but that Mr. Gore was either incorrect or lying about GW. After the first headline and the second headline, OM (b) had a significant relationship with SM (c), but RM (a) did not have a significant relationship with SM (c). What respondents thought of GW (i.e., OM [b]) was associated with what they thought Mr. Gore thought about GW (i.e., SM [c]) after the T1 and T2 headlines were presented, but what respondents thought of Mr. Gore's opinion (i.e., RM [a]), was no longer associated with what they thought of Mr. Gore thought about GW (i.e., SM [c]). Respondents initially held beliefs that did or did not align with Mr. Gore's beliefs, and were assigned to groups accordingly, but after T1 and T2 headlines were presented, their beliefs about what they thought Mr. Gore thought about GW (i.e., SM [c]) were associated with their own beliefs (i.e., OM [b]), but there was no relationship between what they thought of Mr. Gore's opinion (i.e., RM [a]) and what respondents thought were Mr. Gore views of GW (i.e., SM [c]).

In Figure 25, those respondents who rated SM (c) high at T0 did not rate it high at T2 and those who rated SM (c) low at T0 did not rate it low at T2, indicating that changes in attitude were the result of CD increase and decrease relative to an SCR. The presentation of the first headline from a credible publication, which contained a message tone that was the opposite of the respondents' initial position had the strongest effect on changes in β coefficients for RM (a), OM (b), and SM (c) at T1 and the first headline had a lasting effect at T2 (see Figure 27). Presentation of

involuntary, unfavorable information resulted in a strong change in the β coefficients, and induced an increase in CD. Evaluations of SM (c) changed from T0 to T2, after the second headline (see Figure 25); respondents changed their evaluations of what Mr. Gore thought of GW (i.e., SM [c]), resulting in residual attitude change.

In Table 4.16 and Figure 25, what respondents thought of Mr. Gore's opinion was decreased and made insignificant after T1 and T2 headlines were presented; the relationship between what respondents thought of Mr. Gore's opinion of GW (i.e., RM [a]) and respondents' evaluations of what Mr. Gore thought of GW (i.e., SM [c]) was significant before the simulated headlines were presented, but not significant after the headlines were presented. After T1 and T2 headlines were presented, respondents' evaluations of what Mr. Gore thought of GW (i.e., SM [c]) and what respondents thought of Mr. Gore's opinion (i.e., RM [a]) were significantly changed after repeated measures, indicating balancing across repeated measures to reduce CD. Respondents' evaluations of what Mr. Gore thought of GW (i.e., SM [c]) were not maintained across repeated measures. SM (c) increased after the simulated headline was introduced at T1 and then decreased and made insignificant after the simulated headlines were presented at T2 (see Table 4.16 and Figure 24). There were statistically significant relationships of SM (c) between T0 and T1, T1 and T2, but not between T0 and T2. RM (a) was decreased after the simulated headlines were presented at T1 and T2 (see Table 4.16 and Figure 24).

In Table 4.16 and Figure 25) the relationship between OM (b) and SM (c) was not significant before the headlines were presented, and then became significant after the headlines were presented. This is additional evidence that respondents decreased

SM (c) after the second headline due to the balancing reaction from the information in the headlines. There were changes in the relationship between what respondents thought of GW (i.e., OM [b]) and respondents' evaluations of Mr. Gore's opinion of GW (i.e., RM [a]); Before the headlines, the relationship between OM (b) and RM (a) was significant with a large magnitude relationship, but after the first and second headlines, the β coefficient for the relationship was statistically significant. Moreover, the first and second headlines decreased the relationship between OM (b) and SM (c).

The effect of the publication source in the headline, either the Wall Street Journal (high credibility) or the National Enquirer (low credibility), was moderated by the positive or negative tone of the headline in Figure 27. If a respondent believed the publication source, a message of support for GW generated more support for the existence of GW, and if a respondent did not believe the publication source, a message of support for GW generated less support for the existence of GW. However, if a respondent did not believe the publication source, a message of support for GW did not generate more support for the existence of GW, and if a respondent believed the publication source, a message of support for GW generated more support for the existence of GW.

In Table 4.18 and Figure 27, the attributed research organization, the American Academy of Environmental Science or the Russian Academy of Environmental Science, which was the source of the simulated facts in the headlines, did not have a large effect on the respondents' evaluations of RM (a), OM (b), or SM (c), after the first headline, and did not increase CD. However, the change in the attributed research organization had an effect after the second headline, and increased CD. This finding

suggests that in the first headline an unknown, attributed source of information was not as believable to respondents as a known, publication source reporting the information, and did not increase CD.

The additional findings show differences in how respondents viewed GW and secondary effects within the DCF framework. In the prequalification data and full survey data, strong belief in GW was not found across the entire sample, which was maintained during the data collection period. There were preexisting differences in the manner in which GW was believed among male / female and young / old respondents. There were interaction effects between the measurement scales of the SCR, which demonstrated how an endorser SCR could affect attitude measurement. After the headlines were presented, there were shifts in RM (a), OM (b), and SM (c) within the DCF. The changes to the DCF were moderated by the positive or negative tone of the headline; an attributed source of information did not change SM (c) as much as a known, publication source reporting the information. These effects demonstrate that the DCF can be examined with the β coefficients of the path relationships for RM (a), OM (b), and SM (c).

Implications for Marketing Practice

In belief-disconfirmation CD, a belief that has been disconfirmed (or that could be disconfirmed) is held strongly by the consumer in a social context. Dissonant cognitive forms (DCFs) (see Appendix B Table B1) provide an organizing principle for classifying the effect of marketing messages. The DCF provides a method for marketing practitioners to classify a wide variety of market segments (cf. Sweeney & Souter, 2003), peer reference groups, consumption subcultures, or organizations by

identifying the type of DCF being experienced by a consumer. The process of anticipating the outcomes of learning and deliberation in models of predicting consumer behavior will help marketing practitioners to create marketing messages that embody DCFs with meaningful social comparison referents (SCR) and predictable paths of resolution in a social context, such as the creating consumer brand loyalty among alternatives with an endorser example in Appendix I: CD Example of Brand Loyalty with Endorser during Consumer Purchase. One possible explanation for the differences between brand-related advertising and point-of-sale retail sales approaches is that depending on the consumer, some of the DCFs involving individual product purchase beliefs can be addressed by endorser-based advertising while other product purchase beliefs, must be addressed by telemarketers or face-to-face sales personnel. It is understandable how some complex or expensive products are sold face to face rather than marketed directly due to the large number of DCFs that are associated with the entire purchase experience that cannot be addressed in advertising or direct marketing materials. The large number of DCFs must be addressed at the point of sale by sales personnel who become an SCR at the moment that the purchasing behavior occurs. Understanding the strength of the DCF buying relationships and how information could influence consumer decision-making is essential to the development of product and services, how to promote and how to distribute them efficiently.

Implications for Theory

Examinations of post-purchase behaviors have influenced the application of CD theory to advertising and marketing communications. CD induction and reduction associated with post purchase behaviors are typically a factor of the financial

component of the purchase and the time / effort component of the decision underlying the purchase. GW and other issues involving social choices that affect purchase decisions differ in the respect that the financial component (e.g., price) and the time / effort component (e.g., decision making about the product features) may vary substantially with the product decision. However, deep-seated values and beliefs show signs of being more difficult to change than evaluations of price and decision making processes; the social milieu provides a resistant context of shared opinions that differ substantially from opinions of purchase related decisions. This implication mirrors the difference found between belief disconfirmation CD and free choice CD, as distinct constructs.

As shown in Appendix A, the CD instrument enables distinguishing CD from psychological and marketing constructs that have similar definitions. The classification methodology with the CD instrument makes it possible to distinguish between CD experienced by consumers that differs from other related constructs.

In a meta-analytic review of 185 independent studies published through 1997, Armitage and Conner (2001) observed that the theory of planned behavior (Ajzen, 1991), which extends the scope of attitude measurement constructs, including subjective norm in the theory of reasoned action and perceived behavioral control, explains no more than 27% to 39% of the variance between behavior and intention. It is possible that failure to explain a larger amount of this variance is attributable to the presence of CD during the measurement process. While attitudinal measurement attempts to classify how the individual feels, thinks, and is predisposed toward an object, CD measurement involves examining how attitudes change affect, cognition,

and conation, when relevant cognitions interact. The interaction of information from the social context and salient memory signifies learning that is not easily measured; individuals learn and self-persuade themselves to adopt new, synthesized beliefs in a deliberative process. The process of cognitive interaction toward consistency promotes learning and renders the prediction of behavioral intent beyond the scope of current attitudinal models for predicting consumer behavior.

Efforts to demonstrate how attitudes generate behavioral intention rely upon examining how consistencies between cognitions fit together in a causal relationship. Instead, in this dissertation, CD for GW was induced from inconsistency in pairs of unbalanced social cognitions; the social context of which depends upon the chosen endorser social comparison referent (SCR), Mr. Gore. This finding suggests further investigation into how the magnitude of the CD leads to the avoidance of dissonant information within ongoing buying processes and attitude formation, such as when behavioral intention is blocked and becomes goal-moderated, a common circumstance in which advertising is presented and perceived by the consumer. For example, the protracted nature of the process of trying to consume predisposes the predictions of the model (Bagozzi & Warshaw, 1990) to confounding by the deliberation in the target social context that leads to CD. Current models of goal striving (cf. Bagozzi & Dholakia, 1999) lack the necessary theoretical foundation to account for a common motivation to resolve inconsistencies between attitudes and behaviors. The effect of voluntary and involuntary exposure to information to induce CD in buying contexts was a gap in the research stream, historically speaking, but it is directly relevant to the *reasoned action* that characterizes continuous buying activity.

The significant relationships between RM (a), OM (b), and SM (c) in this dissertation suggest theoretical support for a *social comparison threat to internal validity*. Moreover, all attitude measurement requires implicit borrowing of the social comparison referent (SCR) from friends, family, associates, culture, or general societal context to provide reliability and repeatability between measurements, which was Lewin's (1936) basic premise underlying *Principles of Topological Psychology*. In this sense, tests of reliability of scales are examinations of the stability of the assessments of attributed social context. Festinger (1954, 1957) described social comparison theory and cognitive dissonance (CD) theory, but stopped short of combining his theories into a single model using congruity (Osgood & Tannenbaum, 1955) and balance theory (Heider, 1946) as a hierarchy of effects, which is the approach that was explored in this dissertation with the balance model of CD measurement.

The order of CD reduction upon introduction of unfavorable information in the first set of headlines is social meaning (i.e., SM [c]), referent meaning (i.e., RM [a]), and object meaning (i.e., OM [b]), which is consistent with the order of dissonance reduction for belief-disconfirmation CD that was anticipated in Chapter 2. However, after the presentation of the second set of headlines in which the respondents received a mixture of positive and negative headlines, the order of CD reduction upon introduction of unfavorable information is OM (b), SM (c), and RM (a).

After the first headline, the respondents re-evaluated: 1. The content of the message (i.e., they changed SM [c]), 2. The source of the message (i.e., they changed RM [a]), and then 3. Changed their own view of GW on a scale of 1 to 10 (i.e. they

changed OM [b]). Essentially, the attitude change process for new, contrary information required three steps: 1. The respondents indicated that they thought that the SCR was either lying or wrong about GW (i.e., they changed SM [c]); 2. They stopped believing the SCR (i.e., they changed RM (a)]; and 3. Finally, they changed their own belief (i.e., they changed OM [b]). However, after the second headline, some groups of respondents again received contrary information and others received information that corresponded to their original viewpoint. The statistically significant relationships that resulted were that respondents: 1. First changed their view of GW; 2. They challenged the content of the message; and 3. They challenged the source of the message. The order of the CD resolution after the second headline was different than after the first headline in the sense that the views of GW were changed due to the information, but social meaning was changed before referent meaning; respondents tended to challenge the content of the message before they challenged the source of the message, in that order. The receipt of confirming or disconfirming information reinforces or undermines beliefs underlying brand images and brand attitudes in the mind of consumers, and brand personalities intended by manufacturers, or both. Identical processes are at work in the strengthening or weakening of beliefs, such as GW, held in common by a large group of individuals.

The introduction of dissonance-inducing information in the practice of advertising and marketing communications is common, especially involving brand spokespersons or product endorsers. The introduction of information in this dissertation demonstrated how dissonant information alters the meaning within the combined meaning of social cognitions within the model of the dissonant cognitive

form (DCF). When RM (a), OM (b), or SM (c) on either side of the cognitive structures in the DCF changed, an imbalance was created that shifted the entire cognitive structure of meaning related to GW, as was evidenced by multiple findings discussed with RQ2 and RQ3. The researcher and practitioner can use the procedure in Appendix C for documenting DCF observed within consumer contexts; the cognitive structures can be mapped and the scales adapted to measure how negative or positive information imbalances or balances cognitive dissonance (CD) or consonance in consumer contexts.

The methodological approach in this dissertation provides a method for investigating psychological discomfort arising from unbalanced cognitions for the study of consumer behavior in response to endorsers and general attitude measurement. In addition to enumerating possible dissolution resolution strategies, the dissonant cognitive forms (DCF) proposed in Appendix B Table B1 resemble problem-based learning scenarios that were anticipated by Piaget (1932/1965) and Vygotsky (1926/1997). The harmonization of balance theory, congruity theory and CD theory in the DCF approximate Piaget's accommodation mechanism (Piaget, 1932/1965; Piaget, 1974/1980; Piaget, 1975/1985; Piaget & Inhelder, 1966/1969; cf. Vygotsky, 1934/1986; Vygotsky, 1926/1997). The use of DCF has potential impact on the investigation of how learning takes place at selected stages of cognitive development. For example, the effect of social transmission and experience as accommodations provide the individual with information that either confirms or disconfirms beliefs. In belief-disconfirmation CD, the representation of CD in semantic space mirrors the discrepant meanings about beliefs that the individual

perceives and strives to reduce within the process of equilibration of cognitive structures. The resultant, incremental changes in cognitive structures that could be framed either as Piaget's *problem* or Festinger's *dissonant cognitions* are interpreted as infinitesimal steps toward a new stage of cognitive development or learning that restores the balance in the cognitive structure and thereby reduces CD between simultaneously considered cognitions. The differences between Festinger's CD measured in the DCF in this dissertation and the non-maturation forces of Piaget's accommodation and adaptation are largely a matter of interpretation.

Limitations and Delimitations of the Research

The external validity of the convenience sample gathered on the Internet is subject to the technological and demographic considerations of that medium, such as speed of Internet access, age, gender, education, and socio-economic factors of the respondents. The external validity of GW as a belief object in this dissertation is assumed generalizable to other targets of attitude measurement, such as endorsement of products, brands, events, services, or social marketing causes. The external validity of Mr. Gore as an SCR is assumed generalizable to other endorsers whether they are named, unnamed, voices, fictional characters, or human models that act as intermediaries to confer attributes on associated belief objects.

There are three primary limitations to the described model for measuring CD. First, false or exaggerated memories of attitudes and behaviors might be used to assess objects (i.e., ideas, opinions, and beliefs toward people, places, and things) in dissonant cognitions during deliberation in a manner similar to the functioning of actual memory, but there is no method to separate actual memories from false or

exaggerated memories (McIntyre, Lord, Lewis, & Frye, 2004). Second, the mode of resolution (Kaplan & Crockett, 1968) (during the interaction of incongruent referent [a], object [b], and social [c] meanings to estimate the values of the degrees of polarization, Osgood & Tannenbaum, 1955, in the cognition) is a simple aggregation through a weighted average; this weighting might not reflect actual weights. Finally, Heider (1958) postulated that a positive self-perception is necessary for positive balancing to occur within the triads linked by sentiment and Aronson (1980, 1999) suggested that self-concept expressed through self-justification is a form of CD reduction; both of which support accounting for the role of the moderating influence of personality differences as an assumption of the measurement instrument.[35] Hence, the relative weights assigned to the degrees of polarization of the points of meaning resolution (i.e., β coefficients) during the balancing of the cognition are assumed to be equivalent and no direct measures were collected of how individual psychological differences, such as how cognitive complexity (Crockett, 1975; Hale, 1980) influences the balancing process.

Implications for Future Research

A wide range of issues are being promoted in the North American media environment, including the issue of global warming. This dissertation addressed the question of how advertisers can influence those individuals or groups who do not believe in an issue that is being promoted. Individuals and groups typically formulate

[35] Aronson (1980) supported what Heider (1958) suggested; self-concept or self-perception influences cognitive consistency processes. Aronson's (1980) self-justification was thought to play a role in the reduction of dissonance associated with objects in a manner similar to the dissonance reduction processes in this dissertation. However, rather than investigating self-justification, this dissertation examined the specific target of justification, the most likely social comparison referent (SCR), and its role in dissonance induction and reduction processes.

positions on an issue in the absence of readily available facts that conclusively confirm or deny belief in the issue. The social context provided by an endorser or a publication provides a level of psychological comfort during the interaction of variables and is apparent through CD measurement. This research is especially applicable in the case of an issue-specific group that supports an issue and whose members tend to read media that reinforce their own pre-existing beliefs. This research demonstrates why advertisers should select publications and endorsers that have a history of promoting issues that are congruent with the beliefs espoused by the publications and endorsers traditionally featured in the media. Otherwise, CD generated by the publication or endorser could interact with the message, generating attempts by the reader to, first, challenge the message being endorsed (i.e., social meaning), second, challenge the endorser (i.e., referent meaning), and, finally, change their own attitudes (i.e., object meaning).

In addition to the need for replicating this study with another set of beliefs relevant to consumers other than GW, there are several considerations for future research. The potential of a *social comparison threat to internal validity* could be examined. An implication of the described instrument of CD measurement is that attitude measurement involving potentially dissonant beliefs is influenced by a social comparison threat to internal validity. The reliability (repeatability) of traditional attitude measurement might result from the respondents selecting the researcher or another group or individual as an SCR from the social context in which the measurement occurs. To address the social comparison threat to internal validity, the researcher should ask additional questions about an SCR related in the mind of the

respondent to the object being measured and examine the scales for convergent / divergent validity.

The congruity formula developed by Osgood and Tannenbaum (1957), postulated that the semantic differential would be manifest in multiple dimensions. Alternate scale items could be selected to examine the possibility of multiple dimensions, such as evaluative, activity, and potency dimensions that were not found in this research.

Models of consumer behavior can be updated to anticipate the effect of CD on intention by examining the multivariate aspects of dissonant cognitive forms (DCF) for the influence of dissonant information, such as the theory of trying to consume (Bagozzi & Warshaw, 1990), the theory of reasoned action (Ajzen & Fishbein, 1980), and the theory of planned behavior (Ajzen, 1991). An implication of this research is that the more closely the defined situation and SCR or endorser resembles the focal behavior (i.e., behavior that could result from the attitude), such as making a decision to consume or consideration of additional products or brands to consume, the more predictive that the measured DCF will be of the focal behavior.

The measurement of an endorser effect for mutually exclusive beliefs or product choices could be examined for a change in the endorser relationship as social context (i.e., RM [a] and SM [c]) and OM (b), after consumers have received advertising and marketing messages. There are numerous studies in the current endorser literature that do not directly examine SM (c), or partially examine a portion of RM (a) that relates to evaluation of the SCR's opinion: attractiveness, trustworthiness, and expertise of athlete endorsers (Pikas, Schied, & Pikas, 2012), role

model influence (Dix, Phau, & Pougnet, 2010), body shape, (D'Alessandro & Chitty, 2011), excitement/ruggedness, competence/sophistication, and sincerity (Dees, Bennett, & Ferreira, 2010), attractiveness (Liu & Brock, 2011), facial hair mediating expertise or trustworthiness (Guido, Peluso, & Moffa, 2011), transfer effects between celebrity endorser image and brand image (Yang, Lo, & Wang, 2012), mediating effects of celebrity endorser credibility and brand equity (Spry, Pappu, & Cornwell, 2011), endorser attractiveness and endorser expertise (Sallam & Wahid, 2012), celebrity endorser and ad / brand attitudes (Ilicic & Webster, 2011), endorser's expertise and trustworthiness with a fear-based /non-fear-based ad (Kim & Lee, 2012). Multiple studies could be replicated to measure SM (c) and OM (b), both of which could be adjusted by the respondent to reduce CD.

The cognitive complexity, gender, and age of the respondent could be examined. In the sample, female respondents were significantly more likely to indicate that GW exists than male respondents. The respondents who were younger than 25 years old and older than 54 years old were more likely to indicate that GW does not exist. The characteristics of the sample show areas for refining the CD model relative to gender and age, given that cognitive complexity (Crockett, 1975; Hale, 1980) and cognitive development (Kaplan & Crockett, 1968; Piaget, 1975/1985) are mediators of CD through the balancing process.

Conclusion

In this dissertation, the author created and tested an instrument derived from the cognitive consistency literature for measuring cognitive dissonance (CD) experienced by consumers for an important social marketing issue (e.g., global

warming [GW]) presented by a known endorser (e.g., Mr. Gore). GW is an important belief system relative to the marketing and consumption of *environmentally green* products and services. The choice of a commonly understood belief such as GW allowed measurement of a type of CD that was experienced uniformly across the sample.

This dissertation demonstrated that Lewin's (1936, 1951) method of examining the social context as framed by Heider's (1946, 1958) balance theory could be used to measure Festinger's (1957) conception of CD. To test the sensitivity of the instrument, the author introduced an initial set of involuntary (favorable or unfavorable) information in simulated headlines, depending on respondents' initial beliefs about GW; this information increased or decreased belief-disconfirmation CD in the sample, depending on whether the respondents' agreed with the endorser, Mr. Gore, about GW. To test further the sensitivity of the instrument, the author presented a second set of involuntary (favorable or unfavorable) information to respondents in simulated headlines that reversed the initial conditions, which correspondingly decreased or increased belief-disconfirmation CD in the sample. The described instrument facilitates the documentation of changes in meaning of dissonant beliefs during the introduction of information; for marketing academics and practitioners, this research reconciles the larger canvas of CD research and defines dissonant cognitive forms (DCFs). In sum, the evidence in this dissertation suggests that attitude measurement becomes inconclusive as a predictor of behavior when it addresses ideas, opinions, or beliefs that could become dissonant, unless the scales likewise measure social meaning (c) and referent meaning (a) of a most likely social comparison referent

(SCR) that resembles the social context in which the behavior under examination could occur or an explicitly referenced celebrity endorser such as Mr. Gore.

This dissertation suggests a practical model of dissonance measurement for assessing candidates for an optimal endorser match-up, based on consideration of how the respondent adjusts social meaning (c), referent meaning (a), and object meaning (b), in that order, to reduce CD. The balance model of CD measurement is a method for assessing what celebrity endorser, among many possible choices, produces the most efficacious CD reduction path if the consumer is presented with confirming / disconfirming information. The more closely the endorser's perceived attitudes about the product match the respondents' attitudes about the product, the more resistant the respondents' attitudes are to change when new information is received by the consumer from a third party. The celebrity or expert endorser, as an SCR, is a specific social context by which confirming / disconfirming information about the brand is interpreted by the consumer. The measurement of dissonance-related endorser effects with the DCF can be generalized to other endorser SCRs. By employing the balance model of CD measurement endorser candidates could be evaluated for shifts in social meaning (c) and referent meaning (a), and an optimal residual effect on object meaning (b) about the brand with a sample of consumers, before millions of ad dollars are spent.

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APPENDIX A–CONSTRUCTS SIMILAR TO COGNITIVE DISSONANCE

Several constructs are similar to cognitive dissonance (CD). Considering Festinger's (1957) original conception, three axioms are proposed to distinguish CD measured with the CD instrument from similar constructs:

- CD is a social phenomenon but perceived by an individual;
- CD is a cognitive construct that presupposes deliberation on accessible memory and new information;
- Dissonant cognitions can be identified by a basic cognition in which the assessment of the obverse of an object *follows from* the other object, are set in a social context, and share substitutable social comparison referents (SCR) and objects under consideration (OC).

The following formulations that are similar to CD are considered: attitudinal ambivalence (Fabrigar et al., 2005), frustration (Chein, 1972), religious doubt (Krause & Wulff, 2004), guilt (Burnett & Lunsford, 1994; Stice, 1992), regret (Loomes & Sugden, 1982), anticipated regret (Abraham & Sheeran, 2003), dissatisfaction (Oliver, 1997), hypocrisy (Aronson, Fried, & Stone, 1991; Krause & Wulff, 2004; O'Leary, n.d.), psychological reactance (Brehm, 1966), and Piaget's cognitive conflict / assimilation and accommodation (Inhelder et al., 1974; Piaget, 1975/1985; Pulaski, 1980).

Attitude Ambivalence and Attitude Inconsistency

Attitude ambivalence and attitude inconsistency are measurement effects that resemble CD except that in traditional attitude measurement the ambivalence and

inconsistency are considered outside the social context. Attitudinal ambivalence arises in evaluations of belief elements that are simultaneously positive and negative within or between related attitudes (Fabrigar et al., 2005; Fazio, 1994). When beliefs are simultaneously considered during the attitude measurement process, an evaluative tension arises from the respondent experiencing conflict between an assessment of the object along the positive and negative dimensions of attitudinal elements.

Maio, Esses, and Bell (2000) drew a distinction between attitude ambivalence and attitude inconsistency by expanding the analysis by separating the belief and feeling components (i.e., attitudinal elements). Attitudinal ambivalence results from differences within belief and feeling components, while attitudinal inconsistency results from differences between overall evaluation of the attitude, and differences in the evaluation of components. Inter-component ambivalence exists between negative beliefs and positive feelings about the object or between positive beliefs and negative feelings about the object. Intra-component ambivalence exists between negative and positive beliefs about the object or negative or positive feelings about the object. Attitudinal inconsistency occurs when a belief or feeling about an object is inconsistent with an overall attitudinal evaluation or other components. Sengupta and Johar (2002) reported evidence of inconsistency reconciliation, attitude strengthening and attitude maintenance through "increased reconciliatory elaboration that can be produced by the presence of inconsistencies has a positive impact on attitude strength, as documented by improved predictive capability" (p. 53).

The described model of CD provides a method for measuring the magnitude of the tension associated with inter-component and intra-component attitudinal

ambivalence (i.e., imbalance) involving beliefs, but not emotions. Moreover, the evaluative-cognitive aspects of attitudinal inconsistency (i.e., cognitive dissonance) among memories of attitudes are indirectly measured in the described model, but not the evaluative-dimensions of the original attitudes. While attitudinal ambivalence and attitudinal inconsistency arise from differences in beliefs, the cognitive inconsistency arising from the differences arise from deliberation that is triggered by the measurement process and without explicit consideration of the social context.

Frustration, Doubt, Guilt, Regret, and Confusion

There is a class of constructs similar to cognitive dissonance (CD) in that they share common cognitive processes that lead to some form of psychological tension. Frustration, doubt, guilt, regret, and confusion are emotions (i.e., tensions) that share the process of weighing the assessment of objects that do not fit together logically, but lack the social context in which the constructs arise and how the individual responds. Frustration results from a mismatch of expectation with reality. Doubt is wonder about a past choice or whether information received is correct. Regret is experienced as an emotional response to a past choice or the occurrence of events, whether the individual was personally responsible or not. Confusion is manifested when an individual faces a dizzying array of choices or circumstances. The experience of frustration, doubt, guilt, regret, and confusion involves the weighing of cognitions that do not fit together logically (even the induction of CD and modification in the process of CD reduction), but the affective and conative elements of these emotions distinguish them from the underlying cognitive processes.

When intention to act is blocked or inhibited for consumers for choices, the psychological discomfort experienced is characterized as a form of CD. However, it is important to distinguish between CD and other related constructs, such as frustration and other tensions. Both cognitive and emotional discomfort arise in instances of consumption and goal-moderated intention to try to consume. Festinger (1957) suggested how to distinguish dissonant relations from other types of tensions, "…two elements are in a dissonant relation if, considering these two alone, the obverse of one element would follow from the other. To state it a bit more formally, x and y are dissonant if not-x follows from y" (Festinger, 1957, p. 13; cf. Zimbardo & Ebbesen, 1969).

An example of CD in consumer behavior is the psychological discomfort that arises from inconsistent cognitive elements of two competing brands. For example, if a consumer purchases a remedy (i.e., remedy A) for severe headaches, the voluntary exposure to information (e.g., television advertisements) describing unpleasant side effects might arouse CD relative to another remedy (i.e., remedy B). In other words, the brand not selected seems to be the better choice, because it does not result in unwelcome side effects, and ceteris paribus, would have been the brand chosen if the information has been known prior to the purchase. Formally stated, not A follows from B and the cognitive discrepancy between the choices is mediated by the social context. On the other hand, frustration results from the chosen alternative being unavailable at the store, priced too high, or learning that it causes interaction effects with other medications, in which case not A does not follow from B. The frustration stems from evaluative processes about the brand chosen for purchase and not the

narrowing of cognitive elements relative to obverse alternatives. Indeed, frustration is psychological discomfort, but the discomfort does not arise from a forgone alternative or unbalanced social cognitions. Instead, the frustration arises from evaluative processes about the attributes of an object. Frustration in this instance results from the fact that an attribute of an object does not meet expectations (i.e., beliefs about the future), while CD arises from a difference between the assessment of the entire object and the assessment of another object, set in a social context. CD in this instance results from the weighing of the assessment of the object in its social context and not the emotional response to the presence, absence or evaluation of the object attributes.

Does CD resemble an emotion in the clinical sense or does it result from cognitive processes that are shared by other emotions experienced by consumers? Related constructs induce CD and change in the process of CD reduction. That is, does the experience of frustration cause CD or does CD cause frustration? The issue of temporal precedence is important, but only for the object under consideration (OC). For example, the memory of a frustrating experience at a restaurant is dissonant with a pleasurable experience currently being enjoyed at the same restaurant, if the social context generates it. Alternatively, the magnitude of the CD between a current, suboptimal experience and the expectation of an outstanding experience is strong enough to lead to the experience of frustration. In either case, a tension (e.g., frustration, doubt, guilt, regret, and confusion) is different from CD in that it involves discomfort or negative affect regarding a failure to meet expectations over a situation without concern for the social context. Moreover, CD of sufficient magnitude leads to the motivation to reduce CD and not necessarily behavior associated with related

tensions. At the point that the memory of a tension is considered in a social context by acquiring an SCR, it meets the test of CD. In general, two cognitions with the dyads p_1 …> x_1, and p_2 …> x_2, the new information or a social context alters the form of these cognitions to $(+ + +)_1$ and $(+ - +)_2$, at which point the second cognition is unbalanced with a negative OM (b) (See Figure 2). In sum, the memory of an emotion, such as frustration, doubt, guilt, regret, or confusion, can interact with other objects in a social context to become dissonant, but the experience of CD is tandem with, potentially moderating toward, and theoretically distinguishable from the emotion.

Customer Dissatisfaction

Consider the potentially emotional aspects of customer dissatisfaction. While customer dissatisfaction and cognitive dissonance (CD) can be post-decisional, customer dissatisfaction can be contrasted with CD; because the dissatisfaction was induced from the use of the product and was timed substantially after the decision was made. For example, in the purchase of an automobile, CD results from consideration of the forgone automobile, but dissatisfaction is experienced relative to the purchase and use of the current automobile. The dissatisfaction experienced with the current automobile is dissonant with the belief of superior satisfaction associated with the forgone automobile. In sum, experiencing CD requires obverse elements that immediately follow from and are not confounded with intervening variables.

Hypocrisy

Engaging in preaching to others about changing behaviors is usually considered a form of CD reduction. However, the Aronson et al. (1991) study on the induction of hypocrisy suggested that preaching might be a form of belief-

disconfirmation CD induction. Subjects in an experimental condition were reminded about their own sexual behaviors and then asked to write a persuasive speech on the need for using a condom. Results suggested that preparing and delivering the speech had induced and reduced the CD, depending on whether the participant had been practicing what the participant was asked to preach. A critical element in understanding the induction of CD is considering the distinction between the observed individual's perspective and the observer's perspective. The observer may not be aware of the social context of the beliefs of the observed individual; to the observer, a belief that may seem incompatible with another belief may actually be compatible to the observed individual with a more important and unobserved belief. For example, a conscientious person may purchase an expensive new automobile while their favorite charity enters bankruptcy, which seems hypocritical to the observer but not the observed individual. The psychological tension created by considering these two cognitions simultaneously should create attitude or behavior change, as beliefs in the underlying cognitions are altered to reduce CD. However, the fact that the seemingly hypocritical act takes place without attitude or behavior change indicates that low levels of CD, if any, are experienced. Hence, marketing and religious messages that directly link important, seemingly incompatible beliefs and behaviors together are requisite for the supposed hypocrisy seen from the observer's perspective to manifest CD experienced from the observed individual's perspective.

Psychological Reactance

Psychological reactance (Brehm, 1966) is similar to CD. Psychological reactance presupposes the individual's recognition of an inconsistency between a

desired state of behavioral freedom and an actual state of freedom. The reduction or threatened reduction in freedom as perceived by the individual is postulated to result in motivation to restore or maintain desired levels of freedom. The recognition and the reactance to limits in freedom share common cognitive processes with CD in that the individual is seeking to restore equilibrium through attitudinal or behavioral change. The cognitive discrepancy between desired and actual freedom, if an SCR is acquired, is an instance of CD.

Piaget's Assimilation and Accommodation

The equilibration processes of assimilation and accommodation in Piagetian (Piaget, 1932/1965; Piaget, 1974/1980; Piaget, 1975/1985; Piaget & Inhelder, 1966/1969) stages of cognitive development share similarities with the cognitive processes in the described model of CD measurement. Pulaski (1980) termed a phenomenon found by Inhelder, Sinclair, and Bovet (1974) as *cognitive conflict*, a state in which the characteristics of different, contradictory patterns of thought interact to motivate children to resolve discrepancies. The process of creating new cognitions through the organization and integration of environmental stimulation and information is entitled assimilation. The process of modifying preexisting cognitions to fit new information and feedback from external situations is entitled accommodation. The process of adaptation to achieve cognitive equilibrium consists of the continuous processes of assimilation and accommodation. Equilibrium is sought by the child to reconcile environmental experiences with understanding of those experiences. Equilibration functions to balance adaptation of assimilation and accommodation from a lesser to higher state of equilibrium.

Social transmission, social learning, and social interaction are common forms of accommodation during cognitive conflict to restore disturbed equilibrium. As Pulaski (1980) noted:

> When an organism is thrown into a state of cognitive conflict, it searches for a solution, like the small girl trying to find out whether or not there is a Santa Claus. When she was younger, she believed in Santa Claus, but now she suddenly begins to notice that there is one on every street corner. Or her siblings tell her here is no such person, and she is disturbed and troubled until she finds an explanation that makes sense to her in her new, less naïve state of development. Thus, as the child's mental structures become competent to grapple with new problems, she is stimulated and challenged by her environment to seek new solutions (p. 13).

The mediation of differing ideas with the processes of assimilation and accommodation was termed by Piaget (Pulaski, 1980) as social transmission but has been described by other researchers as cognitive conflict or social interaction. Accommodation organizes schemas that have been developed with assimilation. Accommodation works through exogenous or endogenous processes to reconcile schemas developed through assimilation with other schemas or external objects. Piaget (1975/1985) defined equilibration as positive movement through stages of development as adhering to three principles: (1) Assimilation of the assessment of objects to schemas of action and accommodation of schemas of action to the assessment of objects (e.g., achieving congruity and balancing); (2) Reciprocal assimilation and accommodation between existing cognitions (e.g., CD induction and reduction between two or more cognitions); (3) Reciprocal assimilation and accommodation between cognitions and the whole system (i.e., progressive movement through stages of cognitive development). Despite the fundamental similarities, Piaget

(1975/1985) attempted to contrast his model of equilibration with a reference to tension in Lewin's (1951) hodological space:

> The aim of this work is to explain the development of knowledge by appealing to a fundamental process of equilibration. That does not mean, however, that we shall apply the same model of equilibration to all situations at every level, as the Gestalt psychologists did with their form derived from "field" laws. Here equilibration will refer to a process that leads from a state near equilibrium to a qualitatively different state by way of multiple disequilibria and reequilibrations (p. 3).

An interpretation of the hierarchy of effects in the described model is that multiple disequilibria and re-equilibrations occur at multiple levels in the individual's perception. The processes of congruity and balancing are operating within first stage cognitions in a manner that resembles assimilation and accommodation. CD induction and reduction are present in assimilation and accommodation between reality clusters. Although the developmental context extends far beyond the scope of consumer behavior, the parallels between the equilibration of cognitions (Piaget, 1975/1985), and the processes of CD induction and reduction described in this dissertation are numerous.

APPENDIX B–POSTULATED DISSONANT COGNITIVE FORMS (DCF) AND RESOLUTION STRATEGIES BY MAGNITUDE

Dissonant Cognitive Forms (DCFs) are listed in Table B1 comprising 192 postulated forms that could exist in three hypothesized dimensions (i.e., Evaluative: 1-64; Activity: 65-128; Potency: 129-192) from Figure B1, where "~" represents no difference in sign and "^" represents a difference in the sign of the measured referent (a), object (b), and social (c) meaning between the cognitions in the evaluative, activity, and potency dimensions.

Figure B1: Balanced and Imbalanced Cognitions of the Dissonant Cognitive Form (DCF)

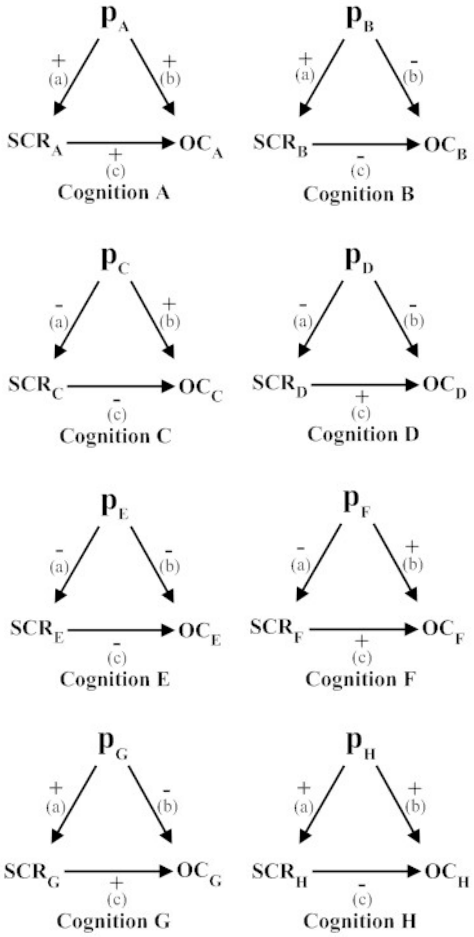


Table B1: *Postulated Dissonant Cognitive Forms (DCF) and Resolution Strategies by Magnitude of Dissonance*

Form #	First Cognition	Dissonant Meaning Resolution Strategy	Second Cognition
1 / 65 / 129	A (+ + +)	^ ^ ^	E (- - -)
2 / 66 / 130	B (+ - -)	^ ^ ^	F (- + +)
3 / 67 / 131	C (- + -)	^ ^ ^	G (+ - +)
4 / 68 / 132	D (- - +)	^ ^ ^	H (+ + -)
5 / 69 / 133	E (- - -)	^ ^ ^	A (+ + +)
6 / 70 / 134	F (- + +)	^ ^ ^	B (+ - -)
7 / 71 / 135	G (+ - +)	^ ^ ^	C (- + -)
8 / 72 / 136	H (+ + -)	^ ^ ^	D (- - +)
9 / 73 / 137	A (+ + +)	^ ^ ~	D (- - +)
10 / 74 / 138	B (+ - -)	^ ^ ~	C (- + -)
11 / 75 / 139	C (- + -)	^ ^ ~	B (+ - -)
12 / 76 / 140	D (- - +)	^ ^ ~	A (+ + +)
13 / 77 / 141	E (- - -)	^ ^ ~	H (+ + -)
14 / 78 / 142	F (- + +)	^ ^ ~	G (+ - +)
15 / 79 / 143	G (+ - +)	^ ^ ~	F (- + +)
16 / 80 / 144	H (+ + -)	^ ^ ~	E (- - -)
17 / 81 / 145	A (+ + +)	^ ~ ^	C (- + -)
18 / 82 / 146	B (+ - -)	^ ~ ^	D (- - +)
19 / 83 / 147	C (- + -)	^ ~ ^	A (+ + +)
20 / 84 / 148	D (- - +)	^ ~ ^	B (+ - -)
21 / 85 / 149	E (- - -)	^ ~ ^	G (+ - +)
22 / 86 / 150	F (- + +)	^ ~ ^	H (+ + -)
23 / 87 / 151	G (+ - +)	^ ~ ^	E (- - -)
24 / 88 / 152	H (+ + -)	^ ~ ^	F (- + +)
25 / 89 / 153	A (+ + +)	^ ~ ~	F (- + +)
26 / 90 / 154	B (+ - -)	^ ~ ~	E (- - -)
27 / 91 / 155	C (- + -)	^ ~ ~	H (+ + -)
28 / 92 / 156	D (- - +)	^ ~ ~	G (+ - +)
29 / 93 / 157	E (- - -)	^ ~ ~	B (+ - -)
30 / 94 / 158	F (- + +)	^ ~ ~	A (+ + +)
31 / 95 / 159	G (+ - +)	^ ~ ~	D (- - +)
32 / 96 / 160	H (+ + -)	^ ~ ~	C (- + -)
33 / 97 / 161	A (+ + +)	~ ^ ^	B (+ - -)
34 / 98 / 162	B (+ - -)	~ ^ ^	A (+ + +)
35 / 99 / 163	C (- + -)	~ ^ ^	D (- - +)
36 / 100 / 164	D (- - +)	~ ^ ^	C (- + -)
37 / 101 / 165	E (- - -)	~ ^ ^	F (- + +)
38 / 102 / 166	F (- + +)	~ ^ ^	E (- - -)
39 / 103 / 167	G (+ - +)	~ ^ ^	H (+ + -)
40 / 104 / 168	H (+ + -)	~ ^ ^	G (+ - +)
41 / 105 / 169	A (+ + +)	~ ^ ~	G (+ - +)
42 / 106 / 170	B (+ - -)	~ ^ ~	H (+ + -)
43 / 107 / 171	C (- + -)	~ ^ ~	E (- - -)
44 / 108 / 172	D (- - +)	~ ^ ~	F (- + +)
45 / 109 / 173	E (- - -)	~ ^ ~	C (- + -)
46 / 110 / 174	F (- + +)	~ ^ ~	D (- - +)
47 / 111 / 175	G (+ - +)	~ ^ ~	A (+ + +)
48 / 112 / 176	H (+ + -)	~ ^ ~	B (+ - -)
49 / 113 /177	A (+ + +)	~ ~ ^	H (+ + -)
50 / 114 / 178	B (+ - -)	~ ~ ^	G (+ - +)
51 / 115 / 179	C (- + -)	~ ~ ^	F (- + +)
52 / 116 / 180	D (- - +)	~ ~ ^	E (- - -)
53 / 117 / 181	E (- - -)	~ ~ ^	D (- - +)
54 / 118 / 182	F (- + +)	~ ~ ^	C (- + -)
55 / 119 / 183	G (+ - +)	~ ~ ^	B (+ - -)
56 / 120 / 184	H (+ + -)	~ ~ ^	A (+ + +)
57 / 121 / 185	A (+ + +)	~ ~ ~	A (+ + +)
58 / 122 / 186	B (+ - -)	~ ~ ~	B (+ - -)
59 / 123 / 187	C (- + -)	~ ~ ~	C (- + -)
60 / 124 / 188	D (- - +)	~ ~ ~	D (- - +)
61 / 125 / 189	E (- - -)	~ ~ ~	E (- - -)
62 / 126 / 190	F (- + +)	~ ~ ~	F (- + +)
63 / 127 / 191	G (+ - +)	~ ~ ~	G (+ - +)
64 / 128 / 192	H (+ + -)	~ ~ ~	H (+ + -)

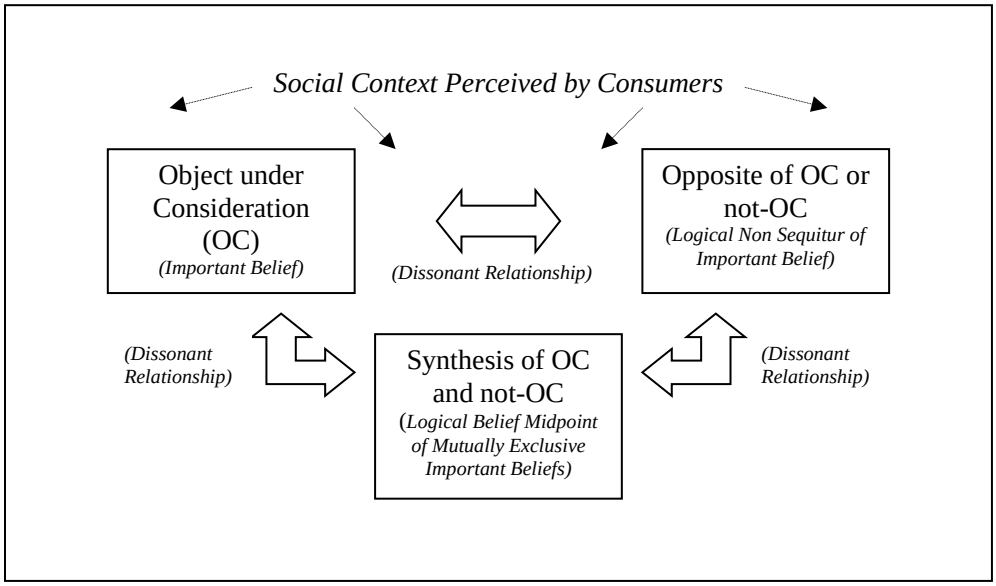
APPENDIX C–A PROCEDURE FOR DIAGRAMMING DISSONANT COGNITIVE FORMS (DCF)

This procedure was used to analyze the beliefs associated with global climate change: global warming (GW), global cooling (GC), and no climate change (NC). The procedure can be used to de-construct potentially dissonant consumer behavior situations, such as Holloway's (1967) CD experiments. The general procedure can be used to identify dissonant cognitive forms (DCF) (see Appendix B) in the free-choice and belief-disconfirmation CD paradigms in other socially based contexts. The social comparison referent (SCR) (e.g., endorser) and DCF should be matched as closely as possible to the focal behavior.

1. Define the situation involving consumer purchase or information transmission, as closely as possible to a relevant focal behavior. Start with a written description of the situation; expand it as in Figure C1 to arrive a working diagram of the dissonant cognitions in Figure 9.
2. See Figure C1. Define a belief, the opposite of the belief, and a belief that represents a midpoint between the two opposing beliefs. Find the *qualitative limit* of the belief or object under consideration (OC) given the estimated valence (i.e., positive or negative scalar value) as it approaches the opposing belief or not-OC and the *qualitative limit* of the not-OC given the estimated valence along the continuum of the inconsistency. Describe the synthesis of the two opposing

beliefs; for measurement purposes, this is the *logical midpoint* of the CD between the two beliefs.[36]

Figure C1: Finding the Belief Midpoint of Dissonant Cognitive Forms (DCF)



3. See Figure 2 and Figure 7. Identify specific or general social comparison referents (SCR) as shown in Figure 2 and Figure 7, such as other individuals (o), media (m), source (s) or researcher (r), their credibility as source of RM (a), and whether the attributable SM (c) would agree with the object meaning (OM) (b). Specify the object under consideration (OC) as a point of reference for OM (b) and as a mutually exclusive choice to be made or a belief that is disconfirmed (i.e., the not-

[36] In belief-disconfirmation CD there is a synthesis of the two dissonant belief-related objects that is likely to be perceived by the respondent, while in free-choice CD there is a logical alternative that is different from and mutually exclusive of both choice-related objects. In any experience involving cognitive dissonance, an uncomfortable learning situation is described as thesis and antithesis colliding in synthesis. When the first belief-related OC is *moved toward* the second, opposing belief-related OC in semantic space along the continuum and that second belief-related OC is *moved toward* the first, opposing belief-related OC, there is a *belief midpoint*. The *qualitative limit*, at which the evaluations of the first and second belief-related OCs each are different from the other, is a logical midpoint of the two beliefs and that midpoint is both a different and dissonant belief than the first two belief-related OCs (see Figure F1).

OC should follow from OC but may relate to an inferred belief). Select the most likely SCRs to be thought of along with the OCs.

4. See Figure 9. Diagram the cognitions from left to right using the *oldest* or existing OC.
5. Match the most likely SCR to the appropriate OC.
6. Identify the cognitions comprising the dissonant cognitive form (DCF) using Appendix B Figure B1.
7. See Figure 9. Estimate the positive or negative scalar value (i.e., valence) of the referent (a), object (b), and social (c) meaning, respectively, by defining the high CD scenario, the low CD scenario and the reason for the CD. Positive values are often above the midpoint of the measurement scale, while negative values are often below the midpoint of the measurement scale. However, there may be instances in which the highest or lowest of the pairs of values may be grouped based on which two values are the closest together.
8. Estimate the most probable changes in referent (a), object (b), and social (c) meaning in either cognition of the DCF to induce or reduce CD (i.e., the meaning that is least resistant to change defines the maximum magnitude of CD [Festinger, 1957, in that dimension). Note that free-choice CD occurs when choices are made about tangible objects, while belief-disconfirmation CD occurs between intangible beliefs or intangible beliefs about objects.
9. In Figure 9, identify the least probable change in meaning, which delineates the minimum magnitude of CD that the observed individual will experience when

considering the beliefs in the DCF shown in Figure 9. Identify the most probable change in meaning, which delineates the maximum magnitude of CD experienced.

10. Operationalize the variables for referent meaning, object meaning, and social meaning with a semantic differential (or other scales of interval level of measurement) on attributes for unfamiliarity/familiarity or unimportance/importance, etc. for the OC, the not-OC (i.e., dissonant OC) in the synthesized DCFs as shown in Figure C1.

The procedure for diagramming DCFs is based on assumptions derived from cognitive consistency theory about the composition of the cognitions to provide a means to facilitate formal measurement of CD and the design of marketing messages to induce or reduce CD. The suppositions for diagramming procedure to the free-choice and belief-disconfirmation CD paradigms (and possibly induced-compliance and effort-justification CD paradigms) are selection of the SCR, the OC, the pairing of the SCR and the OC in the cognitions, and the scale valences of referent (a), object (b) and social (c) meaning.

APPENDIX D–RESEARCH DESIGN AND SIMULATED SCIENCE NEWS HEADLINES

Table D1: *Research Design and Simulated Science News Headlines*

Group / Run	Block 1 (2007) News Headline (A-H)	Factor 1 A:B1 Valence	Factor 2 B:B1 Pub.	Factor 3 C:B1 Attrib.	Block 2 (2008) News Headline (A-H)	Factor 4 D:B2 Valence	Factor 5 E:B2 Pub.	Factor 6 F:B2 Attrib.
1	(F) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 NE	B1 Russian	(A) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 WSJ	B2 American
2	(A) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 WSJ	B1 American	(G) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 WSJ	B2 Russian
3	(G) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 WSJ	B1 Russian	(C) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 WSJ	B2 American
4	(H) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 NE	B1 Russian	(H) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 NE	B2 Russian
5	(E) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 WSJ	B1 Russian	(F) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 NE	B2 Russian

Group / Run	Block 1 (2007) News Headline (A-H)	Factor 1 A:B1 Valence	Factor 2 B:B1 Pub.	Factor 3 C:B1 Attrib.	Block 2 (2008) News Headline (A-H)	Factor 4 D:B2 Valence	Factor 5 E:B2 Pub.	Factor 6 F:B2 Attrib.
6	(C) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 WSJ	B1 American	(H) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 NE	B2 Russian
7	(F) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 NE	B1 Russian	(G) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 WSJ	B2 Russian
8	(H) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 NE	B1 Russian	(B) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 NE	B2 American
9	(B) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 NE	B1 American	(D) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 NE	B2 American
10	(B) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 NE	B1 American	(F) According to the National Enquirer, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 NE	B2 Russian
11	(C) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 WSJ	B1 American	(B) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 NE	B2 American

Group / Run	Block 1 (2007) News Headline (A-H)	Factor 1 A:B1 Valence	Factor 2 B:B1 Pub.	Factor 3 C:B1 Attrib.	Block 2 (2008) News Headline (A-H)	Factor 4 D:B2 Valence	Factor 5 E:B2 Pub.	Factor 6 F:B2 Attrib.
12	(A) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 WSJ	B1 American	(A) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 WSJ	B2 American
13	(G) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 WSJ	B1 Russian	(E) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 WSJ	B2 Russian
14	(E) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B1 Pro	B1 WSJ	B1 Russian	(D) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 NE	B2 American
15	(D) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 NE	B1 American	(E) According to the Wall Street Journal, the Russian Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly increased over the last 50 years.	B2 Pro	B2 WSJ	B2 Russian
16	(D) According to the National Enquirer, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B1 Con	B1 NE	B1 American	(C) According to the Wall Street Journal, the American Academy of Environmental Science recently reported strong evidence that average global temperatures have significantly decreased over the last 50 years.	B2 Con	B2 WSJ	B2 American

APPENDIX E–SOLICITATION EMAIL MESSAGES AND DATA COLLECTION INSTRUMENTS

Table E1: *Solicitation Email Message*

Hi ???,

I need your help. If you could pass this message through your network, I would appreciate it.

For my doctoral dissertation research, I'm studying how changes to strongly held beliefs about climate change occur when consumers read information supplied by the news media.

A donation of $1.00 will be made to the American Heart Association as a token of my appreciation for completing the survey.

To participate in the survey process, this is the web address:

http://www.zoomerang.com

Thank you for your help.

Best wishes,

Dave Wagner
Ph.D. Candidate
College of Business Administration
TUI University
[david.wagner@trident.edu]
+1-###-###-####

Table E2: *Qualification Survey Instrument*

Climate Change Beliefs Survey -- Short Survey

INTRODUCTION

You are being invited to participate in a research study conducted by Dave Wagner, a doctoral candidate in the College of Business Administration at TUI University. If you have questions about this study, you may contact him at [david.wagner@trident.edu] or +1-###-###-####, or the University at the email addresses below.

The purpose of this research study is to measure how changes to strongly held beliefs about climate change occur when consumers read information supplied by the news media. If you are 18 years of age or older and agree to participate in this study, you will be asked preliminary questions in the attached SHORT survey and, if you qualify, sent an email containing a link to the FULL survey about your beliefs toward climate change.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential; individual responses that can be identified with you will be disclosed only with your permission or as required by the laws of your country of residence.

Neither the participants nor the doctoral candidate will receive any financial benefit from this study. Although there are no direct benefits to you from participating, this research will help the doctoral candidate complete his dissertation and make a contribution to knowledge. For the first 480 surveys completed, $1.00 will be donated as a token of appreciation to the American Heart Association in the name of TUI University.

For additional questions about this research study, please contact Dr. Alan B. Flaschner at ##########. For details about the TUI University Institutional Review Board (IRB) process please contact Dr. Afshin Afrookhteh at ##########.

If you agree to participate in this survey, please answer the question and click on the SUBMIT button below. You may quit this survey at any time without penalty by simply closing the browser window, and none of your responses will be recorded.

ABOUT YOU

Q1. Indicate your age:

Under 18
18 or older

[SUBMIT]

If Question Choice - Under 18, Is Selected Then Skip To Survey Restricted Message.

ABOUT CLIMATE CHANGE

Q2. What do you think of GLOBAL WARMING?

Not Occurring (1) <> Occurring (10)

Q3. Enter your complete email address to receive the full Climate Change Beliefs survey (e.g., user@domain.com):

[SUBMIT]

If Question Choice - Enter your complete email address to receive the full survey, Is Not Empty Then Skip To End of Survey Message.

Survey Restricted Message

THANK YOU

This is survey is restricted to adult participants.

You will now be taken to the end of the survey.

End of Survey Message

We thank you for your time spent taking this survey.

Table E3: *Notification Email Message*

Hi ???,

You recently completed the short qualification survey for my doctoral dissertation research project. I'm studying how changes to beliefs about climate change occur when consumers read information supplied by the news media.

Please visit the following link to complete the full survey at your earliest convenience:

http://www.zoomerang.com/##########

A donation of $1.00 will be made to the American Heart Association as a token of my appreciation for completing the survey. You may quit this survey at any time without penalty by simply closing the browser window, and none of your responses will be recorded.

Thanks again for your help.

Best wishes,

Dave Wagner
Ph.D. Candidate
College of Business Administration
TUI University
[david.wagner@trident.edu]
+1-###-###-####

Table E4: *Full Survey Instrument*

>>>Repeated at top of each page<<<

Climate Change Beliefs Survey -- Full Survey (??)

(NOTE: Comments can be entered at the end of the survey.)

>>>Repeated at top of each page<<<

(Survey) Page 1 of 12

INTRODUCTION

The full climate change survey starts after this web page. You were invited in the short climate change survey to participate in the full research study conducted by Dave Wagner, a doctoral candidate in the College of Business Administration at TUI University. If you have questions about this study, you may contact Dave Wagner at [david.wagner@trident.edu] or +1-###-###-####, or the University at the email addresses below. The web address for this survey will remain open for two weeks after the email invitation was received.

The purpose of this research study is to measure how changes to strongly held beliefs about climate change occur when consumers read information supplied by the news media. If you are 18 years of age or older and agree to participate in this study, you will be asked approximately thirty-five questions related to your beliefs about global climate change. There are no right or wrong answers. The survey is for research purposes only; no one will contact you because of your participation.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential; individual responses that can be identified with you will be disclosed only with your permission or as required by the laws of your country of residence.

Neither the participants nor the doctoral candidate will receive any financial benefit from this study. Although there are no direct benefits to you from participating, this research will help the doctoral candidate complete his dissertation and make a contribution to knowledge. For each of the first 480 completed surveys, a donation of $1.00 will be sent as a token of appreciation to the American Heart Association by the doctoral student in the name of TUI University.

For additional questions about this research study, please contact Dr. Alan B. Flaschner at ##########. For details about the TUI University Institutional Review Board (IRB) process please contact Dr. Afshin Afrookhteh at ##########.

If you agree to participate in accordance with the terms stated above, click on the SUBMIT button below. You may quit this survey at any time without penalty by simply closing the browser window, and none of your responses will be recorded.

[SUBMIT]

(Survey) Page 2 of 12

GETTING STARTED

The following questions relate to GLOBAL WARMING, GLOBAL COOLING, and NO CLIMATE CHANGE. Your assessment of individuals, publications, scientific organizations, and scientific information is needed. There are no right or wrong answers to the questions.

Q1. What do YOU think of the publication THE WALL STREET JOURNAL?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

Q2. What do YOU think of the publication THE NATIONAL ENQUIRER?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

Q3. What do YOU think of the research organization the AMERICAN Academy of Environmental Science?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

Q4. What do YOU think of the research organization the RUSSIAN Academy OF Environmental Science?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)

Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

(Survey) Page 3 of 12

ABOUT GLOBAL WARMING

The next series of questions relates to GLOBAL WARMING, the permanent increase in temperatures around the world, which threatens future human, animal, and plant life.

Q5. GLOBAL WARMING is to YOU:

An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Former U.S. Vice President and 2007 Nobel Peace Prize co-winner, Al Gore, recently produced a documentary film on the subject of GLOBAL WARMING. For several questions in the survey, Vice President Gore will serve as a point of reference for how you perceive GLOBAL WARMING, GLOBAL COOLING, and NO CLIMATE CHANGE.

Q6. In YOUR estimation, what is AL GORE's view of GLOBAL WARMING?

An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q7. AL GORE's VIEW of GLOBAL WARMING is to YOU:

An Unfamiliar View to You (1) <> A Familiar View to You (10)
Unbelievable (1) <> Believable (10)

Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

(Survey) Page 4 of 12

2007 SCIENCE NEWS

Consider this news headline from 2007 when answering the following set of questions:

>>>BLOCK 1 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS.<<<

Q8. Given the 2007 headline, what do YOU think of the PUBLICATION that reported the information?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

Q9. Given the 2007 headline, what do YOU think of the RESEARCH ORGANIZATION that researched the information that was quoted by the publication?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

(Survey) Page 5 of 12

>>>BLOCK 1 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS. <<<

ABOUT GLOBAL WARMING IN YEAR 2007

Q10. After reading the 2007 headline, I now think that GLOBAL WARMING is

An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q11. After reading the 2007 headline, I now think that AL GORE thinks GLOBAL WARMING is

An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q12. After reading the 2007 headline, I now think that AL GORE's VIEW of GLOBAL WARMING is

An Unfamiliar View to Me (1) <> A Familiar View to Me (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

>>>BLOCK 1 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS. <<<

ABOUT GLOBAL COOLING IN YEAR 2007

The next series of questions relates to GLOBAL COOLING, the permanent decrease of temperatures around the world, which threatens future human, animal, and plant life.

Q13. After reading the 2007 headline, I now think that GLOBAL COOLING is

An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q14. After reading the 2007 headline, I now think that AL GORE thinks GLOBAL COOLING is

An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q15. After reading the 2007 headline, I now think that AL GORE's VIEW of GLOBAL COOLING is:

An Unfamiliar View to Me (1) <> A Familiar View to Me (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

>>>BLOCK 1 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS. <<<

ABOUT NO CLIMATE CHANGE IN YEAR 2007

The next series of questions relates to NO CLIMATE CHANGE, a condition in which average temperatures around the world will be stable for centuries to come and there is no known threat to future human, animal, and plant life.

Q16. After reading the 2007 headline, I now think that NO CLIMATE CHANGE is

An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Changing Climate (1) <> Stable Climate (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q17. After reading the 2007 headline, I now think that AL GORE thinks NO CLIMATE CHANGE is

An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Changing Climate (1) <> Stable Climate (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q18. After reading the 2007 headline, I now think that AL GORE's VIEW of NO CLIMATE CHANGE is

An Unfamiliar View to Me (1) <> A Familiar View to Me (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

2008 SCIENCE NEWS

Consider this news from 2008 when answering the following set of questions:

>>>BLOCK 2 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS. <<<

Q19. Given the 2008 headline, NOW what do YOU think of the PUBLICATION that reported the information?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

Q20. Given the 2008 headline, NOW what do YOU think of the RESEARCH ORGANIZATION that researched the information that was quoted by the publication?

Unfamiliar (1) <> Familiar (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

>>>BLOCK 2 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS. <<<

ABOUT GLOBAL WARMING IN YEAR 2008

Q21. Given the 2008 headline, GLOBAL WARMING is NOW to YOU:

An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q22. In YOUR estimation, given the 2008 headline, what NOW is AL GORE’s view of GLOBAL WARMING?

An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q23. After reading the 2008 headline, AL GORE's VIEW of GLOBAL WARMING is NOW to YOU:

An Unfamiliar View to You (1) <> A Familiar View to You (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

(Survey) Page 10 of 12

>>>BLOCK 2 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS. <<<

ABOUT GLOBAL COOLING IN YEAR 2008

Q24. Given the 2008 headline, GLOBAL COOLING is NOW to YOU:

An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q25. In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of GLOBAL COOLING?

An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Decreasing (1) <> Increasing (10)

Impossible (1) <> Possible (10)
Not Occurring (1) <> Occurring (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q26. After reading the 2008 headline, AL GORE's VIEW of GLOBAL COOLING is NOW to YOU:

An Unfamiliar View to You (1) <> A Familiar View to You (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

(Survey) Page 11 of 12

>>>BLOCK 2 HEADLINE TEXT FROM APPENDIX D TABLE D1. DISPLAYED HERE BASED ON RANDOM ASSIGNMENT TO GROUPS. <<<

ABOUT NO CLIMATE CHANGE IN YEAR 2008

Q27. Given the 2008 headline, NO CLIMATE CHANGE is NOW to YOU:

An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Changing Climate (1) <> Stable Climate (10)
Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q28. In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of NO CLIMATE CHANGE?

An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)
Decreasing (1) <> Increasing (10)
Impossible (1) <> Possible (10)
Changing Climate (1) <> Stable Climate (10)

Bad for Future Generations (1) <> Good for Future Generations (10)
Unimportant (1) <> Important (10)
Will Not Have an Impact (1) <> Will Have an Impact (10)
Not Real (1) <> Real (10)
Not Inevitable <> Inevitable (10)

Q29. After reading the 2008 headline, AL GORE's VIEW of NO CLIMATE CHANGE is NOW to YOU:

An Unfamiliar View to You (1) <> A Familiar View to You (10)
Unbelievable (1) <> Believable (10)
Untrustworthy (1) <> Trustworthy (10)
Not Credible (1) <> Credible (10)
Unimportant (1) <> Important (10)

[SUBMIT]

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ABOUT YOU

Q30. Please enter your complete email address for statistical purposes:

Q31. Select the country or region in which you reside: <<Dropdown List>>

Q32. Indicate the highest level of education you have completed:

Elementary School
Eighth Grade
Some High School
High School Diploma
Some College or University Courses
Associates Degree
Bachelors Degree
Masters Degree
Doctoral Degree
Other
Prefer not to answer

Q33. Indicate your age:

Under 13
13 to 17
18 to 24
25 to 34
35 to 44

45 to 54
55 to 64
65 or more

Q34. Indicate your gender:

Male
Female

Q35. Provide any comments you have about this survey:

THANK YOU AND PLEASE TELL OTHERS

As a token of appreciation for your participation in this study, $1.00 will be donated to the American Heart Association (http://www.americanheart.org).

If you know of someone who could participate in this research, please ask him or her to take the short survey at the following link:

http://www.zoomerang.com/##########

Thank you!

[SUBMIT]

End of Survey Message

We thank you for your time spent taking this survey.

APPENDIX F–DATA AND STATISTICS

Table F1: *Survey Respondent Assignments, Visits, Partials, and Completes*

Group	Initial Position	Assigns	Visits	Partials	Completes
1	IPCon	113	100	31	42
2	IPCon	113	108	45	38
5	IPCon	131	110	40	42
7	IPCon	116	102	48	40
9	IPCon	126	91	39	36
10	IPCon	128	106	48	40
12	IPCon	117	95	37	39
14	IPCon	123	100	43	39
3	IPPro	106	97	38	31

4	IPPro	112	95	44	30
6	IPPro	70	82	29	35
8	IPPro	91	98	40	31
11	IPPro	91	100	45	31
13	IPPro	105	87	37	31
15	IPPro	91	99	41	31
16	IPPro	78	80	33	31
Sub-Total		1711	1550	638	567
Invalid Email Unassigned		96			
Total		1807			

Table F2: *Survey Assignments Initial Position Pro (IPPro) Global Warming*

IPPro Group	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Total
3	43	3	3	4	4	5	3	5	6	2	6	3	4	8	0	7	106
4	43	3	3	4	4	5	3	5	6	2	6	3	4	8	6	7	112
6	43	3	3	4	4	5	3	5	0	0	0	0	0	0	0	0	70
8	43	3	3	4	4	5	3	5	6	2	6	3	4	0	0	0	91
11	43	3	3	4	4	5	3	5	6	2	6	3	4	0	0	0	91
13	43	3	3	4	4	5	3	5	6	2	6	3	4	8	6	0	105
15	43	3	3	4	4	5	3	5	6	2	6	3	4	0	0	0	91
16	43	3	3	4	4	5	3	5	6	2	0	0	0	0	0	0	78
Total	344	24	24	32	32	40	24	40	42	14	36	18	24	24	12	14	744

Table F3: *Survey Assignments Initial Position Con (IPCon) Global Warming*

IPCon Group	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Total
1	34	5	8	6	8	9	4	8	9	4	10	3	2	3	0	0	113
2	34	5	8	6	8	9	4	8	9	4	10	3	2	3	0	0	113
5	34	5	8	6	8	9	4	8	27	4	10	3	2	3	0	0	131
7	34	5	8	6	8	9	4	8	0	4	10	3	2	3	0	12	116
9	34	5	8	6	8	9	4	8	15	4	10	3	2	3	7	0	126
10	34	5	8	6	8	9	4	8	24	4	10	3	2	3	0	0	128
12	34	5	8	6	8	9	4	8	6	4	10	3	2	3	7	0	117
14	34	5	8	6	8	9	4	8	12	4	10	3	2	3	7	0	123
Total	272	40	64	48	64	72	32	64	102	32	80	24	16	24	21	12	967

Table F4: *Cronbach's Alphas of Averaged Word Pair Response Scales (All Items)*

Cronbach's Alphas of Averaged Word Pair Response Scales (All Items)	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	N of Cases
WSJQ1 (R1 – R5)	0.896	0.905	5	567
NEQ2 (R1 – R5)	0.782	0.855	5	567
AAESQ3 (R1 – R5)	0.914	0.922	5	567
RAESQ4 (R1 – R5)	0.902	0.903	5	567
GWoT0Q5 (R1 – R9)	0.918	0.908	9	567
GWsT0Q6 (R1 – R9)	0.860	0.902	9	567
GWrT0Q7 (R1 – R5)	0.906	0.886	5	567
PubT1Q8 (R1 – R5)	0.894	0.903	5	567
ResT1Q9 (R1 – R5)	0.927	0.928	5	567
GWoT1Q10 (R1 – R9)	0.927	0.919	9	567
GWsT1Q11 (R1 – R9)	0.874	0.917	9	567
GWrT1Q12 (R1 – R5)	0.920	0.905	5	567
GCoT1Q13 (R1 – R9)	0.868	0.866	9	567
GCsT1Q14 (R1 – R9)	0.911	0.911	9	567
GCrT1Q15 (R1 – R5)	0.890	0.892	5	567
NCoT1Q16 (R1 – R9)	0.774	0.772	9	567
NCsT1Q17 (R1 – R9)	0.753	0.770	9	567
NCrT1Q18 (R1 – R5)	0.893	0.895	5	567
PubT2Q19 (R1 – R5)	0.924	0.926	5	567
ResT2Q20 (R1 – R5)	0.945	0.945	5	567
GWoT2Q21 (R1 – R9)	0.928	0.921	9	567
GWsT2Q22 (R1 – R9)	0.898	0.922	9	567
GWrT2Q23 (R1 – R5)	0.920	0.908	5	567
GCoT2Q24 (R1 – R9)	0.873	0.869	9	567
GCsT2Q25 (R1 – R9)	0.907	0.906	9	567
GCrT2Q26 (R1 – R5)	0.897	0.895	5	567
NCoT2Q27 (R1 – R9)	0.786	0.784	9	567
NCsT2Q28 (R1 – R9)	0.755	0.762	9	567
NCrT2Q29 (R1 – R5)	0.906	0.904	5	567

Table F5: *Factor Analysis Component Matrices -- Word Pair Scales (5 Item)*

Factor Analysis (5 Item)	R1	R2	R3	R4	R5
Q1: What do YOU think of the publication THE WALL STREET JOURNAL?	Q1: Unfamiliar (1) <> Familiar (10)	Q1: Unbelievable (1) <> Believable (10)	Q1: Untrust-worthy (1) <> Trustworthy (10)	Q1: Not Credible (1) <> Credible (10)	Q1: Unimportant (1) <> Important (10)
WSJQ1 (R1 – R5) Component / Scale 1	.589	.942	.935	.944	.835
Q2: What do YOU think of the publication THE NATIONAL ENQUIRER?	Q2: Unfamiliar (1) <> Familiar (10)	Q2: Unbelievable (1) <> Believable (10)	Q2: Untrust-worthy (1) <> Trustworthy (10)	Q2: Not Credible (1) <> Credible (10)	Q2: Unimportant (1) <> Important (10)
NEQ2 (R1 – R5) Component / Scale 1	.144	.961	.967	.966	.849
Q3: What do YOU think of the research organization The AMERICAN Academy of Environmental Science?	Q3: Unfamiliar (1) <> Familiar (10)	Q3: Unbelievable (1) <> Believable (10)	Q3: Untrust-worthy (1) <> Trustworthy (10)	Q3: Not Credible (1) <> Credible (10)	Q3: Unimportant (1) <> Important (10)
AAESQ3 (R1 – R5) Component / Scale 1	.526	.973	.969	.971	.912

Factor Analysis (5 Item)	R1	R2	R3	R4	R5
Q4: What do YOU think of the research organization The RUSSIAN Academy of Environmental Science?	Q4: Unfamiliar (1) <> Familiar (10)	Q4: Unbelievable (1) <> Believable (10)	Q4: Untrust-worthy (1) <> Trustworthy (10)	Q4: Not Credible (1) <> Credible (10)	Q4: Unimportant (1) <> Important (10)
RAESQ4 (R1 – R5)Component / Scale 1	.387	.973	.977	.977	.895
Q7: AL GORE's VIEW of GLOBAL WARMING is to YOU:	Q7: An Unfamiliar View to You (1) <> A Familiar View to You (10)	Q7: Unbelievable (1) <> Believable (10)	Q7: Untrust-worthy (1) <> Trustworthy (10)	Q7: Not Credible (1) <> Credible (10)	Q7: Unimportant (1) <> Important (10)
GWrT0Q7 (R1 – R5) Component / Scale 1	.227	.975	.980	.979	.913
Q8: Given the 2007 headline, what do YOU think of the PUBLICATION that reported the information?	Q8: Unfamiliar (1) <> Familiar (10)	Q8: Unbelievable (1) <> Believable (10)	Q8: Untrust-worthy (1) <> Trustworthy (10)	Q8: Not Credible (1) <> Credible (10)	Q8: Unimportant (1) <> Important (10)
PubT1Q8 (R1 – R5) Component / Scale 1	.466	.959	.972	.968	.854
Q9: Given the 2007 headline, what do YOU think of the RESEARCH ORGANIZATION that researched the information that was quoted by the publication?	Q9: Unfamiliar (1) <> Familiar (10)	Q9: Unbelievable (1) <> Believable	Q9: Untrust-worthy (1) <> Trustworth	Q9: Not Credible (1) <> Credible	Q9: Unimportant (1) <> Important
ResT1Q9 (R1 – R5) Component / Scale 1	.616	.964	.969	.971	.878

Factor Analysis (5 Item)	R1	R2	R3	R4	R5
Q12: After reading the 2007 headline, I now think that AL GORE's VIEW of GLOBAL WARMING is:	Q12: An Unfamiliar View to Me (1) <> A Familiar View to Me	Q12: Unbelievable (1) <> Believable (10)	Q12: Untrust-worthy (1) <> Trustworthy (10)	Q12: Not Credible (1) <> Credible (10)	Q12: Unimportant (1) <> Important (10)
GWrT1Q12 (R1 – R5) Component / Scale 1	.304	.984	.984	.984	.948
Q15: After reading the 2007 headline, I now think that AL GORE's VIEW of GLOBAL COOLING is:	Q15: An Unfamiliar View to Me (1) <> A Familiar View to Me	Q15: Unbelievable (1) <> Believable (10)	Q15: Untrust-worthy (1) <> Trustworthy (10)	Q15: Not Credible (1) <> Credible (10)	Q15: Unimportant (1) <> Important (10)
GCrT1Q15 (R1 – R5) Component / Scale 1	.210	.982	.985	.984	.947
Q18: After reading the 2007 headline, I now think that AL GORE's VIEW of NO CLIMATE CHANGE is:	Q18: An Unfamiliar View to Me (1) <> A Familiar View to Me	Q18: Unbelievable (1) <> Believable (10)	Q18: Untrust-worthy (1) <> Trustworthy (10)	Q18: Not Credible (1) <> Credible (10)	Q18: Unimportant (1) <> Important (10)
NCrT1Q18 (R1 – R5) Component / Scale 1	.315	.966	.977	.975	.911
Q19: Given the 2008 headline, NOW what do YOU think of the PUBLICATION that reported the information?	Q19: Unfamiliar (1) <> Familiar (10)	Q19: Unbelievable (1) <> Believable (10)	Q19: Untrust-worthy (1) <> Trustworthy (10)	Q19: Not Credible (1) <> Credible (10)	Q19: Unimportant (1) <> Important (10)
PubT2Q19 (R1 – R5) Component / Scale 1	.526	.976	.974	.977	.923

Factor Analysis (5 Item)	R1	R2	R3	R4	R5
Q20: Given the 2008 headline, NOW what do YOU think of the RESEARCH ORGANIZATION that researched the information that was quoted by the publication?	Q20: Unfamiliar (1) <> Familiar (10)	Q20: Unbelievable (1) <> Believable (10)	Q20: Untrust-worthy (1) <> Trustworthy (10)	Q20: Not Credible (1) <> Credible (10)	Q20: Unimportant (1) <> Important (10)
ResT2Q20 (R1 – R5) Component / Scale 1	.668	.975	.976	.977	.927
Q23: After reading the 2008 headline, AL GORE's VIEW of GLOBAL WARMING is NOW to YOU:	Q23: An Unfamiliar View to You (1) <> A Familiar View to You	Q23: Unbelievable (1) <> Believable (10)	Q23: Untrust-worthy (1) <> Trustworthy (10)	Q23: Not Credible (1) <> Credible (10)	Q23: Unimportant (1) <> Important (10)
GWrT2Q23 (R1 – R5) Component / Scale 1	.305	.984	.988	.988	.958
Q26: After reading the 2008 headline, AL GORE's VIEW of GLOBAL COOLING is NOW to YOU:	Q26: An Unfamiliar View to You (1) <> A Familiar View to You	Q26: Unbelievable (1) <> Believable (10)	Q26: Untrust-worthy (1) <> Trustworthy (10)	Q26: Not Credible (1) <> Credible (10)	Q26: Unimportant (1) <> Important (10)
GCrT2Q26 (R1 – R5) Component / Scale 1	.231	.983	.986	.983	.949
Q29: After reading the 2008 headline, AL GORE's VIEW of NO CLIMATE CHANGE is NOW to YOU:	Q29: An Unfamiliar View to You (1) <> A Familiar View to You	Q29: Unbelievable (1) <> Believable (10)	Q29: Untrust-worthy (1) <> Trustworthy (10)	Q29: Not Credible (1) <> Credible (10)	Q29: Unimportant (1) <> Important (10)
NCrT2Q29 (R1 – R5) Component / Scale 1	.302	.981	.981	.983	.951

Table F6: *Factor Analysis Rotated Component / Scale Matrices -- Word Pair Scales (9 Item)*

Factor Analysis (9 Item)	R1	R2	R3	R4	R5	R6	R7	R8	R9
Q5: GLOBAL WARMING is to YOU:	Q5: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)	Q5: Decreasing (1) <> Increasing (10)	Q5: Im-possible (1) <> Possible (10)	Q5: Not Occur-ring (1) <> Occur-ring (10)	Q5: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q5: Unimportant (1) <> Important (10)	Q5: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q5: Not Real (1) <> Real (10)	Q5: Not Inevitable (1) <> Inevitable (10)
GWoT0Q5 (R2, R3, R4, R6, R7, R8, R9) Component / Scale 1	.243	.885	.870	.939	-.390	.895	.905	.950	.710
GWoT0Q5 (R1, R5) Component / Scale 2	.816	-.090	.103	-.062	.581	-.110	-.089	-.030	.088
Q6: In YOUR estimation, what is AL GORE's view of GLOBAL WARMING?	Q6: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q6: Decreasing (1) Increasing (10)	Q6: Impossible (1) <> Possible (10)	Q6: Not Occur-ring (1) <> Occurring (10)	Q6: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q6: Unimportant (1) <> Important (10)	Q6: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q6: Not Real (1) <> Real (10)	Q6: Not Inevitable (1) <> Inevitable (10)
GWsT0Q6 (R1, R2, R3, R4, R6, R7, R8) Component / Scale 1	.569	.932	.938	.946	-.184	.934	.925	.945	.307
GWsT0Q6 (R5, R9) Component / Scale 2	-.116	.104	.096	.109	.857	.071	.075	.119	.547

Factor Analysis (9 Item)	R1	R2	R3	R4	R5	R6	R7	R8	R9
Q10: After reading the 2007 headline, I now think that GLOBAL WARMING is:	Q10: An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)	Q10: Decreasing (1) <> Increasing (10)	Q10: Impossible (1) <> Possible (10)	Q10: Not Occurring (1) <> Occurring (10)	Q10: Bad for Future Generations (1) <> Good for Future Generations (10)	Q10: Unimportant (1) <> Important (10)	Q10: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q10: Not Real (1) <> Real (10)	Q10: Not Inevitable (1) <> Inevitable (10)
GWoT1Q10 (R2, R3, R4, R6, R7, R8, – R9) Component / Scale 1	.322	.911	.908	.950	-.316	.920	.935	.949	.760
GWoT1Q10 (R1, R5) Component / Scale 2	.694	-.023	.095	-.022	.740	-.055	-.046	-.006	.071
Q11: After reading the 2007 headline, I now think that AL GORE thinks GLOBAL WARMING is:	Q11: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q11: Decreasing (1) <> Increasing (10)	Q11: Impossible (1) <> Possible (10)	Q11: Not Occurring (1) <> Occurring (10)	Q11: Bad for Future Generations (1) <> Good for Future Generations (10)	Q11: Unimportant (1) <> Important (10)	Q11: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q11: Not Real (1) <> Real (10)	Q11: Not Inevitable (1) <> Inevitable (10)
GWsT1Q11 (R1, R2, R3, R4, R6, R7, R8) Component / Scale 1	.663	.937	.969	.970	-.174	.961	.906	.956	.399
GWsT1Q11 (R5, R9) Component / Scale 2	.037	.030	.043	.065	.894	.068	.058	.055	.513

Factor Analysis (9 Item)	R1	R2	R3	R4	R5	R6	R7	R8	R9
Q13: After reading the 2007 headline, I now think that GLOBAL COOLING is:	Q13: An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)	Q13: Decreasing (1) <> In-creasing (10)	Q13: Impossible (1) <> Possible (10)	Q13: Not Occur-ring (1) <> Occurring (10)	Q13: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q13: Unimportant (1) <> Important (10)	Q13: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q13: Not Real (1) <> Real (10)	Q13: Not Inevitable (1) <> Inevitable (10)
GCoT1Q13 (R2, R3, R4, R6, R7, R8, R9) Component / Scale 1	.317	.773	.797	.873	-.069	.793	.832	.897	.816
GCoT1Q13 (R1, R5) Component / Scale 2	.579	.221	.169	.156	.865	-.050	.010	.171	.188
Q14: After reading the 2007 headline, I now think that AL GORE thinks GLOBAL COOLING is:	Q14: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q14: Decreasing (1) <> In-creasing (10)	Q14: Impossible (1) <> Possible (10)	Q14: Not Occur-ring (1) <> Occurring (10)	Q14: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q14: Unimportant (1) <> Important (10)	Q14: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q14: Not Real (1) <> Real (10)	Q14: Not Inevitable (1) <> Inevitable (10)
GCsT1Q14 (R1, R2, R3, R4, R6, R7, R8 R9) Component / Scale 1	.574	.871	.888	.915	-.010	.858	.860	.931	.880
GCsT1Q14 (R5) Component / Scale 2	.008	-.012	-.016	-.104	.995	.056	.084	-.086	-.023

Factor Analysis (9 Item)	R1	R2	R3	R4	R5	R6	R7	R8	R9
Q16: After reading the 2007 headline, I now think that NO CLIMATE CHANGE is:	Q16: An Unfamiliar Topic to Me (1) <> A Familiar Topic to Me (10)	Q16: Decreasing (1) <> In-creasing (10)	Q16: Impossible (1) <> Possible (10)	Q16: Changing Climate (1) <> Stable Climate	Q16: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q16: Unimportant (1) <> Important (10)	Q16: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q16: Not Real (1) <> Real (10)	Q16: Not Inevitable (1) <> Inevitable (10)
NCoT1Q16 (R1, R3, R4, R5, R8, R9) Component / Scale 1	.417	.501	.689	.772	.667	.194	-.013	.730	.633
NCoT1Q16 (R2, R6, R7) Component / Scale 2	.157	.585	.479	.173	-.211	.701	.856	.462	.503
Q17: After reading the 2007 headline, I now think that AL GORE thinks NO CLIMATE CHANGE is:	Q17: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q17: Decreasing (1) <> In-creasing (10)	Q17: Impossible (1) <> Possible (10)	Q17: Changing Climate (1) <> Stable Climate	Q17: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q17: Unimportant (1) <> Important (10)	Q17: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q17: Not Real (1) <> Real (10)	Q17: Not Inevitable (1) <> Inevitable (10)
NCsT1Q17 (R2, R3, R4, R8, R9) Component / Scale 1	.061	.715	.752	.568	-.094	.356	.507	.828	.840
NCsT1Q17 (R1, R6, R7) Component / Scale 2	.796	.158	.342	-.209	.127	.595	.525	.141	.135
NCsT1Q17 (R5) Component / Scale 3	-.005	.002	.194	.555	.898	.416	-.036	.151	-.097

Factor Analysis (9 Item)	R1	R2	R3	R4	R5	R6	R7	R8	R9
Q21: Given the 2008 headline, GLOBAL WARMING is NOW to YOU:	Q21: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)	Q21: Decreasing (1) <> In-creasing (10)	Q21: Impossible (1) <> Possible (10)	Q21: Not Occur-ring (1) <> Occurring (10)	Q21: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q21: Unimportant (1) <> Important (10)	Q21: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q21: Not Real (1) <> Real (10)	Q21: Not Inevitable (1) <> Inevitable (10)
GWoT2Q21 (R2, R3, R4, R6, R7, R8, R9) Component / Scale 1	.301	.913	.918	.954	-.333	.929	.913	.956	.779
GWoT2Q21 (R1, R5) Component / Scale 2	.726	-.015	.106	-.083	.701	-.090	-.035	-.039	.106
Q22: In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of GLOBAL WARMING?	Q22: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q22: Decreasing (1) <> In-creasing (10)	Q22: Impossible (1) <> Possible (10)	Q22: Not Occur-ring (1) <> Occurring (10)	Q22: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q22: Unimportant (1) <> Important (10)	Q22: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q22: Not Real (1) <> Real (10)	Q22: Not Inevitable (1) <> Inevitable (10)
GWsT2Q22 (R1, R2, R3, R4, R6, R7, R8, R9) Component / Scale 1	.688	.934	.968	.960	-.139	.926	.919	.965	.499
GWsT2Q22 (R5) Component / Scale 2	.029	-.022	-.031	-.006	.960	.026	.006	-.002	.286

Factor Analysis (9 Item)	R1	R2	R3	R4	R5	R6	R7	R8	R9
Q24: Given the 2008 headline, GLOBAL COOLING is NOW to YOU:	Q24: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)	Q24: Decreasing (1) <> In-creasing (10)	Q24: Impossible (1) <> Possible (10)	Q24: Not Occur-ring (1) <> Occurring (10)	Q24: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q24: Unimportant (1) <> Important (10)	Q24: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q24: Not Real (1) <> Real (10)	Q24: Not Inevitable (1) <> Inevitable (10)
GCoT2Q24 (R2, R3, R4, R6, R7, R8, R9) Component / Scale 1	.285	.823	.825	.893	-.054	.757	.830	.919	.806
GCoT2Q24 (R1, R5) Component / Scale 2	.635	.102	.189	.112	.865	.085	.059	.124	.127
Q25: In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of GLOBAL COOLING?	Q25: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q25: Decreasing (1) <> In-creasing (10)	Q25: Impossible (1) <> Possible (10)	Q25: Not Occur-ring (1) <> Occurring (10)	Q25: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q25: Unimportant (1) <> Important (10)	Q25: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q25: Not Real (1) <> Real (10)	Q25: Not Inevitable (1) <> Inevitable (10)
GCsT2Q25 (R1, R2, R3, R4, R6, R7, R8, R9) Component / Scale 1	.450	.855	.910	.922	-.034	.823	.860	.933	.868
GCsT2Q25 (R5) Component / Scale 2	.148	-.182	-.007	-.168	.966	.088	.069	-.090	-.110

Factor Analysis (9 Item)	R1	R2	R3	R4	R5	R6	R7	R8	R9
Q27: Given the 2008 headline, NO CLIMATE CHANGE is NOW to YOU:	Q27: An Unfamiliar Topic to You (1) <> A Familiar Topic to You (10)	Q27: Decreasing (1) <> In-creasing (10)	Q27: Impossible (1) <> Possible (10)	Q27: Chang-ing Climate (1) <> Stable Climate	Q27: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q27: Unimportant (1) <> Important (10)	Q27: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q27: Not Real (1) <> Real (10)	Q27: Not Inevitable (1) <> Inevitable (10)
NCoT2Q27 (R1, R2, R3, R6, R7, R8, R9) Component / Scale 1	.350	.805	.658	.315	-.091	.681	.804	.677	.670
NCoT2Q27 (R4, R5) Component / Scale 2	.216	.243	.499	.736	.719	.034	-.156	.543	.407
Q28: In YOUR estimation, given the 2008 headline, what NOW is AL GORE's view of NO CLIMATE CHANGE?	Q28: An Unfamiliar Topic to Al Gore (1) <> A Familiar Topic to Al Gore (10)	Q28: Decreasing (1) <> In-creasing (10)	Q28: Impossible (1) <> Possible (10)	Q28: Changing Climate (1) <> Stable Climate	Q28: Bad for Future Genera-tions (1) <> Good for Future Generations (10)	Q28: Unimportant (1) <> Important (10)	Q28: Will Not Have an Impact (1) <> Will Have an Impact (10)	Q28: Not Real (1) <> Real (10)	Q28: Not Inevitable (1) <> Inevitable (10)
NCsT2Q28 (R2, R3, R7, R8, R9) Component / Scale 1	.078	.793	.808	.548	-.106	.533	.701	.858	.841
NCsT2Q28 (R1, R6) Component / Scale 2	.868	.086	.188	-.193	.188	.594	.298	.134	.046
NCsT2Q28 (R4, R5) Component / Scale 3	.053	-.033	.194	.608	.898	.114	-.094	.130	.017

Table F7: *Tests of Normality of Averaged Word Pair Scales from Factor Analysis*

Tests of Normality of Averaged Word Pair Scales Derived from Factor Analysis	Kolmogorov-Smirnov[a]		
	Statistic	d.f.	Sig.
WSJQ1 (R1 – R5) Q1Scale 1	.096	567	0.000
NEQ2 (R1 – R5) Q2Scale1	.135	567	0.000
AAESQ3 (R1 – R5) Q3Scale1	.148	567	0.000
RAESQ4 (R1 – R5) Q4Scale1	.215	567	0.000
GWoT0Q5 (R2, R3, R4, R6, R7, R8, R9) Q5Scale1	.093	567	0.000
GWoT0Q5 (R1, R5) Q5Scale2	.144	567	0.000
GWsT0Q6 (R1, R2, R3, R4, R6, R7, R8) Q6Scale1	.296	567	0.000
GWsT0Q6 (R5, R9) Q6Scale2	.180	567	0.000
GWrT0Q7 (R1 – R5) Q7Scale1	.125	567	0.000
PubT1Q8 (R1 – R5) Q8Scale1	.082	567	0.000
ResT1Q9 (R1 – R5) Q9Scale1	.076	567	0.000
GWoT1Q10 (R2, R3, R4, R6, R7, R8, R9) Q10Scale1	.085	567	0.000
GWoT1Q10 (R1, R5) Q10Scale2	.127	567	0.000
GWsT1Q11 (R1, R2, R3, R4, R6, R7, R8) Q11Scale1	.289	567	0.000
GWsT1Q11 (R5, R9) Q11Scale2	.233	567	0.000
GWrT1Q12 (R1 – R5) Q12Scale1	.116	567	0.000
GCoT1Q13 (R2, R3, R4, R6, R7, R8, R9) Q13Scale1	.089	567	0.000
GCoT1Q13 (R1, R5) Q13Scale2	.080	567	0.000
GCsT1Q14 (R1, R2, R3, R4, R6, R7, R8 R9) Q14Scale1	.121	567	0.000
GCsT1Q14 (R5) Q14Scale2	.208	567	0.000
GCrT1Q15 (R1 – R5) Q15Scale1	.143	567	0.000
NCoT1Q16 (R1, R3, R4, R5, R8, R9) Q16Scale1	.088	567	0.000
NCoT1Q16 (R2, R6, R7) Q16Scale2	.147	567	0.000
NCsT1Q17 (R2, R3, R4, R8, R9) Q17Scale1	.133	567	0.000
NCsT1Q17 (R1, R6, R7) Q17Scale2	.088	567	0.000
NCrT1Q18 (R1 – R5) Q18Scale1	.139	567	0.000
PubT2Q19 (R1 – R5) Q19Scale1	.078	567	0.000
ResT2Q20 (R1 – R5) Q20Scale1	.075	567	0.000
GWoT2Q21 (R2, R3, R4, R6, R7, R8, R9) Q21Scale1	.087	567	0.000
GWoT2Q21 (R1, R5) Q21Scale2	.144	567	0.000
GWsT2Q22 (R1, R2, R3, R4, R6, R7, R8, R9) Q22Scale1	.227	567	0.000
GWsT2Q22 (R5) Q22Scale2	.329	567	0.000
GWrT2Q23 (R1 – R5) Q23Scale1	.131	567	0.000
GCoT2Q24 (R2, R3, R4, R6, R7, R8, R9) Q24Scale1	.083	567	0.000
GCoT2Q24 (R1, R5) Q24Scale2	.119	567	0.000
GCsT2Q25 (R1, R2, R3, R4, R6, R7, R8, R9) Q25Scale1	.117	567	0.000
GCsT2Q25 (R5) Q25Scale2	.205	567	0.000
GCrT2Q26 (R1 – R5) Q26Scale1	.138	567	0.000
NCoT2Q27 (R1, R2, R3, R6, R7, R8, R9) Q27Scale1	.088	567	0.000
NCoT2Q27 (R4, R5) Q27Scale2	.145	567	0.000

Tests of Normality of Averaged Word Pair Scales Derived from Factor Analysis	Kolmogorov-Smirnov[a]		
	Statistic	d.f.	Sig.
NCsT2Q28 (R2, R3, R7, R8, R9) Q28Scale1	.113	567	0.000
NCsT2Q28 (R1, R6) Q28Scale2	.124	567	0.000
NCrT2Q29 (R1 – R5) Q29Scale1	.138	567	0.000
a. Lilliefors Significance Correction			

Table F8: β Coefficients of *SmartPLS™ Paths and Tests of Significance*

	SmartPLS™ Path	β Calculated on Original Sample β	Mean of β Calculated by Bootstrapping	Stand. Dev.	*t* Statistic	Two-Tailed Probability (d.f. 565, sig. level 10%))
1	GWoT0 -> GWoT1	0.8153	0.8158	0.0308	26.4580	<0.0001 [a]
2	GWoT0 -> GWoT1T0	-1.7855	-1.7863	0.1014	17.6041	<0.0001
3	GWoT0 -> GWoT2	0.3543	0.3461	0.0686	5.1615	<0.0001 [b]
4	GWoT0 -> GWoT2T0	-1.6457	-1.6487	0.0898	18.3233	<0.0001
5	GWoT0 -> GWrT0	0.7705	0.7708	0.0175	43.9789	<0.0001 [c]
6	GWoT0 -> GWsT0	0.0677	0.0635	0.0758	0.8932	0.3721 [d]
7	GWoT1 -> GWoT1T0	1.9520	1.9540	0.1075	18.1524	<0.0001
8	GWoT1 -> GWoT2	0.5044	0.5132	0.0739	6.8273	<0.0001 [e]
9	GWoT1 -> GWoT2T1	-1.8452	-1.8585	0.1343	13.7422	<0.0001
10	GWoT1 -> GWrT1	0.1927	0.1939	0.0440	4.3838	<0.0001 [f]
11	GWoT1 -> GWsT1	0.1707	0.1746	0.0728	2.3445	0.0194 [g]
12	GWoT2 -> GWoT2T0	1.7513	1.7527	0.0930	18.8234	<0.0001
13	GWoT2 -> GWoT2T1	1.8790	1.8904	0.1314	14.3030	<0.0001
14	GWoT2 -> GWrT2	0.1185	0.1219	0.0370	3.2024	0.0014 [h]
15	GWoT2 -> GWsT2	0.1254	0.1301	0.0494	2.5365	0.0115 [i]
16	GWrT0 -> GWrT1	0.7610	0.7603	0.0420	18.1023	<0.0001 [j]
17	GWrT0 -> GWrT1T0	-1.9461	-1.9603	0.1374	14.1683	<0.0001
18	GWrT0 -> GWrT2	0.4118	0.4125	0.0628	6.5591	<0.0001 [k]
19	GWrT0 -> GWrT2T0	-2.1081	-2.1204	0.1248	16.8916	<0.0001
20	GWrT0 -> GWsT0	0.2588	0.2589	0.0636	4.0707	0.0001 [l]
21	GWrT1 -> GWrT1T0	2.0486	2.0637	0.1459	14.0376	<0.0001
22	GWrT1 -> GWrT2	0.4554	0.4507	0.0652	6.9851	<0.0001 [m]
23	GWrT1 -> GWrT2T1	-2.2568	-2.2663	0.1533	14.7185	<0.0001
24	GWrT1 -> GWsT1	0.0286	0.0217	0.0602	0.4753	0.6348 [n]
25	GWrT2 -> GWrT2T0	2.2021	2.2141	0.1340	16.4307	<0.0001
26	GWrT2 -> GWrT2T1	2.2653	2.2742	0.1616	14.0182	<0.0001
27	GWrT2 -> GWsT2	0.0224	0.0211	0.0475	0.4717	0.6373 [o]
28	GWsT0 -> GWsT1	0.4467	0.4525	0.0577	7.7478	<0.0001 [p]
29	GWsT0 -> GWsT1T0	-0.9800	-0.9852	0.0592	16.5520	<0.0001
30	GWsT0 -> GWsT2	0.0850	0.0937	0.0596	1.4271	0.1541 [q]
31	GWsT0 -> GWsT2T0	-0.8704	-0.8716	0.0508	17.1218	<0.0001
32	GWsT1 -> GWsT1T0	0.9684	0.9784	0.0623	15.5494	<0.0001
33	GWsT1 -> GWsT2	0.6088	0.5956	0.0587	10.3774	<0.0001 [r]
34	GWsT1 -> GWsT2T1	-1.1672	-1.1612	0.0903	12.9259	<0.0001
35	GWsT2 -> GWsT2T0	0.9713	0.9801	0.0565	17.1784	<0.0001
36	GWsT2 -> GWsT2T1	1.3186	1.3148	0.0846	15.5833	<0.0001

	SmartPLS™ Path	β Calculated on Original Sample β	Mean of β Calculated by Bootstrapping	Stand. Dev.	*t* Statistic	Two-Tailed Probability (d.f. 565, sig. level 10%))
37	IP -> GWoT0	0.7232	0.7224	0.0191	37.8247	<0.0001 [s]
38	T1A -> GWoT1	0.0112	0.0086	0.0188	0.5957	0.5516
39	T1A -> GWoT1T0	-0.0136	-0.0133	0.0145	0.9383	0.3485
40	T1A -> GWoT2	-0.0017	-0.0029	0.0204	0.0851	0.9322
41	T1A -> GWoT2T1	0.0012	0.0015	0.0042	0.2797	0.7798
42	T1A -> GWrT1	0.0016	0.0034	0.0190	0.0859	0.9316
43	T1A -> GWrT1T0	-0.0269	-0.0263	0.0111	2.4289	0.0155 [t]
44	T1A -> GWrT2	-0.0152	-0.0147	0.0158	0.9598	0.3376
45	T1A -> GWrT2T1	0.0123	0.0123	0.0073	1.6784	0.0938 [u]
46	T1A -> GWsT1	0.0065	0.0067	0.0359	0.1815	0.8560
47	T1A -> GWsT1T0	-0.0017	-0.0015	0.0017	0.9627	0.3361
48	T1A -> GWsT2	-0.0137	-0.0152	0.0312	0.4378	0.6617
49	T1A -> GWsT2T1	-0.0012	-0.0013	0.0023	0.5026	0.6154
50	T1P -> GWoT1	0.0237	0.0222	0.0214	1.1033	0.2704
51	T1P -> GWoT1T0	0.0021	0.0015	0.0140	0.1481	0.8823
52	T1P -> GWoT2	-0.0231	-0.0223	0.0196	1.1806	0.2383
53	T1P -> GWoT2T1	0.0003	0.0004	0.0046	0.0562	0.9552
54	T1P -> GWrT1	0.0090	0.0099	0.0201	0.4457	0.6560
55	T1P -> GWrT1T0	-0.0064	-0.0064	0.0111	0.5721	0.5675
56	T1P -> GWrT2	-0.0071	-0.0083	0.0145	0.4941	0.6214
57	T1P -> GWrT2T1	-0.0003	0.0000	0.0071	0.0437	0.9652
58	T1P -> GWsT1	-0.0381	-0.0370	0.0361	1.0542	0.2922
59	T1P -> GWsT1T0	-0.0008	-0.0006	0.0018	0.4519	0.6515
60	T1P -> GWsT2	0.0080	0.0061	0.0304	0.2630	0.7926
61	T1P -> GWsT2T1	-0.0001	0.0000	0.0023	0.0492	0.9608
62	T1V -> GWoT1	-0.0861	-0.0847	0.0359	2.3986	0.0168 [v]
63	T1V -> GWoT1T0	0.1122	0.1138	0.0240	4.6655	<0.0001 [w]
64	T1V -> GWoT2	-0.0582	-0.0569	0.0362	1.6054	0.1090 [x]
65	T1V -> GWoT2T1	-0.0072	-0.0076	0.0066	1.1007	0.2715
66	T1V -> GWrT1	0.0488	0.0497	0.0306	1.5951	0.1112
67	T1V -> GWrT1T0	0.0279	0.0280	0.0187	1.4918	0.1363
68	T1V -> GWrT2	0.0149	0.0154	0.0250	0.5953	0.5519
69	T1V -> GWrT2T1	-0.0128	-0.0128	0.0099	1.2997	0.1942
70	T1V -> GWsT1	0.1477	0.1500	0.0637	2.3184	0.0208 [y]
71	T1V -> GWsT1T0	0.0043	0.0043	0.0016	2.6335	0.0087 [z]
72	T1V -> GWsT2	0.0508	0.0554	0.0422	1.2029	0.2295
73	T1V -> GWsT2T1	0.0011	0.0012	0.0022	0.5113	0.6093
74	T2A -> GWoT2	-0.0221	-0.0210	0.0191	1.1583	0.2472

	SmartPLS™ Path	β Calculated on Original Sample β	Mean of β Calculated by Bootstrapping	Stand. Dev.	*t* Statistic	Two-Tailed Probability (d.f. 565, sig. level 10%))
75	T2A -> GWoT2T0	-0.0147	-0.0133	0.0105	1.4048	0.1606
76	T2A -> GWoT2T1	-0.0001	-0.0004	0.0042	0.0234	0.9813
77	T2A -> GWrT2	0.0064	0.0053	0.0142	0.4476	0.6546
78	T2A -> GWrT2T0	-0.0052	-0.0053	0.0110	0.4741	0.6356
79	T2A -> GWrT2T1	0.0016	0.0011	0.0075	0.2146	0.8302
80	T2A -> GWsT2	0.0191	0.0199	0.0305	0.6241	0.5328
81	T2A -> GWsT2T0	-0.0007	-0.0008	0.0018	0.4198	0.6748
82	T2A -> GWsT2T1	0.0016	0.0018	0.0023	0.7066	0.4801
83	T2P -> GWoT2	0.0126	0.0130	0.0196	0.6406	0.5220
84	T2P -> GWoT2T0	0.0162	0.0161	0.0098	1.6614	0.0972 [aa]
85	T2P -> GWoT2T1	-0.0039	-0.0041	0.0041	0.9418	0.3467
86	T2P -> GWrT2	-0.0008	-0.0002	0.0159	0.0472	0.9624
87	T2P -> GWrT2T0	0.0093	0.0087	0.0105	0.8812	0.3786
88	T2P -> GWrT2T1	-0.0027	-0.0025	0.0069	0.3824	0.7023
89	T2P -> GWsT2	-0.0132	-0.0120	0.0305	0.4318	0.6661
90	T2P -> GWsT2T0	0.0031	0.0029	0.0017	1.7926	0.0736 [ab]
91	T2P -> GWsT2T1	-0.0008	-0.0007	0.0025	0.3142	0.7535
92	T2V -> GWoT2	-0.0099	-0.0074	0.0196	0.5025	0.6155
93	T2V -> GWoT2T0	0.0058	0.0063	0.0101	0.5709	0.5683
94	T2V -> GWoT2T1	-0.0031	-0.0030	0.0045	0.6910	0.4898
95	T2V -> GWrT2	0.0135	0.0132	0.0144	0.9387	0.3483
96	T2V -> GWrT2T0	0.0158	0.0159	0.0108	1.4585	0.1453
97	T2V -> GWrT2T1	-0.0060	-0.0061	0.0070	0.8513	0.3950
98	T2V -> GWsT2	0.0323	0.0296	0.0308	1.0491	0.2946
99	T2V -> GWsT2T0	-0.0014	-0.0013	0.0018	0.7604	0.4473
100	T2V -> GWsT2T1	-0.0009	-0.0008	0.0023	0.4058	0.6850

Table F9: β Coefficients of *Verification of Induced Effects and Tests of Difference in the Average Changes in Referent (a), Object (b), and Social (c) Meanings*

	SmartPLS™ Path	β Calculated on Original Sample β	Mean of β Calculated by Bootstrapping	Stand. Dev.	*t* Statistic	Two-Tailed Probability (d.f. 565, sig. level 10%))
1	T1A -> GWoT1T0	0.0095	0.0119	0.0403	0.2357	0.8138
2	T1A -> GWoT2T1	-0.0198	-0.0241	0.0416	0.4754	0.6347
3	T1A -> GWrT1T0	0.0049	0.0053	0.0382	0.1291	0.8973
4	T1A -> GWrT2T1	-0.0401	-0.0399	0.0392	1.0230	0.3067
5	T1A -> GWsT1T0	0.0398	0.0425	0.0408	0.9764	0.3293
6	T1A -> GWsT2T1	-0.0122	-0.0154	0.0413	0.2963	0.7671
7	T1A * T1V -> GWrT1T0	-0.0078	-0.0101	0.0406	0.1917	0.8480
8	T1A * T1V -> GWoT1T0	-0.0308	-0.0295	0.0427	0.7203	0.4716
9	T1A * T1V -> GWsT1T0	-0.0206	-0.0196	0.0383	0.5378	0.5909
10	T1A * T1V -> GWrT2T1	0.0167	0.0167	0.0396	0.4225	0.6728
11	T1A * T1V -> GWoT2T1	0.0611	0.0632	0.0410	1.4901	0.1368
12	T1A * T1V -> GWsT2T1	0.0173	0.0160	0.0388	0.4449	0.6566
13	T1P -> GWoT1T0	0.0501	0.0509	0.0382	1.3118	0.1901
14	T1P -> GWoT2T1	-0.0679	-0.0650	0.0378	1.7954	0.0731 [a]
15	T1P -> GWrT1T0	0.0104	0.0102	0.0421	0.2477	0.8045
16	T1P -> GWrT2T1	-0.0272	-0.0237	0.0414	0.6569	0.5115
17	T1P -> GWsT1T0	-0.0316	-0.0328	0.0450	0.7011	0.4835
18	T1P -> GWsT2T1	0.0417	0.0428	0.0401	1.0405	0.2986
19	T1P * T1A -> GWrT2T1	0.0086	0.0096	0.1959	0.0440	0.9649
20	T1P * T1V -> GWrT1T0	0.0918	0.0883	0.0362	2.5397	0.0114 [b]
21	T1P * T1V -> GWoT1T0	0.0872	0.0840	0.0407	2.1417	0.0326 [c]
22	T1P * T1V -> GWsT1T0	0.0082	0.0074	0.0392	0.2088	0.8347
23	T1P * T1V -> GWoT2T1	-0.0989	-0.1017	0.0453	2.1845	0.0293 [d]
24	T1P * T1V -> GWsT2T1	-0.0105	-0.0110	0.0401	0.2610	0.7942
25	T1V -> GWoT1T0	0.0862	0.0884	0.0386	2.2322	0.0260 [e]
26	T1V -> GWoT2T1	0.0389	0.0446	0.0451	0.8622	0.3889
27	T1V -> GWrT1T0	0.1287	0.1273	0.0332	3.8725	0.0001 [f]
28	T1V -> GWrT2T1	-0.0405	-0.0377	0.0422	0.9602	0.3374
29	T1V -> GWsT1T0	0.0706	0.0745	0.0347	2.0330	0.0425 [g]
30	T1V -> GWsT2T1	-0.0517	-0.0559	0.0382	1.3540	0.1763
31	T2A -> GWoT2T0	-0.0248	-0.0236	0.0450	0.5507	0.5821
32	T2A -> GWoT2T1	-0.0499	-0.0496	0.0419	1.1921	0.2337
33	T2A -> GWrT2T0	0.0230	0.0208	0.0385	0.5992	0.5493
34	T2A -> GWrT2T1	-0.0053	-0.0089	0.0395	0.1341	0.8934
35	T2A -> GWsT2T0	0.0213	0.0176	0.0378	0.5624	0.5741

	SmartPLS™ Path	β Calculated on Original Sample β	Mean of β Calculated by Bootstrapping	Stand. Dev.	*t* Statistic	Two-Tailed Probability (d.f. 565, sig. level 10%))
36	T2A -> GWsT2T1	-0.0070	-0.0083	0.0374	0.1859	0.8526
37	T2A * T2V -> GWrT2T1	0.0058	0.0050	0.2052	0.0283	0.9774
38	T2A * T2V -> GWoT2T1	0.0982	0.0966	0.0402	2.4415	0.0149 [h]
39	T2A * T2V -> GWsT2T1	-0.0012	-0.0043	0.0349	0.0357	0.9715
40	T2A * T2V -> GWrT2T0	-0.0171	-0.0230	0.0400	0.4273	0.6693
41	T2A * T2V -> GWoT2T0	-0.0030	-0.0051	0.0441	0.0670	0.9466
42	T2A * T2V -> GWsT2T0	0.0173	0.0158	0.0363	0.4779	0.6329
43	T2P -> GWoT2T0	0.0540	0.0532	0.0420	1.2852	0.1992
44	T2P -> GWoT2T1	-0.0265	-0.0269	0.0405	0.6538	0.5135
45	T2P -> GWrT2T0	-0.0097	-0.0135	0.0412	0.2360	0.8135
46	T2P -> GWrT2T1	0.0095	0.0058	0.0409	0.2329	0.8159
47	T2P -> GWsT2T0	-0.0179	-0.0204	0.0383	0.4668	0.6408
48	T2P -> GWsT2T1	-0.0251	-0.0263	0.0388	0.6474	0.5176
49	T2P * T2V -> GWrT2T1	0.1080	0.1086	0.0401	2.6970	0.0072 [i]
50	T2P * T2V -> GWoT2T1	0.0345	0.0369	0.0411	0.8401	0.4012
51	T2P * T2V -> GWsT2T1	0.0764	0.0760	0.0386	1.9777	0.0484 [j]
52	T2P * T2V -> GWrT2T0	0.0504	0.0562	0.0400	1.2594	0.2084
53	T2P * T2V -> GWoT2T0	0.0485	0.0498	0.0410	1.1820	0.2377
54	T2P * T2V -> GWsT2T0	0.0301	0.0291	0.0392	0.7685	0.4425
55	T2V -> GWoT2T0	-0.0516	-0.0516	0.0411	1.2564	0.2095
56	T2V -> GWoT2T1	-0.0178	-0.0192	0.0422	0.4218	0.6733
57	T2V -> GWrT2T0	0.0788	0.0789	0.0388	2.0324	0.0426 [k]
58	T2V -> GWrT2T1	0.0102	0.0124	0.0427	0.2397	0.8106
59	T2V -> GWsT2T0	0.0029	0.0006	0.0394	0.0736	0.9414
60	T2V -> GWsT2T1	0.0485	0.0500	0.0412	1.1792	0.2388
61	GWoT1T0 -> GWrT1T0	0.1827	0.1834	0.0656	2.7835	0.0056 [l]
62	GWoT1T0 -> GWsT1T0	0.0928	0.0962	0.0505	1.8380	0.0666 [m]
63	GWoT2T0 -> GWrT2T0	0.2873	0.2878	0.0534	5.3754	<0.0001 [n]
64	GWoT2T0 -> GWsT2T0	0.0482	0.0487	0.0566	0.8512	0.3950 [o]
65	GWoT2T1 -> GWrT2T1	0.1054	0.1080	0.0765	1.3781	0.1687 [p]
66	GWoT2T1 -> GWsT2T1	0.1133	0.1098	0.0498	2.2765	0.0232 [q]
67	GWrT1T0 -> GWsT1T0	0.1347	0.1285	0.0674	1.9983	0.0462 [r]
68	GWrT2T0 -> GWsT2T0	0.2263	0.2264	0.0652	3.4719	0.0006 [s]
69	GWrT2T1 -> GWsT2T1	0.1372	0.1383	0.0597	2.2970	0.0220 [t]

APPENDIX G– FRAMING COGNITIVE DISSONANCE MEASUREMENT AS ENDORSEMENT

This dissertation examined how the endorser affects CD by developing new scales for measuring multivariate CD and presenting confirming / disconfirming information to respondents in a repeated measures procedure. In the endorser literature, there is wide opinion on how to select the endorser for a product, brand, event, service, or social marketing cause in advertising. The optimal selection of an endorser will result in a consumer being more receptive to positive information and less receptive to negative information about the product, etc. CD creates a specific effect: the more closely an endorser's perceived attitudes about the product, etc. align with consumer attitudes about the product, etc., the more resistant consumer attitudes are to change when conflicting information is received.

Framing Cognitive Dissonance Measurement as Endorsement

This dissertation takes a harmonized approach to the measurement of CD by unifying the complementary elements of the major theories of cognitive consistency. The theoretical orientation of this dissertation is that of Lewin (1936, 1951, 1958), Heider (1946, 1958), Festinger (1954, 1957), Osgood et al. (1957), and French and Raven (1959) relative to the cognitive approach of field theory (cf. Fishbein & Ajzen, 1975). The measurement of CD is attempted for the meaning of a single pair of potentially dissonant cognitions in three hypothesized dimensions of *semantic space*: evaluative, activity, and potency (i.e., power), with consideration to the multi-relational aspects of other social entities present during data collection. This approach to examining CD posits a hierarchy of cognitive consistency effects shown in Figure 1

as an aggregation of assessments within overlapping, undefined Jordan curves (cf. Lewin, 1936). Congruity theory (Osgood & Tannenbaum, 1955) describes the first stage of cognitive consistency, balance theory (Heider, 1946) describes the second stage of cognitive consistency, and CD theory describes the third stage of cognitive consistency.[37]

Heider's (1946) earliest application of attribution theory to balancing of perceptions about objects with others, such as individuals and groups, applies to measuring the social context of CD induction. Although CD is not always active during the deliberation between choices, this dissertation assumes that considering its potential effect on consumer behavior and predicting subsequent behavior will increase the explanatory power of consumer decision-making models that predict behavior, such as the theory of planned behavior (Ajzen, 1991) and the theory of trying to consume (Bagozzi & Warshaw, 1990).

Cognitive consistency theories, such as CD theory, are relevant to measuring consumption intent that is within volitional control of an individual and potential effects of the endorser during marketing communication. For consumer behavior, belief-disconfirmation CD may be experienced relative to advertising or corporate messaging that disconfirms important beliefs about a company or product. Moreover, free-choice CD (i.e., Festinger's, 1957, post-decision CD) may occur after having made the consumption decision and may be experienced while trying to consume the

[37] The size and shape of the Jordan curves (Lewin, 1936) are irrelevant in Figure 11, as they depict boundaries and relative position of objects rather than size or distance; the overlapping stages of the cognitive consistency effects are depicted as parts of a whole phenomenon.

product. Fishbein and Ajzen (1975) did not include early CD research in the formulation of the theory of reasoned action.[38]

Reasoned action theory has been supported by research. It has been applied in Bagozzi and Warshaw's (1990) theory of trying to consume and extensions to Ajzen's (1991) more general theory of planned behavior. The addition of measures to capture *social norms toward trying* and *habitual behavior* to those theories have increased predictive power. Belief-disconfirmation CD moderates attitude toward trying while free-choice CD moderates intention to try relative to the focal behavior. CD theory embodies Festinger's (1957) attempted explanation of when and how Lewin's resistance to change is observed, and is directly applicable to the identification of psychological resistance to marketing promotion.

[38] It is possible that a provision for cognitive dissonance in the theory of reasoned action (Fishbein & Ajzen, 1975) was not made due to the application of specific definitions of beliefs and attitudes, and thus they posited that dissonance could only be experienced between belief components, and not between other aspects of attitudes, such as feelings and intentions to act. In effect, examination of cognitive dissonance forces emphasis on beliefs and beliefs about attitudes stored in accessible memory due to the exclusion of the feeling component of an attitude.

APPENDIX H– CLASSIFICATION OF COGNITIVE DISSONANCE TYPES AND EXISTING MODELS OF PREDICTING CONSUMER BEHAVIOR

Armitage and Conner (2001) noted that the theory of planned behavior (TPB) (Ajzen, 1991), which includes measurement of the subjective norm as in the theory of reasoned action and perceived behavioral control, explains up to 39% of the variance between behavior and behavioral intention. Considering the classification of CD types and past CD research, models of predicting consumer behavior that anticipate the role of behavioral intention in predicting consumption behavior, such as the theory of reasoned action (Ajzen & Fishbein, 1980), the theory of planned behavior (Ajzen, 1991), and the theory of trying to consume (Bagozzi & Warshaw, 1990), can be revised with the theoretical underpinnings of this dissertation to consider the multivariate aspects of CD.

Paradigms of Current Cognitive Dissonance Research

CD researchers sometimes have employed examples from different CD paradigms to support or attack theoretical points made by others. Therefore, it is important to distinguish between the types of CD in framing the discussion of the effects of CD induction and reduction on consumer behavior. Festinger and Aronson (1959), Holloway (1967), Shultz and Lepper (1996), Harmon-Jones and Mills (1999) proposed various paradigms for classifying CD research. To explain the current paradigms of CD research, consider the adaptation of Heider's (1946) triads depicting referent (a), object (b), and social (c) meanings in Figure 2.

In Figure 5 and Figure 6, Heider's balanced and imbalanced triads are extrapolated from Figure 2 to depict dissonant cognitions that *follow from* one another,

because CD reduction activities are reconciled with the relative attitudes expressed in those triads. However, rather than examine the attitudes that assess the evaluative dimensions, the hypothesized multi-dimensional aspects of meaning are examined in the development of the described model. While individual triads (i.e., reality clusters) can be out of balance and move toward balance through various balancing activities, CD as described by Festinger (1957) is best described as the cognitive discrepancy between the triads. That is, two triads with mismatched meanings (i.e., counter-attitudinal properties) depict how CD is manifested and how to anticipate potential CD reduction.

Festinger and Aronson (1959) noted types of CD induction could be classified as arising from individual and group sources. Individual sources of CD induction are consequence of decisions, temptation, effort, and fait accompli. Group sources of CD induction are faulty anticipation of social environment, disagreement with others, and forced public compliance. These classifications are included in the Harmon-Jones and Mills (1999) paradigms.

Holloway (1967) described buying scenarios in which CD is likely to be experienced. Each of Holloway's scenarios could be juxtaposed as OCs and SCRs using the procedure for mapping DCF described in Appendix C. Belief-disconfirmation CD is found in these Holloway scenarios: importance of the cognitions involved, positive inducement, discrepant or negative action, information available, and anticipated CD. Free-choice CD is found in these Holloway scenarios: attractiveness of the rejected alternative, negative factors of the chosen alternative,

number of alternatives, cognitive overlap (cf. Zimbardo & Ebbesen, 1969), and familiarity and knowledge.

Shultz and Lepper (1996) classified CD research into two paradigms: free choice and insufficient justification. The free-choice CD paradigm aligns with the post-decision paradigm described by Festinger (1957). The insufficient-justification CD paradigm includes the sub-paradigms of prohibition, initiation, and forced compliance.

The four primary CD research paradigms suggested by Harmon-Jones and Mills (1999) are free choice, belief-disconfirmation, effort justification, and induced compliance. Each of these paradigms can be analyzed with the model using the procedure for mapping DCF described in Appendix C. The CD reduction processes in the dyadic unit relationships for the induced-compliance paradigm are identical to those in free-choice, belief-disconfirmation and effort-justification CD. Hence, the selection of the SCR for experiments determines the path for CD induction and reduction, regardless of the DCF; there is potential for the researcher to be perceived as an SCR and play a role in how CD is experienced, which is defined in this dissertation as the social comparison threat to internal validity (see Glossary).

Each of the current paradigms of CD research can be derived from the fundamental laws suggested by Festinger (1957). However, the cognitions underlying the experience of CD, introduction of new information that generates CD, and reduction strategies employed to reduce CD are open to investigation. After experimental treatments, several attempts to estimate the magnitude of CD that can be

induced or that was induced have been made, each with varying degrees of success and with few researchers considering the mediating effect of social reality.

Constructs Similar to Cognitive Dissonance

Several constructs may resemble CD from the observer's perspective: attitudinal ambivalence (Fabrigar et al., 2005), frustration (Chein, 1972), religious doubt (Krause & Wulff, 2004), guilt (Burnett & Lunsford, 1994; Stice, 1992), confusion between product choices (Holloway, 1967), confusion over cognitive or affective mismatch in advertising or product attributes (Mahajan & Wind, 2002), regret (Loomes & Sugden, 1982), anticipated regret (Abraham & Sheeran, 2003), dissatisfaction (Oliver, 1997), hypocrisy (Aronson, Fried, & Stone, 1991; Krause & Wulff, 2004; O'Leary, n.d.), psychological reactance (Brehm, 1966), and cognitive conflict (Inhelder et al., 1974; Piaget, 1975/1985; Pulaski, 1980).

The following principles applied in Appendix A are used to draw distinctions between CD (Festinger, 1957) and similar constructs:

1. CD is a social phenomenon experienced individually;
2. CD presupposes deliberation on accessible memory and new information;
3. Dissonant cognitions can be identified by a dual cognitive structure in which the assessment of the obverse of an object *follows from* the other object
4. The objects are set in a social contexts, and
5. The cognitions share substitutable social comparison referents (SCR) and objects under consideration (OC).

Models of Predicting Consumer Behavior

Free-choice cognitive dissonance (CD) in consumer behavior is more about how consumers make sense of a decision in those moments after purchase intent is established or the purchase decision is consummated than why that purchase might not have made sense in the first place (Aronson, 1997). For the potential effects of CD on consumer behavior, individuals might engage in the focal behaviors of purchasing or consuming for a variety of reasons. For example, consider smoking behaviors, Festinger's (1957) example of CD induction and reduction, within the context of the theory of trying to consume (Bagozzi & Warshaw, 1990).[39] A person might smoke cigarettes or engage in any other form of *injurious consumption* to achieve goals of achieving social acceptance (i.e., considering social norms) *and* experiencing psychoactive effects. As with many planned behaviors, smoking provides a background to understand how CD theory demonstrates the need to extend the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behavior (Ajzen, 1991).

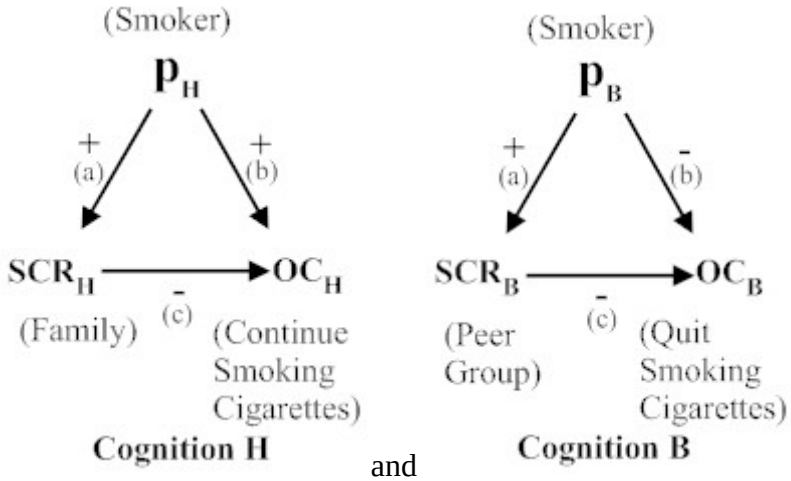
Consider an example of how CD is affected by consumers favoring beliefs and making choices. Consumers typically assume they are competent to make ordinary consumption decisions, such as purchasing cigarettes or consuming other products and services; therefore, introduction of a contrary belief that is relevant to the consumer induces belief-disconfirmation CD. For smoking-related behaviors, induction of CD of sufficient magnitude relative to the development of an attitude toward smoking leads

[39] The theory of trying to consume is an extension of Ajzen's (1991) theory of planned behavior, which is an extension of the theory of reasoned action. [39]

to CD reduction behavior associated with belief disconfirmation, such as quitting smoking or proselytizing others to smoke.

In Figure H1, an evaluation (e.g., importance) of the benefits of continuing to smoke (on the left) is juxtaposed with quitting smoking (on the right) within social contexts of family and peer group. On the left, the smoker favors object $OC_{H,}$ the goal of continuing to smoke cigarettes, and OM (b) is positive. This smoker favors SCR_H, the opinion of his family, and RM (a) is positive. However, his family (e.g., the endorser in this situation) does not favor OC_H, him continuing to smoke cigarettes. SM (c) is negative and the left side of Figure H1 is not balanced. On the right of Figure H1, the smoker does not favor OC_B, the goal of quitting smoking cigarettes, which is the opposite of OC_H, his continuing to smoke cigarettes and OM (b) is negative. The smoker favors the opinion of SCR_B, his peer group and RM (a) is positive. However, his peer group, SCR_B, does not favor him quitting smoking cigarettes and SM (c) is negative. The right side of Figure H1 is balanced. There is psychological pressure to resolve the imbalance in the left side, which may result in the right side becoming imbalanced. Balancing the cognition on one side may cause the other to be imbalanced if RM (a) is altered by discounting the opinion of family members or peer group members. When the consumer thinks of quitting smoking, he or she is altering OM (b) in both cognitions. Proselytizing others to smoke could have no effect on the attitudes of family members or peer group members, but SM (c) in either cognition could change to reduce CD. The effort to reduce belief-disconfirmation CD moderates beliefs and feelings toward intention to smoke and trying to smoke.

Figure H1: Belief-Disconfirmation Cognitive Dissonance–Continuing Smoking vs. Quitting Smoking

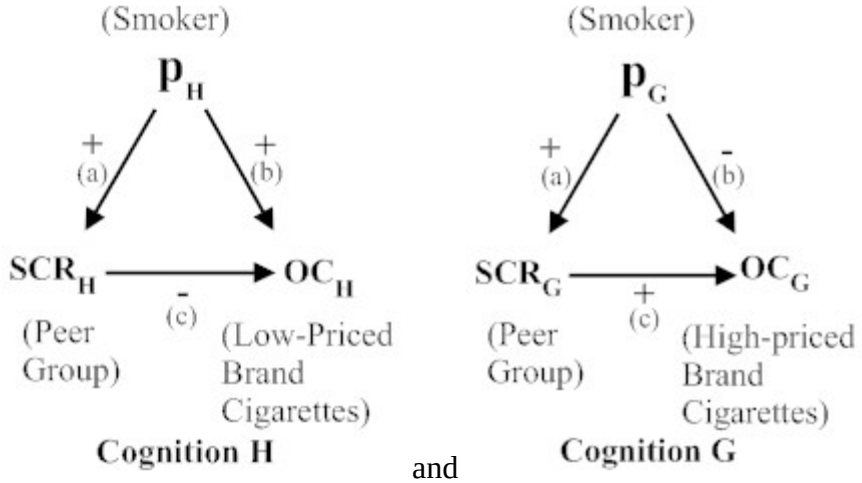


and

In Figure H2, once a consumer intends to try to smoke (cf. Bagozzi & Warshaw, 1990), there is a consumption decision of how to obtain cigarettes to continue smoking within the social context of a peer group (e.g., the general endorser). This decision involves choices about how to obtain cigarettes of a desired brand at an acceptable price (on the left), perhaps a repeat purchase of a previously chosen brand or purchase a higher-priced cigarettes favored by friends. On the left of Figure H2, the smoker favors OC_H, purchasing the low-priced cigarettes and OM (b) is positive. The smoker favors the opinion of his or her peer group, SCR_H and RM (a) is positive. However, his peer group, SCR_H, does not favor the low-priced cigarettes and SM (c) is negative. On the right of Figure H2, the smoker does not favor the purchase of higher-priced cigarettes, OC_G, and OM (b) is negative. The smoker favors the opinions of his peer group, SCR_G and RM (a) is positive. However, his peer group, SCR_G, favors the higher-priced, branded cigarettes. The scenario behind this decision leads to free-choice CD relative to the evaluation (e.g., importance, familiarity, or favorability) of

the forgone alternatives; there is psychological pressure to balance the left side of Figure H2 without causing an imbalance in the right side of Figure H2. If CD induction occurs, due to the introduction of dissonant information, the magnitude of the CD results in CD reduction such as information seeking about the product chosen or social support about the decision to smoke. With smoking-related behaviors, belief-disconfirmation CD and free-choice CD (i.e., post-decision CD) affect consumption attitudes. The principles of CD illustrated in the Festinger's (1957) example of smoking are applicable to many other socially relevant situations in which an endorser may be involved, such as shopping for clothing, test-driving automobiles, negotiating suitable housing, and selecting *green* or environmentally friendly products to combat global climate change.

Figure H2: Free-Choice Cognitive Dissonance–Purchasing Low-priced vs. High-priced Brand Cigarettes



and

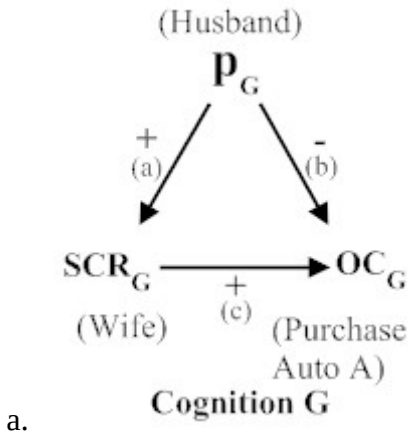
APPENDIX I–COGNITIVE DISSONANCE EXAMPLE OF BRAND LOYALTY WITH ENDORSER DURING CONSUMER PURCHASE

In Figure 8, cognitive dissonance arising from the beliefs associated with creating brand loyalty or making a decision around an automobile purchase could be specifically addressed by marketing practitioners in advertising messages and at the point of sale. There various and specific beliefs associated with making the purchase such as can the automobile be afforded, will it be accepted by friends, is it reliable, and it is safe. In Figure 8, the husband and the wife believe that only one of two different automobiles can be purchased. To influence this decision with marketing messages, the wife, significant others, family members, or the automobile brands that may have a purchasing decision role can be identified as SCRs. In Figure 8, the belief that Auto A should be purchased is dissonant with the belief that Auto B should be purchased due to the wife's role as an SCR. The CD experienced by the husband when considering the options of Purchase Auto A and Purchase Auto B, can be explored as individual product purchase beliefs about the two automobiles, such as comfort, styling, safety, price, financing, maintenance cost, reliability, performance, and environmental concerns, etc. Each of the product purchase beliefs can be identified and specified in a DCF with an appropriate SCR, and addressed with advertising or at the point of sale with sales personnel.

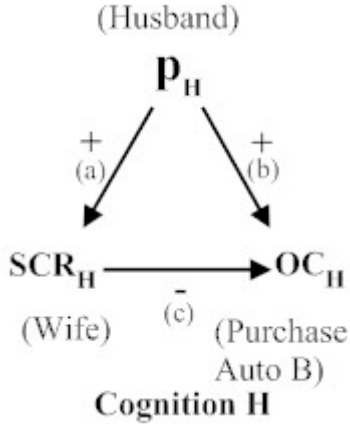
In Figure I1a and Figure I1b, consider the option of how to influence the husband's attitude in Figure 8 using an endorser, which is a common situation for close relationships that include a comingling of social and financial factors. In Figure I1a and Figure I1b, the husband is experiencing CD relative to the wife's role as an

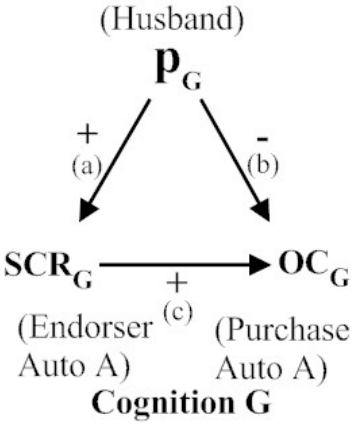
SCR. In Figure I1c, the manufacturer of Auto A could use Endorser A in an advertisement to influence the Husband's attitude toward Auto A. In Figure I1d, the husband's attitude toward the purchase of Auto B relative to the wife's perceived attitude remains the same. In Figure I1e, the selection of the Endorser A was successful at influencing the husband's attitude toward Auto A and balancing the cognition. In Figure I1f, the husband's attitude toward the purchase of Auto B remains the same. In Figure I1g, the husband's shifted attitude toward the purchase of Auto A, has generated a shift and in Figure I1h, the husband's attitude toward the purchase of Auto B has become negative and balanced the cognition. However, in Figures I1i and Figure I1j, Endorser B is presented to the Husband for Product B. In Figures I1k and Figure I1l, the husband's attitude toward Product B has shifted toward positive, resulting in the balancing action of Endorser B has caused a change in the attitude toward Product A. An alternative tactic could be to influence the wife with an inverted set of endorsers, but the optimal selection of an endorser depends on the DCF (see Appendix B) and the attitude change tactic that is employed. An advertiser could test endorsers for a product similar Auto A in Figure I1e or Auto B in Figure I1k using the scales in this dissertation to determine the optimal effect for influencing the attitude of a test sample of husbands.

Figure I1: Belief-Disconfirmation Dissonant Cognitive Form (DCF)–Automobile Purchase Alternatives with Endorser

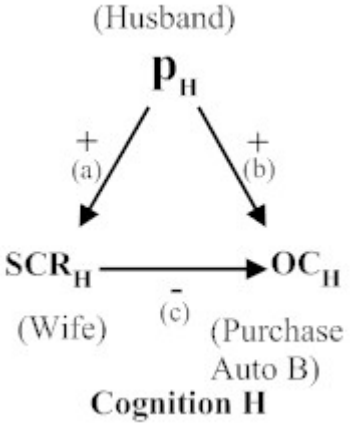


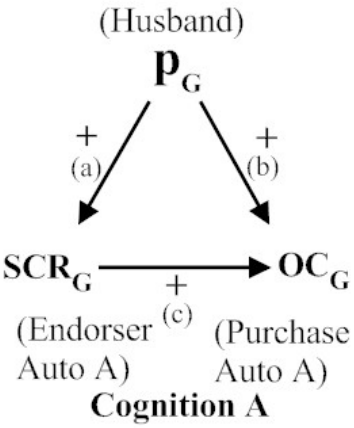
a. and b.



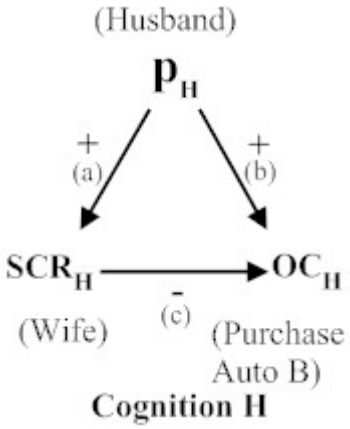


c. and d.

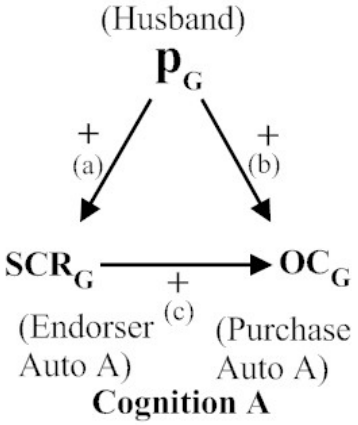




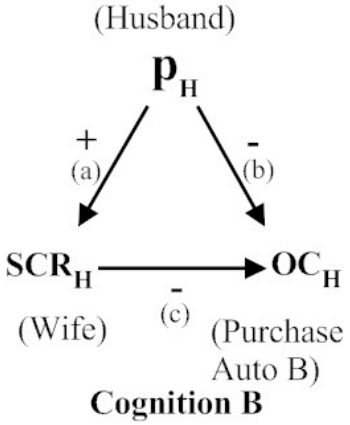
e. and f.



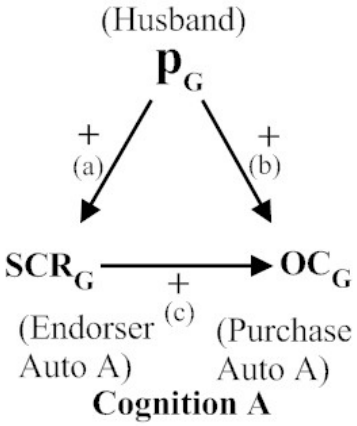
g.



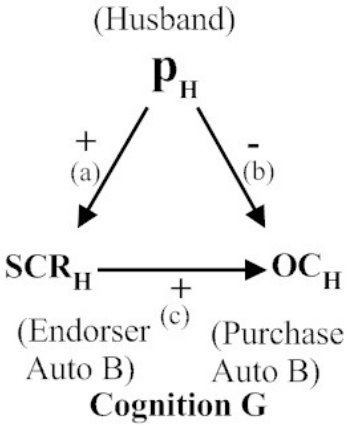
and h.



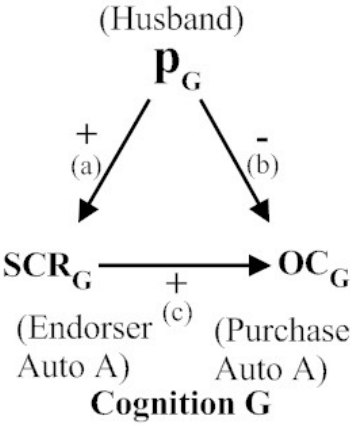
i.



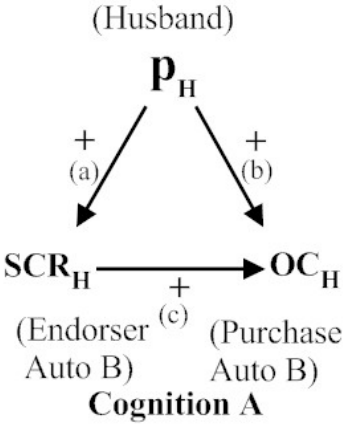
and j.



k.



and l.



GLOSSARY

- Balance – (see Figure 1) according to balance theory (Heider, 1946) there will be agreement between an observed individual's (p) assessment of the object under consideration (OC) (x) (i.e., object meaning [b]), what the social comparison referent (SCR) (o) thinks of OC (x) (i.e., social meaning [c]), and an observed individual's (p) assessment of what the SCR (o) thinks of OC (x) (i.e., referent meaning [a]). Balance theory stipulates that assessments of p, o, and x are associated to form a triadic cognition shown in Figure 2. This dissertation posits that balance between referent (a), object (b), and social (c) meaning is the second level of psychological tension in theories of cognitive consistency.
- Congruence – (see Figure 1) according to congruity theory (Osgood & Tannenbaum, 1955) referent (a), object (b), or social (c) meanings interact in pairs to form new meanings in proportion to the weights of the original meanings. This dissertation posits that congruence is associated with balance and that congruence between paired referent (a), object (b), and social (c) meaning is the first level of psychological tension in theories of cognitive consistency.
- Dissonance or Cognitive Dissonance (CD) – a condition of psychological tension existing when a person thinks about inconsistent beliefs or attitudes (see Figure 1). According to cognitive dissonance theory (Festinger, 1957), objects under consideration (OC) (x) associated with a social comparison referent (SCR) (i.e., a social context) are dissonant with related objects (x) also set in a social context (e.g., SCR), leading to psychological discomfort and motivation to reduce CD. This dissertation posits imbalanced cognitions involving an OC and SCR are

associated with CD within the dissonant cognitive form (DCF), and that dissonance between cognitions comprised of referent (a), object (b), and social (c) meaning is the third level of psychological tension in theories of cognitive consistency.

- DCF – a dissonant cognitive form (DCF) is a term first defined in this dissertation to describe a set of two balanced or imbalanced triadic cognitions of referent (a), object (b), and social (c) meanings that may or may not be dissonant with each other. Figure 2 is an example of a triadic cognition that forms one-half a DCF. This dissertation posits that a DCF can be used to measure CD.
- OC (x) – (see Figure 2) an object under consideration (OC) is a term first defined in this dissertation to describe an idea, opinion, or belief, and other measurable psychological constructs, such as memories of attitudes, behavior, and values.
- Object Meaning (OM) (b or $p \ldots> x$) – in Figure 2, is a term first defined in this dissertation to describe an evaluation by an observed individual of the OC with semantic differentials such as familiarity, bad/good for future, importance, realness, inevitability, possibility, level of occurrence, and level of increase (i.e., the observed individual's opinion of the OC) (See Table 3.4: *Adjective Pairs to Measure Object Meaning [b] and Social Meaning [c]).*
- Referent Meaning (RM) (a or $p \ldots> o$) – in Figure 2, is a term first defined in this dissertation to describe an evaluation by an observed individual of the SCR's view of the OC with semantic differentials such as familiarity, believability, trustworthiness, credibility, and importance (i.e., the observed individual's opinion

of the SCR's perspective on the OC) (See Table 3.3: *Adjective Pairs to Measure Referent Meaning [a]).*

- Social Comparison Threat to Internal Validity – the effect postulated in this dissertation of a perceived, socially powerful individual or group (e.g., researcher, publication, spokesperson, etc.) on attitude measurement; for example, a researcher becomes a social comparison referent (SCR) in Figure 2 during CD induction and reduction concomitant with attitude measurement, thus attitudes within the sample are altered during measurement based on the SCR.
- SCR (o) – (see Figure 2) a social comparison referent (SCR) is an individual (e.g., endorser) or group considered within a dissonant cognitive form (DCF). An external source of information is a specific instance of an SCR from which information about the OC is believed.
- Social Meaning (SM) (c or *o* …> *x*) – in Figure 2, is a term first defined in this dissertation to describe an evaluation by an observed individual of the social comparison referent's (SCR) view (estimation or perception) of the object under consideration (OC) with semantic differentials such as familiarity, bad/good for future, importance, realness, inevitability, possibility, level of occurrence, and level of increase. (i.e., the observed individual's estimation of the SCR's perspective on the OC). (See Table 3.4: *Adjective Pairs to Measure Object Meaning [b] and Social Meaning [c]).*