

DO CONSUMERS HOLD GRUDGES AND PRACTICE AVOIDANCE FOREVER? A MARKOV CHAIN MODEL OF THE DECAY OF GRUDGEHOLDING AND AVOIDANCE ATTITUDES

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ABSTRACT

How do individuals with strong grudgeholding and avoidance attitudes react to counterattitudinal information that is factual and objective and comes from credible sources? Using the elaboration likelihood model, social judgment theory and the characterization-correction model (Ahluwalia 2000), this article discusses the rationale and proposes a framework behind a change in grudgeholding and avoidance attitudes of individuals. The reduction in grudgeholding and avoidance attitudes of individuals over time, when individuals are exposed to factual and objective counterattitudinal information from credible sources, is modeled as a finite markov chain.

INTRODUCTION

My dad purchased a brand new Ford in 1952 and it was a lemon. After repeated attempts to get the dealership to fix the vehicle or exchange it for a less problematic car, he gave up in exasperation. Less than two years after he purchased the car, he sold it to someone else, cut his losses, and purchased a used Chevy that was much more reliable. But the story doesn't end there. His experience with his Ford was so bad, he never purchased another Ford in his life and took every opportunity to bad mouth the brand. When he learned that someone was driving a Ford, his typical response was, "I'm sorry you don't drive a real car" and mocked the brand at every opportunity. In 2002, I was at a reunion with my four

brothers and we were talking cars. It dawned on all of us that none of us had ever purchased a Ford, either. None of us had any experience with a Ford, but Dad's bad experience and negative comments about his car ended up affecting our purchase decisions. When it was time to buy a new car, none of us ever even considered a Ford!

When consumers are dissatisfied with a product to the extent described in the scenario above, not only do they hold a grudge against such a product, but they also avoid the product in the future. In such cases, dissatisfaction results in grudgeholding which, in turn, leads to strong emotionally charged negative attitudes toward the product in question (Aron 2001). Because a negative emotion decays extremely slowly (Thota 2004), it becomes imperative to predict and model how grudgeholding and avoidance behaviors could decay over time. Extrapolating this theme in the Ford scenario above, is it possible that the purchaser's strong negative attitude, characterized by grudgeholding and avoidance of Ford automobiles, could have decayed if he were provided with factual and objective counterattitudinal information from credible sources favoring Ford cars several times? Specifically, could the purchaser's attitude have changed for the positive about Ford if he was told repeatedly and on an ongoing basis good news from credible sources about Ford vehicles? For example, what effect would information from reliable sources about improved quality, new technology, outstanding performance, and

numerous happy consumers of Ford vehicles have on his grudge and subsequent avoidance behaviors?

There is a growing interest in how individuals with strong attitudes resist attitude change. That individuals with strong attitudes resist attitude change is a well-accepted finding in the consumer behavior and psychology literature (Ahluwalia 2000; Eagly and Chaiken 1995; Haugvedt and Petty 1992; Petty and Cacioppo 1986). For example, Republicans (Democrats) are more likely to believe that the economy and political affairs are being managed better under a Republican (Democrat) President (Bartels 2002). While Burden (2006) contends that this follows as a result of motivated learning and because of selective exposure to attitude consistent information (Taber and Lodge 2006), we argue that individuals with strong attitudes may not be always be able to encounter attitude consistent information a hundred percent of the time and cannot ignore exposure to counterattitudinal information especially if such information is rampant and is constantly the subject of debate in the media. We provide the following small case whereby rural Republicans underwent a change in their attitudes after repeated exposures to counterattitudinal information against Republicans¹.

¹ In support of our arguments, the poll by Greenberg Quinlan Rosner Research in October 2006 found that rural voters, who were earlier strongly committed to Republican ideals, were unenthusiastic about voting for the Republican President George W. Bush in the November 2006 election. This shift in attitudes occurred primarily because of (a) decreased support for going to Iraq war, elevated concern about the current war status in Iraq and the demand for a quick return of American troops by next year – which does not appear tenable under the Republican government, and (b) increased concern about the economy, high interest rates and gas prices during the Republican government. In this vein, the rural poll shifted against Republicans from 45% in September 2006 to 39% in October 2006 – a huge margin in a single month (*Morning Edition*, October 27, 2006). We argue that this shift occurred in wake of the unending Iraq war accompanied by a huge loss of troops, and an overall unpromising economic scene. Therefore, it must have been difficult for Republicans themselves to ignore these important truths simply to continue their support for their earlier

Because extant research has not yet investigated how grudgeholding and avoidance attitudes decay over time, it may be both of academic and managerial significance to delve deep into the issue and model this change of attitudes. This is because these two responses to consumer dissatisfaction – grudgeholding and avoidance – both lead to strongly held, sometimes emotionally charged attitudes towards products, brands, and organizations that persist over time (Huefner and Hunt 1994; Hunt and Hunt 1990). Consumer avoidance of stores and brands is a form of exit behavior (Hirschman 1970) that persists over time, has relatively little emotional involvement, and is primarily cognitive in nature (Huefner and Hunt 1992). In contrast, consumer grudgeholding is exit over laden with strong negative emotion that persists over time, often over many years (Hunt et al. 1988; Hunt and Hunt 1990). In the scenario above, the father's reaction to the Ford company exemplifies grudgeholding, while his sons' reactions exemplify avoidance. Both grudgeholding and avoidance behaviors incorporate strong attitudes resistant to change over time. It is important to note that throughout the article, when we refer to attitudes, we refer to attitudes characterized by grudgeholding and avoidance. The unanswered question that this article attempts to address is whether these strong emotionally laden negative attitudes (characterized by grudgeholding and avoidance) could change in favor of factual and objective counterattitudinal information over time. How would an incremental attitude change occur in such a case? Could a complete reversal of attitude in favor of counterattitudinal information happen at any given time?

At present, relatively little attention has been given to psychological processes that mediate resistance to attitude change. Ahluwalia (2000) proposed that individuals with strong attitudes toward a given target develop strong

position – favoring Republicans. Further, these statistics point toward a strong case of shift in attitudes of some rural Republicans, who held strong attitudes in favor of Republicans, and underwent a change in attitudes because of numerous objective and credible media exposures to counterattitudinal information over time.

resistance to attitude change and employ three different psychological mechanisms, biased assimilation, relative weighting of attributes, and minimizing of impact – to resist counterattitudinal information. Past research has looked at the mechanisms that individuals employ to resist counterattitudinal messages (Ahluwalia 2000). This article attempts to investigate the effects of providing counterattitudinal information on future grudgeholding and avoidance attitudes of individuals. Specifically, the focus of this article is to explore reducing the effect of behaviors by providing these individuals with factual and objective counterattitudinal information coming from credible sources and explore the consequent change in attitudes. Consumers consider word-of-mouth information, blogs on the internet, and information from expert sources such as Consumer Reports as credible information. In other words, this research explores the process by which avoiders and grudgeholders undergo attitude change when they are faced with counterattitudinal information and it identifies the underlying factors that contribute to this attitudinal change.

This article begins with an extended discussion of consumer grudgeholding and avoidance. It then discusses the psychological mechanisms individuals employ to resist counterattitudinal information followed by a brief discussion on the effects of (a) factual and objective information and (b) information from credible sources on the attitudes of these individuals. The article then links these constructs to previous work in marketing and psychology to develop a framework to study the decay of grudgeholding and avoidance attitudes. The subsequent change in attitudes of individuals exposed to factual and objective counterattitudinal information from credible sources is modeled as a finite markov chain. Finally, the model proposes a solution for the incremental and complete change in attitudes at different levels of exposures and proposes a way to overcome grudgeholding and avoidance behaviors.

CONCEPTUAL OVERVIEW

Grudgeholding and Avoidance

The concept of consumers holding grudges was introduced into the consumer behavior literature by Twedt in 1979. Twedt proposed that consumer grudges against brands would gradually decrease over time, but his empirical study was inconclusive (Twedt 1979). H. Keith Hunt and colleagues greatly expanded Twedt's concept of consumer grudges. Hunt et al. (1988) proposed, among other things, that grudge holders were emotionally upset at the incident that produced the grudge and remained upset over time, often for years. Grudges, they proposed, persist across the years (and even decades), are created more by treatment than performance, and that holders of consumer grudges were the "all-time champions" of negative word of mouth (p. 118). They concluded that the dollar loss to consumers with grudges was fairly significant. Hunt and Hunt (1990) expanded this concept by suggesting the phenomenon be called consumer "grudgeholding – one word, not two" (p. 117). They proposed a research agenda for consumer grudgeholding and raised this interesting question: "what leads to the decay of consumer grudgeholding?" (p. 118).

Huefner and Hunt (1992) formally defined consumer grudgeholding as a form of "extreme exit" (p. 228) and proposed differences between consumer grudgeholding and a new idea, consumer avoidance. According to Huefner and Hunt (1992), avoidance is persistent exit but without the emotional upset of grudgeholding. They defined grudgeholding as "a composite of voice and exit exacerbated by extreme emotional upset" (p. 228) and concluded it was a subset of avoidance behavior. Otto et al. (2004) reanalyzed the Huefner and Hunt (1992) data to quantify the costs of consumer avoidance behaviors. One important finding of this later study was an empirical affirmation that the difference between avoidance and grudgeholding behaviors was emotional intensity. Those holding grudges remembered the original upset years, even decades after the incident. Malafi (1996) also

discovered emotional intensity of grudgeholders in a series of focus groups with soldiers.

Wright and Larsen (1997) proposed expanding on Kowalski's (1996) general theory of complaining by including grudgeholding as a response to failed complaints about a product or a service. Aron (2001) suggested that grudgeholding is the result of a "flashpoint," or a "strong and negative emotional reaction" experienced by the consumer that "provokes avoidance behavior against the marketer" (p. 109). He proposed the following definition of consumer grudgeholding:

Consumer grudgeholding is a negative attitude toward a marketer, distinguished by the persisting and purposive avoidance of the marketer (e.g., vendor or group of vendors, brand, product class, or organization) and possible other actions against the marketer as a means of coping with a real or perceived grievance attributed to the marketer (p. 109).

According to Aron, grudgeholding begins with the flashpoint, which leads to a negative attitude, driven by the upset inherent in the situation that led to the flashpoint. He also pointed out that grudgeholding is not simply another way of expressing the concept of customer dissatisfaction, but is rather an emotional or attitudinal *consequence* of consumer dissatisfaction.

In the next sections, we review past research on resistance to persuasion and propose how consumers' grudgeholding and avoidance attitudes could possibly undergo a change with repeated exposure to factual and objective counterattitudinal information from credible sources.

Resistance to Persuasion

Using Fishbein and Ajzen's (1981) expectancy-value approach, Ahluwalia (2000) proposed three mechanisms that mediate persuasiveness. The first mechanism identified is *biased assimilation*, or the tendency of individuals to perceive attitude consistent information as *more valid* than attitude inconsistent information - a

robust finding in the literature (Ditto et al. 1998; Kunda 1990; Lord et al. 1979). One mechanism leading to biased assimilation is the biased memory search by individuals to access hypotheses and inference rules from past behavior that are most likely to support their desired conclusion (Kunda 1990). The second mechanism is the *minimizing impact* or the tendency of individuals to isolate negative information toward the target attribute, thereby minimizing its potential damage to the existing attitude. The third mechanism is *attribute weighting*, or the tendency of individuals to decrease the weight given to dissonant cognitions and at the same time to increase the relative importance of attitude-consistent beliefs (Festinger 1957; Ahluwalia 2000).

Arguing on the basis of these three mechanisms and the theory of social judgment, incoming messages on involving topics are thought to have an enhanced probability of being rejected (Sherif 1965; Petty 1983) because (a) highly involved individuals exhibit extended latitudes of rejection, and (b) individuals' prior beliefs can distort perceptions. For example, the prior belief that Ford automobiles are "bad" cars distorts any positive Ford news the purchaser in the above scenario may hear. The characterization-correction model may also explain the processes by which attributions are made and may predict what cognitions are likely to be used at lower and higher levels of processing (Gilbert 1989). According to the characterization-correction model, individuals with high (vs. low) levels of involvement towards the target enter the correction mode which is associated with more elaborate processing. Since individuals with strong negative attitudes would possess high levels of involvement because of their strong attitudes, they are likely to enter the correction mode and consider any message claims (including counterattitudinal message claims) that may either refute or support the counterattitudinal information. The elaboration likelihood model could also help understand how individuals with strong attitudes toward a target (individuals who are highly involved) consider and interpret incoming information. When individuals are highly involved with a product (or an issue) and possess strong attitudes toward a target, they

indulge in issue relevant thinking by a careful consideration of message relevant thoughts (Petty and Cacioppo 1986). This process is labeled the "Central route to persuasion" under the elaboration likelihood Model. Therefore, individuals with strong attitudes toward a target would follow the central route to persuasion and consider message relevant information that is verifiable and objective.

Factual and Objective Information

According to Darley and Smith (1993), objective claims associate brands with *tangible* product features (e.g., "this car has a V-8 engine") or they include specific *factual* information to support the brand-attribute association. Factual claims include specific data that are measured by standard scales that are not subject to individual interpretation (Atkin 1979; Debevec et al. 1984; Edell et al. 1983; Holbrook 1978; Marquez 1977; Puto and Wells 1984). Further, both factualness and tangibility contribute to claim objectivity and claim objectivity is effective under central route processing conditions of the ELM (Darley and Smith 1993).

Information from Credible Sources

If a message originates from an expert or objective source, that message influences beliefs more than the same message from a non-expert or non-objective source (Slater et al. 1996). Thus, source credibility influences perceptions about the message. The effects of source credibility on receiver's attitudes are greater for more discrepant than for less discrepant messages (Aronson et al. 1963; Rhine et al. 1970). Factual and objective information (that may be discrepant) coming from credible sources may have a strong positive effect on the receivers of counterattitudinal information. In terms of grudgeholding and avoidance, factual and objective information from a credible source may lead to the lessening of grudgeholding or avoidance behaviors. For example, a factual and objective study on the increased quality of Ford automobiles since 1952 from an unbiased, third party may help reduce the grudgeholding and avoidance behaviors of the consumers in the introductory example.

This article develops a framework to structure the above discussion. Specifically, the framework models the change in attitudes grudgeholders and avoiders undergo when they are exposed to factual and objective counterattitudinal information from credible sources. The framework, shown in Figure 1 (see page 98), represents the effect of factual and objective counterattitudinal information from credible sources on the current and the subsequent choice tasks of grudgeholders and avoiders. According to this framework, at each R^{th} stage, the effect of factual and objective counterattitudinal information from credible sources would be moderated by the attitude formed at $(R-1)^{\text{th}}$ stage. This is because the change in attitude at any given stage would not only depend upon the factual and objective counterattitudinal information coming from a credible source but also depend upon the attitude of the grudgeholder or avoider formed at an earlier stage.

THE MARKOV CHAIN MODEL

The subsequent change in attitudes when grudgeholders and avoiders are exposed to factual and objective counterattitudinal information from credible sources is modeled as a finite markov chain with absorbing and transient states and shown in Figure 2 (see page 99). The Markov chain model utilizes the psychological mechanisms described by Ahluwalia (2000). Based on the above discussion, we argue that factual and objective information from credible sources may have an effect on grudgeholders and avoiders in favor of the counterattitudinal information. We argue that when individuals are exposed to factual and objective counterattitudinal information from credible sources repeatedly, they may not forever resist the counterattitudinal information and may undergo a change in attitudes, which may cause grudgeholding and avoidance behaviors to decay. For example, when the purchaser of the Ford and his descendants, who possess a strongly negative attitude toward Ford vehicles, are repeatedly exposed to factual and objective counterattitudinal information from credible sources that are positive about Ford, they may not resist the counterattitudinal information

and may undergo a change in attitude in favor of the counterattitudinal information. Examples of credible sources include independent, unbiased, third party rating organizations such as *Car and Driver* magazine, as well as positive television and news article stories about Ford based on credible sources. Examples of positive information about Ford products might be Ford's investments and excellence in technical improvements in fuel cell system to create industry's first "hybridized fuel cell vehicles". The new Ford hybrid vehicles combine the improved range and performance of hybrid technology with the addition of a 300-volt Sanyo battery pack and a brake-by-wire electrohydraulic series regenerative braking system with the overall benefits of a fuel cell. (Motor Trend 2005). In other words, the grudgeholding and avoidance of Ford automobiles may diminish and in fact disappear over repeated exposures to such positive information about Ford from credible sources. On a theoretical level, it is emphasized that the three mechanisms of biased assimilation, minimizing impact and attribute weighting – laid out by Ahluwalia (2000) that individuals employ to resist attitudinal change to counterattitudinal information – would be weakened and not be employed when individuals are repeatedly exposed to convincing and credible information against their attitudinal position.

Some grudgeholders and avoiders may undergo incremental attitude change, i.e., a change from a_1 to a_2 (in favor of the counterattitudinal information) whereas some grudgeholders and avoiders may undergo a reversal in attitudes (A_R) or a complete change in attitudes in favor of counterattitudinal information after exposure to factual and objective counterattitudinal information from credible sources. A complete attitude reversal would depend on the source credibility and the degree of factuality and objectivity of the presented information. However, with the first exposure to counterattitudinal information, most of the grudgeholders and avoiders, as suggested by Ahluwalia (2000), may strongly resist the counterattitudinal information and may not experience attitude change. This probability is given by $1 - p_1 - q_1$. Therefore, with the first exposure to factual and objective

counterattitudinal information from a credible source, we make the following proposition:

PI: When grudgeholders and avoiders are faced with factual and objective counterattitudinal information from credible source(s) for the first time, they are less likely to experience a change in their attitudes.

Similarly, when exposed to factual and objective counterattitudinal information from credible source(s) for the second time, some grudgeholders and avoiders may undergo an incremental change in attitudes. The difference between the change in attitudes of grudgeholders and avoiders on each subsequent exposure would increase i.e., $(a_3 - a_2) > (a_2 - a_1)$ (please see proposition 2 below). As with exposure to factual and objective counterattitudinal information from credible source(s) for the first time, some grudgeholders and avoiders may experience a complete reversal in attitudes (A_R) when exposed to the counterattitudinal information for the second time. Again, some grudgeholders and avoiders may strongly resist counterattitudinal information and may not experience a change in attitudes. This probability is given by $1 - p_2 - q_2$. Similarly, on exposure to factual and objective counterattitudinal information from credible (and multiple) sources for the third time and on subsequent occasions, some grudgeholders and avoiders may undergo an incremental change in attitudes while others may experience a complete reversal in attitudes (A_R).

Generalizing the above discussed patterns for the first and second stages to an arbitrary R^{th} stage, some grudgeholders and avoiders may resist a change in attitudes, which probability is given by $1 - p_r - q_r$. Hence, with 'n' exposures, the attitude of grudgeholders and avoiders at time t_N represented by a_N would have undergone a significant amount of change. We propose that $a_N \rightarrow A_R$ (a_N tends to A_R) as 'n' increases. On each subsequent exposure, the probability of grudgeholders and avoiders exhibiting strong resistance to factual and objective counterattitudinal information from credible and multiple sources would decrease, i.e., $1 - p_1 - q_1 > 1 - p_2 - q_2 > 1 - p_3 - q_3 > \dots > 1 - p_N - q_N$. Also, with

each subsequent exposure, the probability of grudgeholders and avoiders undergoing a complete change or reversal in attitudes will increase, i.e., $q_1 < q_2 < q_3 < \dots < q_N$ and the probability of grudgeholders and avoiders undergoing incremental changes in attitudes $p_1 < p_2 < p_3 < \dots < p_N$ will increase. The decrease in probabilities representing resistance to counterattitudinal information with every exposure to factual and objective counterattitudinal information from credible sources ($1 - p_R - q_R$, or the probability representing resistance to counterattitudinal information at R^{th} stage) would be offset by a corresponding increase in the probabilities that represent incremental attitude changes in favor of counterattitudinal information, i.e., $p_1, p_2, p_3, \dots, p_N$ and the probabilities that represent a complete attitude change in favor of counterattitudinal information, i.e., $q_1, q_2, q_3, \dots, q_N$. The following propositions follow from the above discussion:

P2: Incremental attitude change may increase with each exposure when grudgeholders and avoiders are exposed to factual and objective counterattitudinal information from credible source(s).

P3: When grudgeholders and avoiders perceive the source(s) to be more credible, their attitudes may undergo incremental and complete change to a much greater degree than when they perceive the counterattitudinal source to be less credible.

P4: When grudgeholders and avoiders perceive the counterattitudinal information to be more factual and objective, their attitudes may undergo incremental and complete change to a greater degree than when they perceive the counterattitudinal information to be less factual and objective.

The Matrices

The framework, which was developed as a finite markov chain with transient and absorbing states, is represented as matrices so the matrices can be multiplied to produce the probabilities that represent incremental and complete change in attitudes at any stage. The transition matrix of the Markov chain X is given by:

$$I = \begin{pmatrix} & a_1 & a_2 & a_3 & \dots & a_R & a_{R+1} & a_N \\ a_1 & 1-p_1-q_1 & p_1 & 0 & & 0 & & 0 \\ a_2 & 0 & 1-p_2-q_2 & p_2 & & 0 & & 0 \\ a_3 & 0 & 0 & 1-p_3-q_3 & p_3 & 0 & & 0 \\ \dots & 0 & 0 & 0 & & & & \\ a_R & 0 & 0 & 0 & 0 & 1-p_R-q_R & p_R & 0 \\ a_N & 0 & 0 & 0 & 0 & 0 & 0 & 1-q_N \end{pmatrix}$$

The transition matrix represented above can be represented in the canonical form as:

$$Q = \begin{pmatrix} Q & R \\ O & I \end{pmatrix}$$

The matrix R consists of q_1, q_2, \dots, q_N which represent the probabilities of complete reversal in attitudes at a given stage. The matrix $(I-Q)^{-1} R$ represents that if we are in a given transient state represented by a_R , we will eventually be absorbed

in the absorbing state, i.e., the state represented by x_R . Thus, for each a_R there is corresponding x_R , which depicts a complete change or reversal in attitudes in favor of counterattitudinal information.

$$R = \begin{pmatrix} q_1 \\ q_2 \\ q_3 \\ \cdot \\ \cdot \\ q_R \\ \cdot \\ \cdot \\ q_N \end{pmatrix} \quad (I-Q)^{-1} R = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ \cdot \\ \cdot \\ x_R \\ \cdot \\ \cdot \\ x_N \end{pmatrix}$$

Model Solution

1. The probability that a strong preexisting attitude at R^{th} stage will eventually undergo a complete change i.e., $a_R \rightarrow A_R$, on exposure to factual and objective counterattitudinal information from credible and multiple sources is given by

$$q_1 + p_1 q_2 + p_1 p_2 q_3 + p_1 p_2 p_3 q_4 + \dots + p_1 p_2 p_3 \dots p_{N-1} q_N.$$

2. The probability that a_1 will end up in a_N is given by $(p_1 * p_2 * p_3 * \dots * p_{N-1})$. This implies that a complete reversal in attitudes does not take place and some of the preexisting attitude remains even after exposure to the factual and objective counterattitudinal information from credible source(s).

3. The probability that an attitude in transient state a_R undergoes a complete change or gets reversed is given by x_R . It is the corresponding x-value from the $(I-Q)^{-1} * R$ matrix.

MANAGERIAL IMPLICATIONS

As demonstrated by Hunt et al. (1988) and Otto et al. (2004), grudgeholding and avoidance can be quite costly to business and industry. It would be in their best interests to understand the process by which grudgeholding and avoidance behaviors can be reduced and, ultimately, reversed, over time by repeated exposure to factual and objective counterattitudinal information from (multiple) credible sources. In an era of globalization, with

repeated calls for boycotts of organizations like Wal-Mart, McDonald's, and Coca Cola (Johansson 2004), it would be helpful to understand the process by which attitude change and, ultimately, reversal is possible in consumers who harbor grudges and avoid products, brands, or organizations. Furthermore, since credible information (capable of changing consumers' attitudes) could arise from sources such as word-of-mouth information and more importantly negative-word-of-mouth information, blogs on the Internet, and information from expert sources such as Consumer Reports as credible information, it becomes important for marketers to ensure that no negative information reaches consumers from such credible sources since these sources could be capable of incrementally changing or even switching consumers' strong attitudes especially even when consumers hold positive attitudes toward the marketer.

SUMMARY AND FUTURE RESEARCH

This article focuses on the decreasing effectiveness of the arsenal employed by the

grudgeholders and avoiders when information becomes difficult-to-refute (i.e., when the information is factual and objective) and comes from credible sources. We add to the existing literature by studying the role of factual and objective counterattitudinal information that comes from credible sources, in influencing the effectiveness of resistance mechanisms of grudgeholders and avoiders. We develop a markov chain model and further the understanding of attitude change in grudgeholders and avoiders when they are exposed to counterattitudinal information.

Future research should test the model empirically and refine it as necessary to fully understand the process of attitude change in grudgeholders and avoiders. Various social and environmental factors may need to be included in the model to better represent attitude change. For example, the role of strong emotions in grudgeholding would be an incredibly useful and insightful contribution. Specifically, it might be interesting to study the mediating role of the intensity of negative emotions on the decay rate of grudgeholding and avoidance.

Figure 1

The Framework

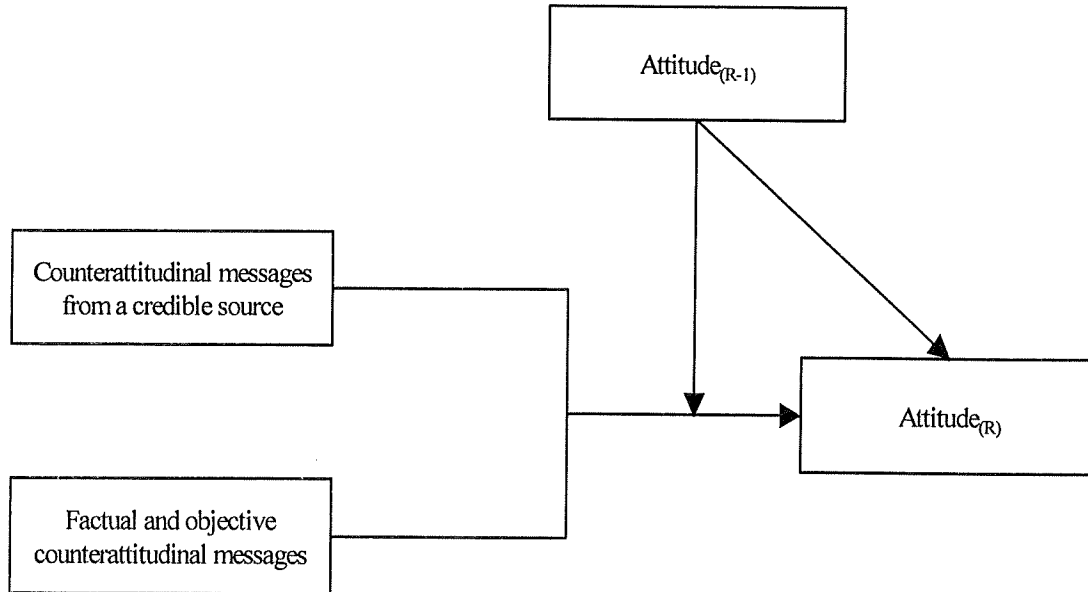
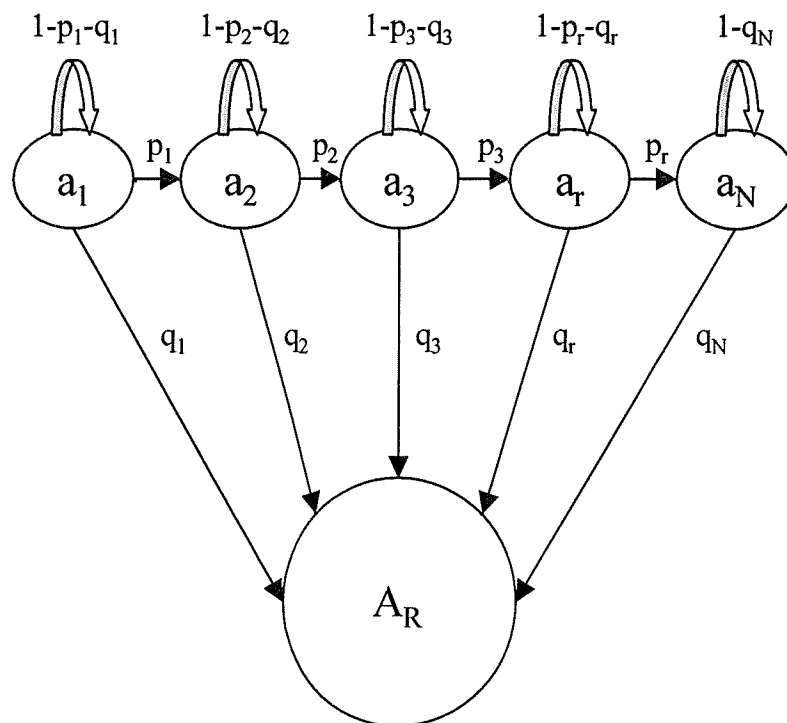


Figure 2

The Markov Chain Model



a_1 represents the attitude of grudgeholders and avoiders at time t_1

a_2 represents the attitude of grudgeholders and avoiders at time t_2

a_3 represents the attitude of grudgeholders and avoiders at time t_3

a_r represents the attitude of grudgeholders and avoiders at time t_r

a_N represents the attitude of grudgeholders and avoiders at time t_N

A_R represents a reversal or complete change in attitudes of grudgeholders and avoiders

p_1 represents the probability of change in attitude of grudgeholders and avoiders from a_1 to a_2 at time t_1

p_2 represents the probability of change in attitude of grudgeholders and avoiders from a_2 to a_3 at time t_2

p_3 represents the probability of change in attitude of grudgeholders and avoiders from a_3 to a_4 at time t_3

p_{N-1} represents the probability of change in attitude of grudgeholders and avoiders from a_{N-1} to a_N at time t_N

q_1 represents the probability of change in attitude of grudgeholders and avoiders from a_1 to A_R at time t_1

q_2 represents the probability of change in attitude of grudgeholders and avoiders from a_2 to A_R at time t_2

q_3 represents the probability of change in attitude of grudgeholders and avoiders from a_3 to A_R at time t_3

q_N represents the probability of change in attitude of grudgeholders and avoiders from a_N to A_R at time t_N

$1 - p_1 - q_1$ represents the probability of resistance to change in attitudes of grudgeholders and avoiders at time t_1

$1 - p_2 - q_2$ represents the probability of resistance to change in attitudes of grudgeholders and avoiders at time t_2

$1 - p_3 - q_3$ represents the probability of resistance to change in attitudes of grudgeholders and avoiders at time t_3

$1 - p_N - q_N$ represents the probability of resistance to change in attitudes of grudgeholders and avoiders at time t_N

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