UNCERTAINTY AND INFORMATION SEEKING PATTERNS: A TEST OF COMPETING HYPOTHESES IN THE CONTEXT OF HEALTH CARE REFORM

By

Lindsay Neuberger

A DISSERTATION

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

DOCTOR OF PHILOSOPHY

Communication

2011

ABSTRACT

UNCERTAINTY AND INFORMATION SEEKING PATTERNS: A TEST OF COMPETING HYPOTHESES IN THE CONTEXT OF HEALTH CARE REFORM

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The current research presents two studies that investigate uncertainty and information seeking in the context of health care reform. Competing uncertainty frameworks (i.e., uncertainty reduction, motivation to reduce uncertainty, predicted outcome value) are integrated in a model and then tested against each other to better understand how individuals are faced with and manage their uncertainty. Health care reform is an appropriate context for this research as uncertainty levels are high and it is important to understand how individuals will deal with that uncertainty in the near future. Providing information that is both accurate and useful will be essential, but understanding the antecedents of information seeking will also be vital in effective information provision. The current paper outlines theoretical approaches to uncertainty and notes relevant individual difference variables (i.e., knowledge, involvement) before proposing an explanatory model and a 2x2x2 to examine effects.

Methods included an initial survey as well as an online information seeking tracking study with pre and post-tests. The first study used a survey to assess potential model variables, solidify measurement models, and aid in the construction of a website containing health care reform information. Results from that study suggest high levels of uncertainty and predicted outcome value of health care reform information. Levels of uncertainty tolerance and health care reform knowledge were low. Additionally, participants indicated that they preferred to receive health care reform information from

interpersonal sources and the internet and they wanted information in the form of fact sheets and statistics. These data informed the construction of the website used in study two.

The second study in this research consisted of a pre-test to assess model variables followed by a web-based information seeking tracking study where participant use of the website was tracked. A post-test assessed uncertainty and information recall after website exposure. Results suggest that predicted outcome value is the best predictor of information seeking and that increased information seeking is associated with greater certainty and information recall. The data suggest that uncertainty alone is not enough to motivate information seeking; it is essential that individuals perceive the information available to have value in order to spend time information seeking. Additionally, post-test uncertainty and information recall data suggest that the website provided greater utility for those who spent more time viewing it. These data provide evidence that helps clarify the motivations for and effects of information seeking that may be valuable to individuals and organizations seeking to effectively provide information related to health care reform and other issues. Further implications and avenues for future research are presented.

DEDICATION

To my Nana, Seton Shields, who was my greatest role model and taught me to always display character, have pride, and demand respect.

ACKNOWLEDGEMENTS

First, I would like to thank the Michigan State University Department of Communication, College of Communication Arts & Sciences, and Graduate School for their generous support that made this dissertation and my entire doctoral work possible. I never thought I could be cajoled into coming up to the great white north for my doctoral work, but I am really glad I ended up here. I will carry on the Spartan name with pride.

Consistent support from family, friends, colleagues, and mentors made getting my Ph.D. a much more productive and enjoyable experience. Dr. Kami Silk has been the type of advisor you kind of don't think really exists. Authority and expertise paired with lightheartedness and approachability is a difficult combination to pull off -- but she does it. She served as a great model and reminded me that while I often needed to buckle down and get things done, sometimes I also needed to go for a run or find a patio and put a beer in my hand instead. Our battles on the basketball court were spirited, but our research and teaching collaborations were seamless, and I look forward to having her as a friend and colleague for years to come. Thanks, Kami.

In addition to having a great advisor, I also was lucky to have an incredible committee. Drs. Chuck Atkin, Dan Bergan, and Steve Lacy provided sage comments that made both my prelim and dissertation much better projects. Additionally, teaching with and being taught by these scholars was an incredible opportunity that shaped my academic identity. I am also indebted to several other MSU professors for their assistance during my time at State. Dr. Maria Lapinski was a great resource and research collaborator. Her attention to detail, grant knowledge, and generally fun disposition are three things I hope to embody as a faculty member. Additional thanks are due to Drs.

Frank Boster, Meredith Gore, Tim Levine, Sandi Smith, Colleen Tremonte, and Gwen Wittenbaum for providing me with knowledge and challenging me during my four years at MSU. Marge Barkman, Estrella Starn, Deb Waters, and Ann Wooten also helped me navigate the program and were incredible sources of information. Thanks to all of you.

Regardless of all the support I received at MSU, I wouldn't even have started the Ph.D. process without inspiration from former professors. Drs. Al Louden, Marina Krcmar, and Michaelle Browers all harassed me into pursuing a Ph.D. and they were all right about it being a good fit. Thanks for pushing it.

My incredible friends not only put up with me, but also encouraged me, listened to my ideas, and were just generally available and supportive through this process. They also ensured I had way more fun than I probably should've while getting a Ph.D. Great thanks are due to Jenn Anderson, Jenny Cornacchione, Dave Deandrea, Allison Eden, Kayla Gassmann, Rebecca Jacobsen, Molly Kennedy, Erin Maloney, Jessica Russell, Allison Shaw, Hillary Shulman, Kelly Wood, and numerous other friends and colleagues.

My three intelligent, kind, and good looking brothers were another great source of inspiration. Honestly, I know Daniel, Austin, and David are all much smarter than me and bound for greatness – I've just been trying to keep up. Never too serious, always supportive and fun, these three guys will be Drs. Neuberger in no time. I've also been lucky to have my loving extended family behind me the whole way. Thanks, everyone.

Finally, I am blessed to have parents who are unreasonably awesome. Knowing that two intelligent, understanding, supportive, and reasonable human beings were always there to listen and provide insight into any situation I encountered was invaluable. Thank you so much for everything.

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Introduction

The relationship between uncertainty and information seeking is fundamental to human communication processes. All individuals experience uncertainty regarding numerous situations every day and thus the concept has been the subject of considerable scholarly study. Despite the amount of investigation in this area there is no consensus about how uncertainty operates; instead, there is a great deal of variation in theoretical approaches to the concept. In the study of communication, Shannon and Weaver (1949) introduced preliminary definitions that suggest information as an uncertainty reducing agent, but uncertainty reduction theory (URT; Berger & Calabrese, 1975) was the first major theoretical paradigm to address uncertainty and information seeking. Although URT may have been among the first theories to consider uncertainty, research about the relationship between uncertainty and information seeking has been pervasive across fields consistently since the introduction of that seminal theory (see Afifi & Weiner, 2004; Babrow, Kasch, & Ford, 1998; Brashers, 2001; Kellerman & Reynolds, 1990; Kramer, 1999; Miller, 1987; Neuberger, 2010b; Sorrentino & Short, 1986; Spink, Wilson, Ford, Foster, & Ellis, 2002a; Sunnafrank 1986).

URT proposes that uncertainty is a largely negative state that individuals are motivated to resolve or reduce in order to exist in a productive, equilibrium state (Berger & Calabrese, 1975). However, this conceptualization of uncertainty as being necessarily negative is not shared by all. For example, uncertainty management theory (Brashers, 2001) maintains that uncertainty can be productive when strategically used for avoidance or to retain hope in a given situation (e.g., a cancer patient wanting to remain in the dark about his or her prognosis). In still another theoretical approach, motivation to reduce

uncertainty (MRU; Kellerman & Reynolds, 1990; Kramer, 1999) suggests that individuals have varied uncertainty tolerance levels and thus individuals have varied motivation levels regarding their need to reduce uncertainty. Finally, predicted outcome value (POV; Sunnafrank, 1986) suggests that individuals seek to reduce their uncertainty in order to maximize beneficial outcomes.

Despite the apparent breadth of these theories, there are two fundamental challenges that limit them; they are primarily focused on initial interpersonal interactions and generally tested in isolation rather than tested in an integrated model. First, the main focus of uncertainty theories has been at the level of interpersonal interaction. This means that researchers have developed theory and conducted studies regarding uncertainty between two individuals (e.g., Gudykunst, 1985; Ramirez, Walther, Burgoon, & Sunnafrank, 2002). This approach suggests that individuals have uncertainty regarding contact with new individuals and are motivated to reduce that uncertainty based on various factors. Although this context has varied from workplace (Miller, 1996) to romantic (Parks & Adelman, 1983) and even to computer mediated interactions (Ramirez, Walther, Burgoon, & Sunnafrank, 2002), the main focus has been on interpersonal communication. This research seeks to extend previous studies by testing competing uncertainty theory hypotheses in a mediated context.

Another major issue in the study of uncertainty and information seeking has been the lack of a comprehensive model to explain the relationship between these two concepts. While the URT conceptualization of increased uncertainty necessitating increased information seeking appears elegant, copious research has demonstrated that theory to be inadequate (see Afifi & Weiner, 2004; Berger, 1979; Gudykunst, 1985;

Kellerman & Reynolds, 1990; Kramer, 1999; Sunnafrank, 1986, 1990). Thus, many scholars have attempted to better explain the relationship between uncertainty and information seeking by adding additional variables or modifying existing URT concepts.

Unfortunately, these approaches have largely been focused on one additional variable (e.g., uncertainty tolerance) and lacked a cumulative function by failing to build on earlier versions. Afifi and Weiner (2004) proposed a theory of motivated information management (TMIM) which successfully incorporates main tenets from most of the major uncertainty theories, but is unfortunately constrained to explain only interpersonal interaction and specifically rejects applicability to mediated information seeking contexts. In fact, Afifi and Weiner (2004) suggest that specific revisions are necessary for different contexts (e.g., mediated information seeking). The current research aims to provide and test a similar integrated model of uncertainty and information seeking that is specifically focused on non-interpersonal information seeking contexts.

Uncertainty and information seeking have been investigated in mediated contexts, but this work is far less present in the literature as compared to initial interpersonal interactions (see Atkin, 1972; Chafee & Frank, 1996; Chib, 2004). Information seeking or surveillance has been cited as a primary gratification in mass communication research and is particularly relevant when the information has anticipated decisional utility (McQuail, 2005). This suggests that individuals who anticipate having to make a decision about a specific issue may be motivated to seek information about the issue using mass media sources. Despite this, limited research about uncertainty and information seeking in a mediated environment (Neuberger, 2010b) has demonstrated that the inherent

undesirability of uncertainty alone is not enough to predict information seeking behaviors.

The previous overview of the varied theoretical approaches demonstrates the diversity among approaches to uncertainty and clearly suggests the need for further research to reveal how these theories operate when considered in conjunction with one another in a mediated context. Although these theories undeniably borrow from each other in some cases, there exists no comprehensive test of the concepts together. The current research presents two studies to investigate how these theories operate together.

Contextually, health care reform provides an outstanding situational environment to test the operation and interconnectedness of uncertainty and information seeking. In early 2010, 48% of the American public reported being confused about health care reform, and passage of a bill has not significantly ameliorated this situation. In fact, 14% of Americans are still unsure whether they support or oppose the current legislation (Kaiser, 2011). Uncertainty regarding the future of the American health care system appears to be high. But how does this level of uncertainty relate to information seeking? There are theoretical reasons to suggest relevant information seeking will be high to help reduce uncertainty. This research is unique in that it incorporates several theoretical constructs and important individual difference variables to determine the most influential antecedents of health care reform related to information seeking.

The current research outlines two studies that test competing hypotheses about uncertainty and information seeking. This uncertainty and information seeking is considered in conjunction with issue knowledge and involvement in an attempt to reveal meaningful relationships that can increase the predictive utility and explanatory power of

uncertainty theories in the future. The current research is novel not only in its incorporation of multiple uncertainty models in a non-interpersonal context, but also in its measurement of information seeking. Extant research has used several approaches to measuring information seeking (e.g., self-reports, thought listing, question counting), but none of these is adequate in truly gauging accurate real world information seeking behavior. The second study in the current research focuses on time spent seeking information as a primary variable of interest. Investigating information seeking trends by actually monitoring how individuals seek information, not in the lab, but on their own time is not only a clearer measurement technique, but also more organic to actual information seeking situations. Additionally, the controlled nature of the study allows for cleaner causal attributions regarding uncertainty and information seeking.

The following section investigates the importance of health care reform as a context for uncertainty and information seeking research. Then, uncertainty theories are explicated to provide an overview of the current status of research in the area. Specifically, URT (Berger & Calabrese, 1975), MRU (Kellerman & Reynolds, 1990; Kramer, 1999), and POV (Sunnafrank, 1986) will be reviewed. The potential influence of knowledge and involvement will also be explained and tests of competing hypotheses outlined. Finally, the design and measures for two studies are presented followed by results and an in depth discussion and interpretation of those results.

Health Care Reform

Health care reform has been a major political issue since the Clinton administration and has only elevated in importance since then. Health care has consistently been one of the six most important issues to voters since 1998, which places

health in the company of other major political issues like the economy, defense, terrorism and social security (Blendon & Altman, 2006). In 1992 and 2008, voters ranked health care as one of the top three election issues of relevance to them (Blendon, Altman, Benson, Brodie, Buhr, Deane, & Buscho, 2008). The past twenty years has seen the proposition of many different federal health care reform plans and the implementation of such reform at the state level (e.g., Massachusetts, Vermont), but a complete federal level health care reform package has only become a serious potential reality since the 2008 presidential election.

In 2008, health care reform was among the most important issues voters considered when selecting a presidential candidate (see Blendon, Altman, Deane, Benson, Brodie, & Buhr, 2008; Blendon, et al., 2008b). In fact, President Barack Obama acknowledged health care reform as being one of his primary campaign issues and top priorities upon taking office (Obama, 2008). After great deliberation, the Patient Protection and Affordable Care Act was signed into law in March of 2010. Although approval of the bill still varies greatly with 54% of Americans favoring repeal (Rasmussen, 2011), health care reform is currently being implemented and will be in complete effect by 2018. The law itself is thousands of pages long and some congresspersons did not read the entire legislation themselves prior to voting on the bill (Fabian, 2010). With these highly educated and presumably motivated individuals failing to fully digest the material, how, then, is the general public expected to consume this impending legislation?

A Robert Wood Johnson poll executed by Knowledge Networks (2010) suggests that uncertainty regarding health care reform is high. This study asked a random sample

of 1,251 American adults questions regarding their knowledge about health care reform. Participants indicated whether they thought reform would or would not include dozens of specific things like expanding coverage to children up to 26, giving employers tax credits for coverage, and charging fast food restaurants an unhealthy food fee. After answering each individual question, participants indicated how sure they were about their previous answer; the response options ranged from “not sure at all” to “extremely sure”. Although results varied by specific item, the extremely sure answer option was selected least often overall and the responses generally skewed toward the moderate, slightly and not at all sure answer options. This demonstrates that uncertainty about health care reform is currently high, but provides little insight into potential ways to alleviate that uncertainty.

Another major issue regarding uncertainty in a health care reform context is the prevalence of contradictory information available. Health care reform has been a highly polarizing political issue with both politicians and pundits from both sides of the aisle manipulating information to support their perspectives (see Neuberger, 2010a). For example, the controversy surrounding death panels arose from partisan posturing about potential health care reform. In fact, selective exposure (see Sears & Freedman, 1967) and selective attention (see Graf & Aday, 2008) may affect these processes such that individuals only attend to information that confirms their pre-existing beliefs. In this potentially contradictory information climate, individuals can have difficulty managing their uncertainty. Thus, it is important to fully understand how the presentation of information may affect uncertainty and begin to address this strategically.

Additionally, understanding how priority populations manage uncertainty and seek information is of particular interest. Specifically, health care reform has outcomes

that will directly affect the elderly, people with chronic health conditions, low income individuals, and young adults. For example, the extension of parents' health care coverage to young adults up to age 26 is a major tenet of reform that would be of particular interest to college students. Additionally, this coverage extension is among the first components of reform to be implemented as it went into effect at the beginning of 2011. Thus, uncertainty regarding the implementation of this and other parts of health care reform is likely to be of particular relevance for college aged students as they enter the workforce and begin to make health care decisions in the near future. The following section provides an overview of uncertainty and the various theoretical perspectives used to investigate this concept before it explains how the competing theories will be tested.

Uncertainty

Uncertainty, or the lack of complete information, is pervasive. Berger and Calabrese (1975) define uncertainty as lack of predictability regarding a situation, individual, or behavior. Uncertainty has largely been approached within the interpersonal communication literature and is largely seen as a negative state. Thus, many scholars have posited that individuals are, for the most part, motivated to resolve or reduce their uncertainty in order to exist in a productive, equilibrium state. Despite the elegance and clarity of this conceptualization, research has demonstrated that uncertainty is not necessarily always undesirable and there are some instances (e.g., avoidance, coping) when individuals prefer uncertainty (see uncertainty management theory; Babrow, Kasch, & Ford, 1998; Bradac, 2001; Brashers, 2001).

Although this uncertainty management perspective has proven useful in contexts related to health diagnoses (see Brashers, Goldsmith, & Hsieh, 2002), the current study is

focused on information *seeking*, not *avoidance* behaviors. Uncertainty management perspectives posit a *lack* of information seeking, but the current research is interested in learning more about how individuals *do* seek information. Thus, the current investigation is guided by an uncertainty reduction perspective so as to better understand the motivations behind information seeking. Despite this reliance on uncertainty reduction approaches, a lack of information seeking in the current study may suggest the utility of uncertainty management guided investigations of this area in the future.

Although the current research is guided by an uncertainty reduction perspective, it does not rely solely on uncertainty reduction theory (Berger & Calabrese, 1975) and includes other contextual factors (e.g., incentive value, deviance, uncertainty thresholds) that may also influence how individuals deal with uncertainty. Thus, the following sections review URT and several other uncertainty reduction based theoretical approaches to uncertainty and outline different approaches that help explain the relationship between uncertainty and information seeking.

Uncertainty Reduction Theory

URT (Berger & Calabrese, 1975), conceptualized to explain behaviors occurring during initial interpersonal interactions, is also applicable to situations with incentive value or when future interaction is anticipated (Berger, 1979). Individuals seek to reduce their uncertainty when they are interacting with new people, but also when they believe uncertainty reduction will have positive outcomes or when a specific situation that requires certainty is likely to arise in the future. URT proposes that uncertainty is related to many factors including liking, intimacy, reciprocity, and information seeking. Many of these factors (e.g., reciprocity) are less evident in a mediated context and thus the current

research is focused on information seeking as URT axiom three states that uncertain individuals will engage in information seeking in an attempt to resolve their uncertainty (Berger & Calabrese, 1975).

The current study proposes that information seeking to reduce uncertainty is not a feature constrained to interpersonal interactions, but also generalizes well to mass communication contexts (see Atkin, 1972; Chafee & Frank, 1996; Chib, 2004, McQuail, 2005). Much like the information seeking that takes place in initial interpersonal interactions, many situations, including health care reform implementation, may require individuals to become acquainted with information in order to make sufficient decisions. Before proceeding to uncover the relationship between uncertainty and other variables, it is important to understand the baseline uncertainty levels about healthcare reform. Thus, the following research question is posed:

RQ1: What levels of uncertainty do participants report about health care reform?

Despite the heuristic value of uncertainty reduction theory, empirical support has varied widely (see Gudykunst & Nishida, 1984; Kellerman & Reynolds, 1990; Sunnafrank, 1990). While few researchers argue with the logical premises guiding URT, application of the theory is not always met with completely supportive data (see Kellerman & Reynolds, 1990). This variation in findings has encouraged some individuals to develop alternate models in order to explain the resulting data. Berger himself suggested some revisions to the original conceptualization of URT only a few short years after publishing the foundational work (see Berger, 1979), which suggested there were multiple alternate or at least supplementary ways to explain uncertainty reduction motivations.

Perhaps the most central contribution of this work was the acknowledgement that individuals may have different levels of concern regarding their uncertainty level. For example, being uncertain about whether health care reform mandates the coverage of individuals with chronic conditions may be not be of concern for a healthy young person. Contrarily, being certain about the intricacies of extending parents' health coverage to individuals up to 26 years old may be of great concern to that same person. This variance has been referred to as concern for uncertainty (Berger, 1979) or uncertainty tolerance (Kellerman & Reynolds, 1990).

Motivation to Reduce Uncertainty

Individual variance in uncertainty tolerance was first proposed by Berger (1979) but also empirically tested by Kellerman and Reynolds (1990) and Kramer (1999) in the context of their investigations of motivation to reduce uncertainty. Kramer (1999) draws on both Petty and Cacioppo's elaboration likelihood model (1981) and URT (Berger & Calabrese, 1975) in his formulation of motivation to reduce uncertainty. This perspective posits that individuals vary in their desire to reduce uncertainty in different situations. In this approach, motivation to reduce uncertainty is largely contextually based and not an individual difference factor. Thus, an unimportant context may be met with very little motivation to reduce uncertainty while a very important context may mandate great motivation to reduce uncertainty. Consider, for example, a very wealthy individual; his or her motivation to reduce uncertainty about health care reform may be very low given that money is no object and they will likely be able to afford the highest levels of care regardless of reform outcomes. However, that individual may generally have a high need

to reduce uncertainty in his or her life that does not extend into the specific context of health care reform.

Kellerman and Reynolds (1990) conceive of motivation to reduce uncertainty as more of an individual difference variable. That is, uncertainty tolerance is proposed as a mechanism to explain an individual's need to make accurate predictions (Kellerman & Reynolds, 1990). This level of uncertainty tolerance is generally stable across contexts such that individuals who require high levels of certainty are likely to feel that way in many different situations. Extensive testing of various measurement models has suggested that this conceptualization of uncertainty tolerance is unidimensional when considered alongside other measurement models of need for certainty and importance of uncertainty (Kellerman & Reynolds, 1990).

Intolerance of uncertainty has also been studied in the context of motivation to reduce uncertainty (Rosen, Knauper, & Sammut, 2007). The psychological effects of a given context on the individual is the focus of intolerance of uncertainty, and Rosen and colleagues (2007) suggest the level of this variable will activate information seeking behaviors. Similarly, Krohne's (1993) conceptualization of vigilance suggests that some individuals deal with uncertainty by constantly seeking information, while other less vigilant individuals rarely seek information. Finally, individuals may even have different uncertainty orientations such that individual variation in information seeking is guided by a general desire to approach or avoid uncertainty (see Brouwers & Sorrentino, 1993; Sorrentio & Short, 1986).

Based on the great variance in the conceptualization of factors influencing motivation to reduce uncertainty and the operationalization of the concept itself (e.g.,

aggregate or domain specific) further research is required to parse out the different sources of influence. The current study uses multiple measures to assess uncertainty tolerance in order to properly establish the levels and influence of motivation to reduce uncertainty.

RQ2: What levels of uncertainty tolerance do individuals report about health care reform?

Predicted Outcome Value

Predicted outcome value theory (POV; Sunnafrank, 1986, 1989) was born out of an idea that it is not uncertainty alone that motivates initial interaction behaviors. Sunnafrank proposed that the primary goal of individuals was not to reduce uncertainty, but rather to maximize their own relational outcomes. That is, individuals seek to minimize costs while maximizing rewards (Sunnafrank, 1990).

Sunnafrank's focus on the maximization of relational outcomes instead of uncertainty connects predicted outcome value to the concept of self-interest. That is, it is not an internal desire to remain in a state of cognitive homeostasis that motivates behaviors, but rather conceptions regarding the utility of a specific interaction that motivates individuals. This is a very different perspective than the traditional conceptualization of URT; POV suggests that individuals do not seek to know for the sake of knowing, but rather they seek to know for the purpose of usefulness. This idea, although seemingly in contrast with the URT was also supported by Berger in future discussions of uncertainty theory (1979, 1986, 1987).

Berger (1979) suggested that three factors may influence uncertainty: anticipation of future interaction, deviance, and incentive value. Anticipation of future interaction

refers to an individual's chances of encountering an individual or issue in the future. This anticipation does not influence uncertainty itself, but it is posited to have an effect on the uncertainty reduction process in some way. For example, an individual may encounter information about health coverage for individuals with pre-existing conditions and be uncertain about that situation but also be healthy and unlikely to have any future encounters with that situation. Thus, uncertainty about coverage for individuals with pre-existing conditions would not concern that person very much.

Deviance refers to some odd or unexpected interaction that may influence an individual's tolerance for uncertainty. Berger (1979) posits that individuals are not particularly interested in or concerned about reducing uncertainty about deviant individuals or situations. In these unpredictable and odd situations, individuals are less concerned about uncertainty reduction because of the inherent instability of the context. Some individuals may view health care reform as deviant as they believe implementation will be unpredictable or erratic. For example, an individual may think that the current health care reform law will be repealed or augmented in some currently unknown fashion thus making information seeking less valuable. Accordingly, that individual may fail to seek information about health care reform based on their high levels of perceived health care reform deviance.

Incentive value is a judgment about the potential gains resulting from information seeking behaviors. Berger (1979) suggests that information can satisfy specific needs but does not explicitly specify the outcome valence associated with these processes. Specific incentives associated with health care reform information seeking include knowledge about reform that could lead to better access to care and higher quality care. Additionally,

other factors such as being able to provide information to others or being more aware of care options for family members may also have high incentive value and thus motivate information seeking. These three factors (i.e., anticipated future interaction, deviance, incentive value) do not directly increase or decrease level of uncertainty and thus are not well accounted for in the original conceptualization of the URT. Although Berger does suggest that individuals make predictions about future encounters (i.e., anticipated future interaction, incentive value), his research contests the utility of outcome values in uncertainty models. However, Berger's conceptualization avoids the complex calculus of outcome calculation in favor of a predicted utility perspective.

Sunnafrank's (1986; 1988; 1990) conceptualization of POV, the relationship between uncertainty and information seeking is greatly influenced by the anticipated utility of information. In the case of health care reform it is possible that an individual could believe the available information would not be helpful in reducing their uncertainty and thus would not seek information, a legitimate concern given the bulkiness and complexity of the reform package. The media, however, play an important role in helping citizens understand the legislation, and an individual who believes the available information to be useful would be more likely seek out that information.

RQ3: What levels of predicted outcome value do individuals report about health care reform?

Receive Accept Sample Model and Knowledge

In his clarification of URT, Berger (1979) writes about awareness being an antecedent of information seeking. Awareness was not well defined and has been debated (see Kellerman & Reynolds, 1990), but is certainly worthy of further investigation. Some

scholars (e.g., Zaller, 1992) have considered awareness to be akin to knowledge. Knowledge, and specifically political knowledge, is fundamental to Zaller's (1992) RAS model which posits that citizens *receive*, *accept*, and *sample* political information in different ways. Political awareness is the primary differentiating factor when considering the aforementioned RAS model components. Zaller (1992) defines political awareness as knowledge about neutral, factual political information (a definition many find to be similar to political knowledge; see Delli Carpini & Keeter, 1993), and suggests that individuals with different levels of political awareness experience politics very differently. Specifically, the "receive" section of the RAS posits that high political awareness individuals are more likely to receive political information than are low awareness individuals. Despite this higher rate of encountering political information, the "accept" section of the RAS suggests that these high awareness individuals are less likely to accept information at face value than low awareness individuals. Finally, the "sample" section of the RAS model suggests that all individuals hold relatively unstable political opinions and simply sample the most salient considerations to answer opinion questions.

The current research is interested in the reception section of Zaller's RAS model (1992). Specifically, how knowledge may influence information seeking about a political topic. Zaller's RAS (1992) posits that individuals with high levels of political awareness are exposed to more political information than those who know little about the political process. For example, a highly politically aware individual may hear about health care reform on the nightly news, read about it in the newspaper, and engage in interpersonal discussions about health care reform with friends more often than an individual who is not as aware. Zaller's data support this proposition of differential exposure to political

information (1992), but it is unclear how this will operate in an information *seeking* context.

Zaller (1992) suggests high political awareness individuals are exposed to or receive more political information, but he does not specify whether this means that these individuals actively seek that information. For example, a high awareness individual may simply be present in more situations where political talk arises and information is presented. This context of passive reception is very different than active seeking of information. Previous research examining the relationship between knowledge and active information seeking did not provide data sufficient to demonstrate a relationship between the two concepts (Neuberger, 2010b). The current study will further probe this relationship in a different, and more generalized political issue context (i.e., health care reform).

In the context of health care reform, both knowledge and uncertainty have been measured (Robert Wood Johnson Foundation, 2010), but the relationship between the two concepts has not been systematically explored, nor has it been approached in a theoretically guided fashion. Specifically, the Robert Wood Johnson Foundation (2010) measured knowledge about health care reform using multiple items and then asked individuals about their confidence in their answers to those knowledge items. For example, participants were asked whether health care reform allowed adults under age 26 to maintain their parents health insurance and then asked how certain they were of their answer to that item. Thus, this measurement of uncertainty is not a theoretically guided and macro level conceptualization of the term, but rather a specific judgment about individual certainty about one aspect of health care reform. Thus, improved measurement

of knowledge and uncertainty not related to specific pieces of the policy, but regarding health care reform in general is necessary before theoretical relationships can be properly investigated.

RQ4: What levels of knowledge do individuals report about health care reform?

Involvement

Issue involvement is another construct that may influence information seeking. Ciaildini and Petty (1981) report that personal issue involvement relates not only to cognition regarding a specific issue but also to persuasion related to that issue. Involvement, and more specifically issue involvement has been defined as the extent to which a specific attitudinal issue is of personal importance (Petty & Cacioppo, 1979) or as an individual's perceived personal relevance of the issue under consideration (Zaichkowsky, 1985). Issue involvement is of primary concern in the current research because involvement regarding health care reform can vary dramatically, and it is important to better understand how this involvement is related to uncertainty and information seeking.

Individuals who are highly involved with a specific issue find that issue to have personal meaning, intrinsic importance, and the potential to have significant consequences in their lives (see Apsler & Sears, 1968; Sherif & Hovland, 1961). If a specific issue has a high level of personal significance then individuals are highly motivated to process relevant information (Erwin, 2001). This relationship between higher issue involvement and increased information processing is a robust finding, but it does not necessarily extend to persuasion as high involvement individuals can be more or

less persuadable based on several contextual factors including message strength (Petty & Cacioppo, 1979).

Although the current study is focused on information seeking and not depth of message processing, findings regarding processing inform this investigation. It is reasonable to assume that an individual who is more involved in a specific issue may behave differently than an individual who is not personally engaged with an issue at a high level. Thus, the relationship between involvement and other theoretical variables will be probed in the current study. First, levels of issue involvement regarding health care reform must be assessed and thus the following research question is posed:

RQ5: What level of involvement do individuals report about health care reform?

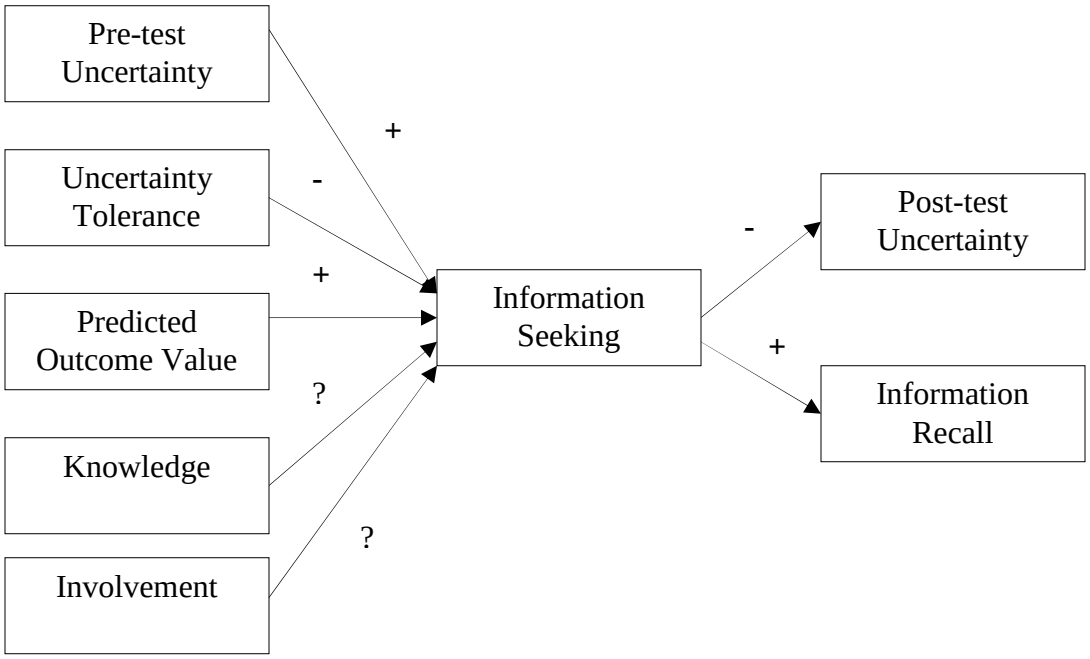
Presentation of a Model

The theories presented above represent several different perspectives regarding the relationship between uncertainty and information seeking. There is considerable empirical backing for all the approaches outlined, and thus the true utility of the current research is in testing these theory based constructs against each other. The cumulative nature of science suggests researchers should learn from past research in the creation of new scholarship, and while this has certainly been the case with MRU and POV as they both considered URT in their conceptualization, the theoretical concepts from all three approaches are not generally considered in conjunction. This section outlines an integrative model (see Figure 1) that explicitly tests the influences of constructs from all three theories as well as incorporating potentially influential individual difference variables. Additionally, a 2x2x2 study design focused on high and low levels of

uncertainty, uncertainty tolerance, and predicted outcome value is proposed to illuminate intricate differences between the main theoretical constructs of the current studies.

Figure 1

Model of study hypotheses



Predictors of information seeking

Uncertainty, uncertainty tolerance, predicted outcome value, knowledge, and involvement are presented as potential predictors of information seeking in the current research.

Uncertainty. Research findings outlined above informed the proposed model which suggests that uncertainty is related to information seeking, uncertainty tolerance, knowledge, and involvement. The positive relationship between uncertainty and information seeking was first proposed by URT (Berger & Calabrese, 1975), but has been tested and met with varied support since then (see Douglas, 1985; Gudykunst, 1985; Gudykunst & Nishida, 1984; Kellerman & Reynolds, 1990; Neuberger, 2010b). Despite

this variance in findings related to uncertainty and information seeking, the "most widely believed principle" (Kellerman & Reynolds, 1990, p. 6) of URT posits that higher levels of uncertainty are met with higher levels of information seeking. Thus, the first hypothesis is proposed:

H1: Greater uncertainty will be associated with more information seeking.

Motivation to reduce uncertainty. Some individuals can be satisfied and arrive at acceptable conclusions while operating under great uncertainty while others require a great deal of certainty to feel at ease. The relationship between tolerance for uncertainty and information seeking has been investigated very infrequently (Kellerman & Reynolds, 1990), but represents an important dimension of uncertainty theorizing. Individuals who require certainty are likely to require information to attain that high level of certainty. On the other hand, individuals who can tolerate uncertainty may be less likely to seek information because they are satisfied with their level of certainty. Thus, there should be a negative relationship between uncertainty tolerance and information seeking:

H2: Higher uncertainty tolerance will be associated with less information seeking.

The relationship between uncertainty and the tolerance of uncertainty has been examined infrequently, yet is of great importance in order to establish the distinctness of either concept. Kellerman and Reynolds (1990) and Kramer (1999) suggest that uncertainty is distinct from concern for or tolerance of uncertainty. Thus, an individual could have great uncertainty, but be relatively unconcerned about it for any number of reasons including topic irrelevance. This lack of a clear directional connection between uncertainty and uncertainty tolerance suggests the following research question:

RQ6: How are uncertainty and uncertainty tolerance related?

Predicted outcome value. The operation of predicted outcome value (POV) is somewhat contested and is thus approached in two separate research questions. Although predicted outcome value is posited to influence information seeking, its association with uncertainty and uncertainty tolerance is less clear. Berger and Sunnafrank have varying perspectives that suggest the proposition of research questions. Berger (1979) suggests that anticipation of future interaction and incentive value should influence uncertainty tolerance and not information seeking or uncertainty itself, while Sunnafrank (1990) suggests that predicted outcome value influences uncertainty.

RQ7: How will predicted outcome value be associated with:

a) uncertainty?

b) uncertainty tolerance?

Predicted outcome value is directly related to the maximization of outcomes; in the context of health care reform information, higher predicted outcome value suggests that an individual believes that information about health care reform will be valuable. Thus, higher levels of predicted outcome value are necessarily tied to more information seeking and the following hypothesis is proposed:

H3: Higher predicted outcome value will be associated with more information seeking.

Individual difference influences. In addition to the main uncertainty theory guided variables explained above, knowledge and involvement are two individual difference variables that may influence information seeking. Although the proposed model (see Figure 1) incorporates various uncertainty based theories, it is also important

to control for other variables that may be influencing the relationship between uncertainty and information seeking. Earlier sections of the current paper mentioned connections to uncertainty theorizing based on Zaller's RAS Model as well as dual process models (see Petty & Cacioppo, 1984; Zaller, 1992). Thus, the current proposal posits that knowledge and involvement are important to control for in studies about uncertainty and information seeking.

Knowledge. Knowledge may influence uncertainty, uncertainty tolerance, predicted outcome value, involvement, and information seeking in systematic ways. Wilson and colleagues (2002) suggest that individuals with greater domain specific knowledge are less likely to be uncertain. Additionally, uncertainty has been defined as a lack of sure knowledge. An individual with full and complete knowledge of a given situation would be certain by definition. Individuals who prefer a higher degree of certainty in their lives are likely to attempt to avoid uncertainty.

If uncertainty is defined as a lack of sure knowledge, then certainty could be equated with the presence of knowledge. In this case, individuals who have a low tolerance for uncertainty would have a greater desire for, and feel more comfortable with higher levels of knowledge. The maximization of outcomes does not have a clear relationship to knowledge such that high or low levels of knowledge could both lead to the greater outcome values depending on the situation.

Zaller's (1992) RAS model posits that individuals with high levels of knowledge are exposed to more information. Despite this assertion and the empirical support for it, the RAS does not extricate information reception from information seeking. Information reception can be a passive process whereas information seeking is an active process that

requires effort on the part of the individual. Additionally, previous research has failed to find a strong connection between increased knowledge and information seeking (Neuberger, 2010b).

Finally, individuals who care deeply about and are engaged with a specific issue may find it cognitively uncomfortable to have low levels of knowledge about that issue (Festinger, 1957). Thus, based on the varied potential influences of knowledge on proposed model variables, knowledge is proposed as a covariate in the model and the following research question is posed:

RQ8: How will knowledge be related to:

a) information seeking behavior, b) uncertainty, c) uncertainty tolerance, d) predicted outcome value, and e) involvement?

Involvement. Involvement may also be associated with uncertainty, uncertainty tolerance, predicted outcome value, and information seeking in systematic ways. Higher levels of involvement with an issue suggest an individual is interested in and engaged with a given topic, but a direct connection to uncertainty is not necessarily evident. For example, an individual's high involvement in a specific issue may in fact make them feel more uncertain about it. Consider an individual who is very involved in health care reform; that person may experience an increase in uncertainty as his or her involvement increases as more resources and intricacies such as tax incentive structures, insurance governance, and coverage requirements are uncovered. Contrarily, a low involvement individual may not comprehend the breadth of health care reform, understand it only as mandating universal coverage, and thus experience less uncertainty regarding the situation.

It is unclear if individuals who are highly involved with a particular issue are more or less likely to tolerate a lack of certainty regarding that specific issue. Although involved individuals may be more tolerant of uncertainty in information blunting situations (see Miller, 1987) or when they are managing their uncertainty for coping reasons (see Brashers, 2001), potential extension to a health care reform context is unclear. Therefore, the relationship between involvement and uncertainty tolerance requires further investigation.

The relationship between involvement and predicted outcome value has not been previously investigated and cannot be determined through logical means. For example, an individual may find information about a specific issue to be associated with positive outcomes and be very involved with that issue. Contrarily, an individual could be highly involved with a specific issue and find the predicted outcome value of additional information to be quite low. Hines (2001) suggests that individuals are more apt to manage uncertainty about topics they consider most important. One way individuals manage uncertainty is through information seeking, and thus individuals with higher levels of involvement would be more likely to seek information. Therefore, based on the varied potential influences of involvement on proposed model variables, involvement is proposed as a covariate in the model and the following research question is posed:

RQ9: How will involvement be related to:

a) information seeking behavior, b) uncertainty, c) uncertainty tolerance, and d) predicted outcome value?

Effects of information seeking

Post-test uncertainty. In addition to all the variables antecedent to anticipated information seeking, study two will also include measurement of actual information seeking and post-test uncertainty. The relationship between information seeking as tracked using an online tool and post-test uncertainty has been tested before (see Neuberger, 2010b) and demonstrated a modest negative relationship between information seeking and uncertainty. This relationship between information seeking and post-test uncertainty is fundamental to the URT and requires further testing to confirm the utility of URT in a non-interpersonal context. Thus, based on previous research, the following hypothesis is advanced:

H4: Higher levels of information seeking will be associated with lower post-test uncertainty.

Information recall. Though measuring the time spent seeking information is a novel way to measure information seeking, it is important to validate the use of this variable. Information seeking alone may not be indicative of actual retention of that information. One participant may spend two minutes on each page of the website and completely retain that information, while another participant may spend the same amount of time seeking information, but be unable to recall any information. The experience of this second individual would be less desirable than the first high information retention participant. It is important to examine the data to ensure that those participants who seek more information actually retain more of that information.

H5: More information seeking will be associated with higher information recall.

Extrication of Theoretical Effects

In addition to testing these hypotheses within an integrated model, it is of particular importance to extricate the effects of the different sources of influence. Although the testing of the proposed path model is more complete than many previously tested models as it includes constructs from multiple uncertainty theories, it is not also without fault. Specifically, testing the path model will take into account how uncertainty, uncertainty tolerance, and predicted outcome value influence both each other and information seeking, but the intricate details about these relationships may still remain undiscovered without additional testing. Thus, a 2x2x2 model (See Figure 2; high/low uncertainty, high/low uncertainty tolerance, and high/low predicted outcome value) is advanced to further explore the relationships between these variables.

Figure 2

2x2x2 of the effects of uncertainty, uncertainty tolerance, and predicted outcome value on information seeking

LOW UNCERTAINTY			**HIGH UNCERTAINTY**		
	Lo UTol	**Hi UTol**		**Lo UTol**	**Hi UTol**
Lo POV	Lo uncert (1) Lo UTol Lo POV	Lo uncert (2) Hi UTol Lo POV	**Lo POV**	Hi uncert (3) Lo UTol Lo POV	Hi uncert (4) Hi UTol Lo POV
Hi POV	Lo uncert (5) Lo UTol Hi POV	Lo uncert (6) Hi UTol Hi POV	**Hi POV**	Hi uncert (7) Lo UTol Hi POV	Hi uncert (8) Hi UTol Hi POV

Each individual cell has the potential to illuminate the role of uncertainty theories in influencing information seeking. First, if participants with low uncertainty, high

uncertainty tolerance, and low predicted outcome value are spending considerable time seeking information – then none of the theories accurately predicts information seeking patterns. This potential result seems unlikely, but could be attributed to the failure of URT, MRU, and POV to generalize to a non-interpersonal context. Alternatively, results suggesting considerable information seeking among participants with high uncertainty, low uncertainty tolerance, and high predicted outcome value would seem to affirm portions of all three theories. See Figure 3 for a complete explication of potential results.

Figure 3

Explanation of theory support based on 2x2x2 cell results

LOW UNCERTAINTY			**HIGH UNCERTAINTY**		
	Lo UTol	**Hi UTol**		**Lo UTol**	**Hi UTol**
Lo POV	UTol	Theories fail to explain info seeking	**Lo POV**	URT	URT & UTol
Hi POV	POV	UTol & POV	**Hi POV**	All theories operate jointly	URT & POV

Aside from those two basic situations that would either confirm or reject all three theories in a comprehensive fashion, increased information seeking in three other cells would affirm the superiority or relative weight of one specific theory over the others. Specifically, high information seeking in the high uncertainty, high uncertainty tolerance, low predicted outcome value cell would suggest URT as the theory with the most explanatory power. Alternatively, high information seeking in the low uncertainty, low uncertainty tolerance, low predicted outcome value cell would demonstrate the strength

of MRU. High information seeking in the low uncertainty, high uncertainty tolerance, high predicted outcome value would suggest that POV is the best theory to explain health care reform information seeking behaviors. Finally, if the highest levels of information seeking in the remaining cells would suggest that a hybrid theory would be likely most effective in influencing information seeking.

RQ10: Which of the theoretical constructs (i.e., uncertainty, uncertainty tolerance, predicted outcome value) will have the strongest effect on information seeking?

Overview of Hypotheses and Research Questions

The overall goal of the current research was to integrate various theoretical perspectives to advance and test a comprehensive model of uncertainty and information seeking in the context of health care reform. This model was investigated using the research questions and hypotheses outlined above. Specifically, the first study assessed uncertainty, uncertainty tolerance, predicted outcome value, knowledge, and involvement as well as provide a measurement test for these variables. Research questions one through five address these variables specifically and aim to assess baseline levels before proceeding into model testing. Preferred sources and formats of information were also measured in study one.

After assessing levels and assuring accurate measurement of the variables of interest, a second study investigated the relationships between these variables. The proposed model (see Figure 1) suggests positive relationships between pre-test uncertainty and information seeking, predicted outcome value and information seeking, information seeking and post-test uncertainty, and information seeking and recall. A

negative relationship between uncertainty tolerance and information seeking is also proposed. Additionally, research questions examine the influence of knowledge and involvement as well as the relationships between all exogenous variables.

The second study also includes a test of a 2x2x2 with high and low levels of uncertainty, uncertainty tolerance, and predicted outcome value being investigated in relation to information seeking. This format allows the effects of each theory on information seeking to be investigated separately, together with one additional theoretical variable, and with all theories together. Investigation of specific cell values suggests the predictive utility of specific theoretical variables over others (see Figure 3).

Study one

Method

Study one consisted of an online survey that assessed theoretical variables of interest, allowed for testing of measures, and served as formative research regarding study two stimulus materials.

Participants. The communication participant pool was used to recruit participants. Participation was voluntary and undergraduate students were provided with course credit for participating. Participants (N=269) were 20.14 years old on average (*SD*=1.76) and 59.1% of the sample was female. All years were represented with 23.8% freshmen, 20.1% sophomores, 27.5% juniors, 27.5% seniors, and 1.1% fifth year or beyond. The majority of the sample (74.0%) self-identified as white with 14.1% self-identifying as African-American, 6.7% Asian, 1.9% mixed, 1.1% Latino/Hispanic, 1.1% other, 0.7% Middle Eastern, and 0.4% Native American. Regarding political affiliation, 16.7% of the sample reported being weak Democrats, 15.2% weak Republicans, 13.4%

strong Democrats, and 12.3% as strong Republicans. Only 10.8% of the sample reported being Independent and 17.4% as being independent Democrats or Republicans. The remaining 36 participants reported being apolitical (5.9%) or other (7.4%). Additionally, participants were relatively politically active with 58.3% of the eligible sample having voted in the 2008 presidential election.

Procedure. After receiving approval from the institutional review board, an online survey was posted on the department participant pool website. An electronic consent form was utilized and participants were free to end their participation by closing their web browser at any point. Participants were also informed that all data were confidential and would become anonymous after they were awarded course credit. Data collection took place over a two week time period in December 2010.

Measures. All measures were self- reported and unless otherwise specified, reported on a seven point likert type scale. The survey instrument included measures of uncertainty, uncertainty tolerance, predicted outcome value, knowledge, involvement, projected information seeking, preferred information formats, and a number of demographic variables. Means and standard deviations for all measures are presented in table 1. Additionally, the reliability of all scales was assessed using Cronbach's alpha (see table 1) and confirmatory factor analyses (CFA) were conducted in AMOS to aid in measure refinement for study two. The complete study one survey can be found in Appendix A.

Table 1

Means and standard deviations for uncertainty, uncertainty tolerance, predicted outcome value, and projected information seeking variables for study one and study two

	Study One			Study two		
	M	*SD*	*α*	*M*	*SD*	*α*
General HCR uncertainty	4.29	.99	.80	4.36	1.29	.92
Personal effect HCR uncertainty	4.30	1.27	.90	4.33	1.38	.94
Financial effects HCR uncertainty	4.45	1.27	.92	4.41	1.39	.94
Quality effects HCR uncertainty	4.32	1.20	.89	4.37	1.31	.88
Availability effects HCR uncertainty	4.31	1.30	.92	4.17	1.40	.91
Post-graduation HCR uncertainty	4.44	1.26	.91	4.43	1.30	.88
General uncertainty tolerance	3.35	1.00	.76	3.27	1.11	.70
Need for political information	3.60	1.47	.94	3.56	1.55	.94
HCR uncertainty tolerance	3.87	1.05	.71	4.00	1.14	.72
General HCR predicted outcome value	3.85	.77	.57	4.12	.84	.65
HCR information predicted outcome value	5.04	1.15	.87	5.15	1.25	.89
Future interaction with HCR	5.03	1.09	.94	5.10	1.10	.90
HCR deviance	4.07	.59	.61	3.86	.88	.68
Knowledge	2.24	1.87	n/a	5.34	1.14	n/a
Involvement	4.46	1.16	n/a	4.39	1.23	n/a
Information seeking (seconds)	--	--	--	120.23	215.98	n/a
Post-test general uncertainty	--	--	--	3.88	1.27	.94
Post-test information recall	--	--	--	1.65	1.12	n/a

Uncertainty. Uncertainty is best defined as the lack of complete information or knowledge. Multiple measures were used to assess uncertainty in study one to assure that all relevant dimensions of the constructs were considered for comprehensive measurement. First, *general uncertainty about health care reform* was measured with five items (e.g., "I generally understand health care reform."). Four items were retained and assessed with CFA; model fit was adequate $\chi^2(2)=6.2$, p=.05, CFI=.98, RMSEA=.09, α=.80. *Uncertainty about how health care reform will affect the individual* participant was also measured with twenty items that measured specific dimensions such as *personal effects*, *financial effects*, and *effects on quality* and *availability of care*.

Uncertainty regarding personal effects was measured with four items (e.g., "I know how health care reform will affect me.") and model fit was adequate $\chi^2(2)=2.70$, p=.26, CFI=.99, RMSEA=.04, α=.90. *Uncertainty about the financial effects of health care reform* was assessed with four items (e.g., I understand how health care reform will influence me financially") and model fit was adequate $\chi^2(2)=4.48$, p=.11, CFI=.99, RMSEA=.07, α=.92. *Uncertainty about effects on quality of health care* was measured with four items (e.g., "I am certain about the influence of health care reform on the quality of my health care") and model fit was adequate $\chi^2(2)=5.16$, p=.08, CFI=.99, RMSEA=.08, α=.89. *Uncertainty about the availability of care* was also assessed with four items (e.g., "I am confident that I comprehend how health care reform will affect the availability of health care") and model fit was adequate $\chi^2(2)=2.51$, p=.29, CFI=.99, RMSEA=.03, α=.92. Finally, uncertainty related to *how health care reform will influence students upon graduation* was measured with four items (e.g., "I know how health care

reform will affect me after graduation") and model fit was adequate $\chi^2(2)1.14$, p=.57, CFI=1.0 RMSEA=0, α=.91.

Uncertainty items were all specifically developed for the current study, but were adapted from measures utilized by Kellerman and Reynolds (1990). Although each measure of uncertainty had five indicators in the survey, investigation of reliability (Cronbach's alpha) and model fit in AMOS suggested that each scale be reduced to four items for more adequate measurement. Correlations between the different uncertainty scales were also investigated to see if a macro level measurement of health care uncertainty would be adequate or if more specific domain area measures would be required. These correlations can be found in table 2 and demonstrate that all uncertainty scales are highly correlated and the omnibus uncertainty scale is a sufficient representation of the specific dimensions of health care reform uncertainty.

Table 2

Correlations of uncertainty scales

	General	Effects	Financial	Quality	Availability	Post-grad
General	--	.76*	.65*	.67*	.67*	.68*
Effects	.73*	--	.74*	.74*	.63*	.72*
Financial	.68*	.77	--	.96*	.67*	.76*
Quality	.69*	.73*	.68*	--	.69*	.77*
Availability	.70*	.76*	.75*	.81*	--	.77*
Post-grad	.65*	.75	.75*	.80*	.83*	--

Note: Correlations for study one are in the bottom half of the table; study two correlations are in the top half
**Correlation is significant at the p<.01 level*

Uncertainty tolerance. Uncertainty tolerance refers to the amount of uncertainty an individual is comfortable with and was measured on three different levels. First, *general uncertainty tolerance* was assessed with six items (e.g., "It frustrates me to not have the information I need") based on the intolerance for uncertainty scale (Buhr & Dugas, 2002). These general uncertainty tolerance items demonstrate an individual participant's overall tolerance for uncertainty (see Kellerman & Reynolds, 1990). This scale was reduced to four items to increase model fit and that four item model demonstrated adequate model fit $\chi^2(2)1.92$, p=.38, CFI=1.0 RMSEA=0, α=.76. Next, *political uncertainty tolerance* was measured with four items (e.g., "I find satisfaction in gathering political information.") This measure was based on findings from a previous study (see Neuberger, 2010b) that suggests need for political information is an important variable in political related information seeking models; model fit was acceptable $\chi^2(2)11.10$, p=.13, CFI=1.0 RMSEA=0, α=.94. Finally, *health care reform specific uncertainty tolerance* was measured with four items (e.g., "I generally try to avoid situations where I am uncertain about health care reform") and model fit was acceptable $\chi^2(2)7.34$, p=.03, CFI=0.99 RMSEA=.10, α=.71.

Health care reform related uncertainty tolerance was measured to ensure accurate context-specific uncertainty tolerance (see Kramer, 1999). In fact, correlations presented in table 3 demonstrate that general uncertainty tolerance, need for political information, and health care specific uncertainty tolerance do not all correlate highly. Kramer's (1999) suggestion to rely on context specific measurement was heeded in study two model testing.

Table 3

Correlations of uncertainty tolerance scales

	General	NFPI	Health Care
General	--	-.22*	.57*
NFPI	-.06	--	-.12
Health Care	.46*	.24*	--

Note: Correlations for study one are in the bottom half of the table; study two correlations are in the top half
** Correlation is significant at the p<.01 level*

Predicted outcome value. Predicted outcome value refers to an individual's positive or negative assessment of the likely result of a given situation. The traditional measurement of predicted outcome value has been focused on interpersonal interactions and thus, new measure development was necessary for the current research. Although predicted outcome value pertains most centrally to the *anticipated utility* of information (Sunnafrank, 1986; 1990), the current research also measured dimensions of *future interaction* and *deviance* as recommended by Berger (1979). Thus, the current research used four items to assess *general health care POV* (e.g., "Health care reform will help me have affordable health care in the future.") CFA revealed poor model fit, $\chi^2(2)107.80$, $p<.001$, CFI=.48 RMSEA=.44, $\alpha=.57$. The *predicted outcome value of health care information* was also assessed with four items (e.g., "Information about health care would be valuable to me") and model fit was acceptable $\chi^2(2)11.29$, p=.01, CFI=.98 RMSEA=.13, $\alpha=.87$. *Future interaction* was measured with four items (e.g., "My life will be influenced directly by health care") and model fit was adequate $\chi^2(2)0.49$, p=.78,

CFI=1 RMSEA=0, α=.94. Four items were also used to measure *deviance* (e.g., "Health care reform laws are likely to change") and model fit was acceptable $\chi^2(2)8.5$, p=.02, CFI=.96 RMSEA=.11, α=.61. Finally, *anticipated utility of health care information* was assessed with four items (e.g., "Information about health care reform will be useful for me in the future") and model fit was poor $\chi^2(2)38.9$, p<.001, CFI=.96 RMSEA=.26, α=.92.

Correlations between these five measures of predicted outcome value can be found in table 4. These correlations varied widely with deviance being one scale that did not fit with the others as well. This makes sense as deviant situations have less predicted outcome value because they are, by definition, unpredictable. After investigating the correlations and considering the items, the measure of predicted outcome value of health care information was selected as the most appropriate scale for the current research because it specifically tapped the utility of the information, correlated highly with future interaction and anticipated utility, and demonstrated adequate fit in CFA.

Table 4

Correlations of predicted outcome value scales

	Health Care	Health Care Info	Future Interaction	Deviance	Incentive Value
Health Care	--	.23*	.08	-.29*	.23*
Health Care Info	.23*	--	.59*	-.01	.84*
Future Interaction	.19*	.60*	--	.01	.58*
Deviance	-.16*	.10	.09	--	-.07
Incentive Value	.22*	.72*	.67*	.08	--

Note: Correlations for study one are in the bottom half of the table; study two correlations are in the top half
** Correlation is significant at the p<.01 level*

Knowledge. Health care reform knowledge was measured using seven items based on those developed and tested by the Robert Wood Johnson Foundation (2010). These seven items covered diverse domains of health care reform (e.g., "Health care reform will give federal tax credits to small companies if they buy health insurance for their employees.") and indicate how much an individual participant knows about health care reform. Responses were coded as correct (1) or incorrect (0) and summed to make a knowledge scale ranging from zero to seven. Participants were also asked how sure they were about each of their responses, and how concerned they were about their level of knowledge for each question.

Involvement. Involvement was measured using seven items developed and tested by Zaichkowsky (1994) as well as six additional items added for this research. The thirteen items were be measured using a semantic differential scale that has anchoring options to the statement: "To me, health care reform is" such as choices ranging from unimportant to important. An average of these items was used for all analyses.

Health care information preferences. In addition to assessing theory guided constructs, study one was also focused on what channels, sources, and presentation styles were preferred by participants regarding health care reform information. Three items asked participants to assign a 1-7 score to their preference level for different channels (e.g., TV news), sources (e.g., politicians), and presentation styles (e.g., fact sheets).

Demographic variables. Participants were asked to select an answer that best described their gender, age, ethnicity, education level, and political identification.

Results

Data Preparation. Before any analyses could be conducted, the data were cleaned and prepared for analysis. First, participants (N=269) were assigned participant numbers and all personal identifiers were deleted from the dataset. There were no individual cases of considerable missing data and given that there was less than five percent missing data overall, missing values for likert type items were replaced with series means. All other cases of incidental missing data were excluded from analyses pairwise. Means, standard deviations, minimums, maximums, and distributions (i.e., skewness and kurtosis) were examined for all variables to ensure clean datasets.

Assessing model variables. Before proceeding with model testing, several research questions were posed to assess levels of major study variables. Table 1 provides a comprehensive listing of the means and standard deviations for all variables assessed in this section.

Research question one. The first research question focused on assessing levels of uncertainty. In study one, *general uncertainty about health care reform* (*M*=4.29, *SD*=.99), *personal effects* (*M*=4.30, *SD*=1.27), *financial effects* (*M*=4.45, *SD*=1.27), *effects on quality* (*M*=4.32, *SD*=.1.20), *availability of care* (*M*=4.32, *SD*=1.30), and *influence upon graduation* (*M*=4.44, *SD*=1.26), were all above the scale midpoint. This indicates that participants were more uncertain than certain, and single sample t-tests for each variable demonstrate that they are all statistically distinct from the midpoint at a $p<.01$ level. This suggests that uncertainty levels about health care reform are high.

Research question two. Research question two asked what levels of uncertainty tolerance participants would report. This was assessed with an overall measure of

uncertainty tolerance as well as specific political focused items and a health care centric scale. Levels of *general uncertainty tolerance* (*M*=3.35, *SD*=1.30), *political uncertainty tolerance* (*M*=3.60, *SD*=1.47), *health care reform specific uncertainty tolerance* (*M*=3.87, *SD*=1.05) varied. The data suggest participants have the least tolerance for uncertainty in their everyday lives, but tolerate slightly more uncertainty about political issues and even more about health care reform. Single sample t-tests for general and political uncertainty tolerance demonstrate they were statistically distinct from the midpoint at a $p<.01$ level; this is not the case for health care reform specific uncertainty tolerance which was statistically indistinguishable from the scale midpoint.

Research question three. Research question three focused on assessing levels of predicted outcome value associated with health care reform. This predicted outcome value was measured five different ways; in addition to assessing *predicted outcome value of health care reform in general*, *predicted outcome value of health care reform information* was measured as was *future interaction with health care reform*, *deviance of health care reform*, and *incentive value of health care reform information*. *Overall predicted outcome value* (*M*=3.85, *SD*=.77), *information predicted outcome value* (*M*=5.04, *SD*=1.15), *future interaction* (*M*=5.03, *SD*=1.09), *deviance* (*M*=4.07, *SD*=.59), and *anticipated utility* (*M*=5.25, *SD*=1.05) demonstrated very different results. These scores indicated that participants associate value with health care information. Single sample t-tests demonstrated that all variables with the exception of deviance in study one were statistically distinct from the midpoint at a $p<.05$ level.

Research question four. Research question four sought to assess levels of health care reform knowledge. Knowledge levels were relatively low with study one participants

answering just over two of the seven questions correctly (*M*=2.24, *SD*=1.87). This suggests that participants were, in general, not very well informed about health care reform.

Research question five. Research question five focused on assessing levels of involvement with health care reform. Participants reported that their involvement was above the midpoint (*M*=4.46, *SD*=1.16) and a single sample t-test demonstrated that value was statistically distinct from the midpoint at a $p<.001$ level

Information preferences. Study one contained items that asked participants about preferred ways to receive health care reform information. Complete results can be found in table 5 and informed the construction of study two stimulus materials. Participants reported wanting to receive information through face to face communication (*M*=4.92, *SD*=1.48) and cited family as the preferred source of information (*M*=5.25, *SD*=1.54). The current study is focused on mediated sources of health care information, but it is important to note that interpersonal sources of information were preferred the most by participants.

Table 5

Means and standard deviations for information provision variables

Channel/Source/Format	M	SD
Insurance companies	3.90	1.78
The media	3.97	1.80
The government	4.40	1.68
Family	5.25	1.54
Friends	4.76	1.64
Non-profit organizations	4.55	1.51
Politicians	3.29	1.66
Health organizations	5.08	1.52
TV news	4.40	1.73
Newspapers	4.48	1.56
Magazines	4.19	1.56
The internet	4.87	1.65
Legislative documents	4.29	1.75
Face to face communication	4.92	1.48
Political speeches	3.54	1.70
Fact sheets	4.95	1.67
Narratives (stories)	4.05	1.59
Statistics	5.01	1.51
Research articles	4.82	1.53
Decision guides	4.29	1.52

Following those interpersonal sources, participants cited the internet as their preferred channel for information about health care reform (*M*=4.87, *SD*=1.65). The internet was preferred over TV news (*M*=4.40, *SD*=1.73), newspapers (*M*=4.48, *SD*=1.56), and magazines (*M*=4.19, *SD*=1.56). The current research was focused on a health care reform website, so it was beneficial that participants cited that format as a preferred modality for receiving health care reform information. Participants also cited wanting to receive information in the form of statistics (*M*=5.01, *SD*=1.51), and fact sheets (*M*=4.95, *SD*=1.67).

Study Two

Method

Informed by study one results, study two investigated health care reform related uncertainty and information seeking through the use of an online pre-test, online web tracking, and an online post-test.

Participants. A communication participant pool at a large Midwestern university was used to recruit participants. Participation was voluntary and undergraduate students were provided with course credit for participating. Additional participants were procured by having instructors email an online survey link to their classes. Participants who completed study one were excluded from participation in study two. For study two, 349 individuals completed the pre-test, but only individuals who completed both the pre and post-test were included in analyses.

Participants (N=265) were 20.78 years old on average (*SD*=2.20) and 56.2% of the sample was female. All years were represented with 19.2% freshmen, 14.8% sophomores, 29.8% juniors, 35.1% seniors, and 1.1% fifth year or beyond. The majority

of the sample (71.3%) self-identified as white with 9.8% self-identifying as African-American, 9.1% Asian, 3.4% Pacific Islander, 2.6% mixed, 1.9% Latino/Hispanic, 1.5% Native American, 1.1% other, and 0.4% Middle Eastern. Regarding political affiliation, 19.6% of the sample reported being weak Republicans, 14.2% weak Democrats, 10.6% strong Democrats, and 6.4% as strong Republicans. 14.7% of the sample reported being Independent and 18.1% as being independent Democrats or Republicans. The remaining 39 participants reported being apolitical (1.5%) or other (13.2%). Additionally, participants were relatively politically active with 52.2% of the eligible sample having voted in the 2008 presidential election.

Cover story. Students were told that campus organizations were in the process of developing a website to best provide students with information about health care reform. They were informed that the preliminary website link would be emailed to them after the pre-test survey was completed and a follow-up survey would be emailed after the link was deactivated.

Procedure. Data were collected using online pre and post-tests as well as web-tracking technology. After providing consent online, participants completed a pre-test with the revised measures from study one. Then, they were emailed a link to a website containing several different information styles and sources (e.g. a frequently asked questions page, a video page). Participants were allowed to access the website for a 48 hour time period. Each participant was provided with a unique link and use of each individual website was tracked using Google Analytics, which can track individual navigation of websites. This web tracking methodology provided data about which subpages participants were accessed more often and for what length of time (see table 6).

After a 48 hour exposure period, a post-test assessed participant uncertainty levels and recall of website information.

Table 6

Means and standard deviations for time spent on website subpages

Subpage	M	SD
Homepage	29.55	55.22
By the Numbers	14.58	37.57
MSU Student Experience	39.71	129.11
In the Media	15.99	46.11
Frequently Asked Questions	20.30	43.01
Total	120.13	215.98

Stimulus materials. Study one contained items that asked participants about preferred ways to receive health care reform information. Complete results, found in table 5, informed the construction of study two stimulus materials. Participants reported wanting to receive information through face to face communication (*M*=4.92, *SD*=1.48) and cited family as the preferred source of information (*M*=5.25, *SD*=1.54). The current study is focused on mediated sources of health care information, but it is important to note that interpersonal sources of information were preferred the most by participants. Following those interpersonal sources, participants cited the internet as their preferred channel for information about health care reform (*M*=4.87, *SD*=1.65). The internet was preferred over TV news (*M*=4.40, *SD*=1.73), newspapers (*M*=4.48, *SD*=1.56), and magazines (*M*=4.19, *SD*=1.56). The current research was focused on a health care reform

website, so it was beneficial that participants cited that format as a preferred modality for receiving health care reform information.

Website content was developed for study two based on findings from study one. Participants cited wanting to receive information in the form of statistics (*M*=5.01, *SD*=1.51), and fact sheets (*M*=4.95, *SD*=1.67). On the website, subpages "By the Numbers" and "Frequently Asked Questions" were constructed to tap into those desires; these pages presented statistics and general facts about health care reform respectively. Although participants did not express a strong desire to receive information from "the media" (*M*=3.97, *SD*=1.80), positive responses to TV news and newspapers presented above prompted the inclusion of an "In the Media" subpage that provided excerpts from major media outlets (e.g., *The Washington Post*). Research articles were also cited as a preferred format (*M*=4.82, *SD*=1.53), but given that health care reform is such a recent development, scholarly research articles providing useful information about the topic were scarce. Thus, a "MSU Student Experience" subpage was created as a way to tap into the potential influence of friends/peers, and because it focused on a video clip that may engage the audience. The video focused on an MSU student who was interviewed about how health care reform would affect his life and then received a call from President Obama. The final website content can be viewed at https://sites.google.com/site/usacarereform400. Data related to average time spent on the website is presented in table 6.

Measures. Study two utilized measures refined from study one measurement work. Health care uncertainty, uncertainty tolerance, predicted outcome value, knowledge, and involvement were all measured. Additionally, information seeking

behavior was measured using Google Analytics and uncertainty and recall were assessed at post-test. Pre and post-test measures can be found in Appendices B and D respectively.

Uncertainty. Although all types of uncertainty assessed in study one (i.e., general, personal effects, financial effects, quality of care, availability, and post-graduation) were measured in study two as well, the macro level scale of general health care reform uncertainty was utilized for hypothesis testing in study two. This decision was based on the high correlations found between the different uncertainty scales (see table 2). *General health care reform uncertainty* was measured with four items (e.g., "I generally understand health care reform") and assessed with confirmatory factor analysis in AMOS; model fit was adequate $\chi^2(2)=3.35$, p=.19, CFI=.99, RMSEA=.05, α=.92. The same scale was used to assess uncertainty in the post-test.

Uncertainty tolerance. All types of uncertainty tolerance assessed in study one (i.e., general, need for political information, health care reform specific) were measured in study two, but the measure for specific *health care reform uncertainty tolerance* was utilized for hypothesis testing in study two. This decision was based on the correlations found between the different uncertainty tolerance scales (see table 3). *Health care reform uncertainty tolerance* was measured with four items (e.g., "It frustrates me to not have all the information about health care reform I need") and assessed with confirmatory factor analysis in AMOS; model fit was adequate $\chi^2(2)=2.81$, p=.25, CFI=.99, RMSEA=.04, α=.72.

Predicted outcome value. All types of predicted outcome value assessed in study one (i.e., general health care reform, future interaction, deviance, incentive value, and health care reform information) were measured in study two, but the measure for the

predicted outcome value of health care reform information was utilized for hypothesis testing in study two. This decision was based on the high correlations found between the different predicted outcome value scales (see table 4) and because the current research is primarily focused on health care reform *information*. *Predicted outcome value of health care reform information* was measured with four items (e.g., "I think health care reform information will be useful for me") and assessed with confirmatory factor analysis in AMOS; model fit was acceptable $\chi^2(2)=9.3$, p=.01, CFI=.98, RMSEA=.11, α=.89.

Knowledge. Health care reform knowledge was measured using seven items based on those developed and tested by the Robert Wood Johnson Foundation (2010). These seven items covered diverse domains of health care reform (e.g., "Health care reform will give federal tax credits to small companies if they buy health insurance for their employees.") and indicate how much an individual participant knows about health care reform. Participants were also asked how sure they were about each of their responses, and how concerned they were about their level of knowledge for each question. Responses were coded as correct (1) or incorrect (0) and summed to make a knowledge scale ranging from zero to seven.

Involvement. Involvement was measured using seven items developed and tested by Zaichkowsky (1994) as well as six additional items added for this research. The thirteen items were measured using a semantic differential scale that has anchoring options to the statement: "To me, health care reform is" such as choices ranging from unimportant to important. An average of these 13 items was used for analyses.

Information seeking. Information seeking was measured using Google Analytics, an online website traffic tracking tool. Each participant was assigned their own individual

website and traffic to that website was tracked using Google Analytics. Google Analytics, a program attached to each individual website, allowed the researcher to identify exactly how each individual website was used. It tracked website clicks, time spent on pages, and other browsing metrics. For the purposes of the current study, data about time spent on the site in its entirety was utilized for analysis. Time spent on the website was measured and reported in seconds.

Information recall. Information recall was measured by asking participants four questions about information appearing on the website. Responses were coded as either correct (1) or incorrect (0) and summed to create an information recall measure (M=1.65, SD=1.12).

Demographic variables. Participants were asked to select an answer that best described their gender, age, ethnicity, education level, and political identification.

Results

Data Preparation. Before any analyses could be conducted, the data were cleaned and prepared for analysis. First, participants (N=349) were assigned participant numbers and all personal identifiers were deleted from the dataset. Next, participants who failed to complete the post-test (N=80) were excluded from analysis. There were no individual cases of considerable missing data and given that there was less than five percent missing data overall, all missing values for likert type items were replaced with series means. All other cases of incidental missing data were excluded from analyses pairwise.

Means, standard deviations, minimums, maximums, and distributions (i.e., skewness and kurtosis) were examined for all variables to ensure clean datasets. The only

variable that required considerable cleaning was information seeking. Information seeking was measured by tracking time spent on the website. It was measured continuously in seconds by Google Analytics. As this phase of the study was not conducted in the lab, there was no way to be certain that participants were actually viewing the website during the entire time they had the page open. Thus, it was important to investigate the data to look for outliers. Individuals spent between 0 and 2352 seconds (i.e., 0 and 39.20 minutes) seeking information on the website (M=153.86, SD=319.56). These data were examined for influential cases and extreme outliers (e.g., 20 minutes spent on a single page) were excluded from analysis. This reduced the final sample size down to 265 participants and brought range (Min=0, Max=1252 seconds) and average time spent on the website down considerably (M=120.12, SD=215.97). These clean data more accurately reflect true time spent seeking information instead of incidental time spent with webpages inadvertently left open by participants.

The potential effect of demographic variables (e.g., age, sex, political affiliation) was assessed prior to the investigation of hypotheses and research questions. While there were differences for some variables (e.g., women were more uncertain than men, strong democrats were more involved than strong republicans), these differences did not extend to information seeking behaviors. That is, participants of different genders, ages, political affiliations, and racial/ethnic groups did not greatly differ in the amount of time they spent seeking information. Thus, based on little variation in information seeking and a lack of hypothesized differences between different demographic groups, these variables were not included in subsequent analyses and all participants were included in all analyses.

Assessing model variables. Before proceeding with model testing, several research questions were posed to assess levels of major study variables. Table 1 provides a comprehensive listing of the means and standard deviations for all variables assessed in this section.

Research question one. The first research question focused on assessing levels of uncertainty. Results were similar to those found in study two with *general uncertainty about health care reform* (*M*=4.35, *SD*=1.29), *personal effects* (*M*=4.32, *SD*=1.37), *financial effects* (*M*=4.41, *SD*=1.39), *effects on quality* (*M*=4.37, *SD*=1.30), *availability of care* (*M*=4.43, *SD*=1.40), and *influence upon graduation* (*M*=4.43, *SD*=1.30) all having scores above the midpoint. This indicates participants were more uncertain than certain, and single sample t-tests for each variable demonstrate they are all statistically distinct from the midpoint at a $p<.01$ level. This suggests that uncertainty levels about health care reform are high.

Research question two. Research question two asked what levels of uncertainty tolerance participants would report. This was assessed with an overall measure of uncertainty tolerance as well as specific political focused items and a health care centric scale. Study two values were similar to those in study one: levels of *general uncertainty tolerance* (*M*=3.28, *SD*=1.12), *political uncertainty tolerance* (*M*=3.56, *SD*=1.55), *health care reform specific uncertainty tolerance* (*M*=4.00, *SD*=1.14). The data suggest participants have the least tolerance for uncertainty in their everyday lives, but tolerate slightly more uncertainty about political issues and even more about health care reform. This indicates uncertainty tolerance can vary across contexts and it is imperative general and domain specific uncertainty tolerance be measured as both would yield different

results. Single sample t-tests for general and political uncertainty tolerance demonstrate they were statistically distinct from the midpoint at a $p<.01$ level; this is not the case for health care reform specific uncertainty tolerance which was statistically indistinguishable from the scale midpoint.

Research question three. Research question three focused on assessing levels of predicted outcome value associated with health care reform. Study two results maintained a similar pattern with study one: *overall predicted outcome value* (M=4.12, SD=.84), *information predicted outcome value* (M=5.15, SD=1.24), *future interaction* (M=5.09, SD=1.10), *deviance* (M=3.85, SD=.88), and *anticipated utility* (M=5.34, SD=1.14). These scores indicated that participants associate value with health care information. Single sample t-tests demonstrated that all variables with the exception of deviance in study one were statistically distinct from the midpoint at a $p<.05$ level.

Research question four. Research question four sought to assess levels of health care reform knowledge. Study two participants answered just under three and a half questions correctly on average (M=3.44, SD=1.49). This suggests that participants were, in general, not very well informed about health care reform. Interestingly, there was a considerable increase in knowledge scores between study one and study two, perhaps indicating that health care reform information had become more pervasive in the four month time period between studies. In fact, major parts of the bill (including the coverage extension to young adults) came into effect between the two studies in January 2011.

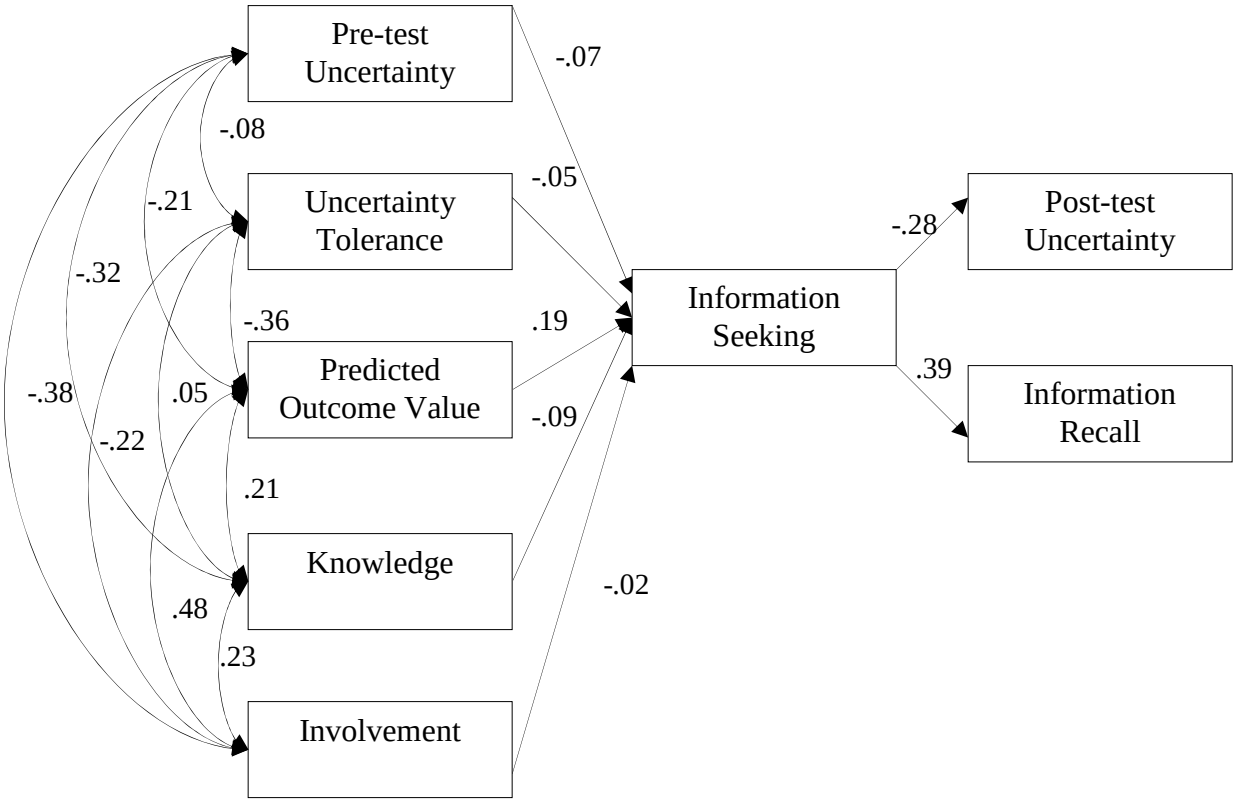
Research question five. Research question five focused on assessing levels of involvement with health care reform. Participants reported that their involvement was above the midpoint in study two (M=4.39, SD=1.23); a single sample t-tests demonstrated

that health care reform involvement levels was statistically distinct from the midpoint at a $p<.001$ level.

Model testing. The proposed model (see figure 1) was tested using AMOS. A model complete with path coefficients and overall model test results can be found in figure 4. It is important to note that because different demographic groups (e.g., political affiliation) demonstrated no significant differences between groups regarding time spent seeking information [i.e., $F(8, 252)=0.69$, p=.70 for political affiliation], all cases were run together. The data suggest partial support for the model. Results for each hypothesis and research question are presented next.

Figure 4

Model of study hypotheses after analysis



Hypothesis one. Based on URT, hypothesis one proposed that higher levels of uncertainty would be associated with more information seeking. The data did not support this hypothesis. Pre-test uncertainty did not significantly motivate information seeking (β=-.07, *p*=.28). Although the connection between uncertainty and information seeking is a primary axiom of URT, that relationship does not hold up in the current study. In fact, although the relationship is non-significant, there does appear to be a slight negative relationship between pre-test uncertainty and information seeking.

Research question six. Research question six asked about the relationship between uncertainty and uncertainty tolerance. The data indicated that the two variables were not significantly related (β=-.08, *p*=.19). This result is in the predicted direction, but is non-significant and suggests that individuals who are more tolerant of health care reform uncertainty were no more or less uncertain about health care reform.

Hypothesis two. Hypothesis two proposed that higher levels of uncertainty tolerance would be associated with less information seeking. The data did not support this hypothesis. Uncertainty tolerance did not significantly motivate information seeking (β=-.05, *p*=.42). Although there is a small non-significant relationship between uncertainty tolerance and information seeking, it does not appear that those with more tolerance for uncertainty spent less time seeking information in the current study.

Research question seven. Research question seven asked how predicted outcome value would be associated with uncertainty and uncertainty tolerance. The data demonstrate a significant negative relationship in both cases. The predicted outcome value of health care information was significantly related to both uncertainty (β=-.21, *p*<.001) and uncertainty tolerance (β=-.36, *p*<.001). This suggests that individuals who

are more certain also think health care information will have more value. The data also indicate that individuals who cannot tolerate much uncertainty think health care information will be valuable.

Hypothesis three. Hypothesis three proposed that higher predicted outcome value would be associated with more information seeking. The data supported this hypothesis. Predicted outcome value did significantly motivate information seeking (β=.19, p<.01). This result indicates that individuals who believe health care reform information will have value are likely to spend more time seeking information.

Research question eight. Research question eight asked how knowledge would be associated with information seeking, uncertainty, uncertainty tolerance, predicted outcome value, and involvement. Results varied with uncertainty, predicted outcome value, and involvement demonstrating significant relationships with knowledge. The data showed non-significant relationships between knowledge and information seeking as well as uncertainty tolerance.

Knowledge was significantly related to uncertainty such that more informed individuals were less uncertain about health care reform (β=-.32, p<.001). In contrast to the negative relationship between knowledge and uncertainty, the data suggest a significant positive relationship between knowledge and predicted outcome value seeking (β=.21, p<.001). A significant positive relationship was also demonstrated between knowledge and involvement (β=.23, p<.001). These two positive relationships with knowledge suggest that individuals who know more about health care reform are both more involved with health care reform, and believe health care reform information to have value.

Knowledge and information seeking were not significantly related (β=-.09, *p*=.16). Knowing more about health care reform does not appear to motivate individuals to spend any more or less time seeking information. Similarly, the data also failed to provide evidence for a significant relationship between knowledge and uncertainty tolerance (β=.05, *p*=.46). This result indicates that individuals who are more informed about health care reform do not vary in their tolerance for uncertainty.

Research question nine. Research question nine asked how involvement would be related to information seeking, uncertainty, uncertainty tolerance, and predicted outcome value. Results varied with uncertainty, uncertainty tolerance, and predicted outcome value demonstrating significant relationships with involvement. Involvement and information seeking were not significantly related (β=-.02, *p*=.76).

The data revealed a significant negative relationship between involvement and uncertainty such that individuals who were more involved with health care reform had lower levels of uncertainty (β=-.38, *p*<.001). There was also a significant negative relationship between involvement and uncertainty tolerance; more involved individuals had a lower tolerance for uncertainty (β=-.22, *p*<.001). Finally, involvement and predicted outcome value were positively associated (β=.48, *p*<.001). This result suggests that individuals who were more involved with health care reform believed health care reform information to be valuable.

Hypothesis four. Hypothesis four proposed that more information seeking would be associated with lower post-test uncertainty. That is, individuals who spent more time on the website would feel more certain about health care reform. The data supported this

hypothesis. Information seeking was negatively associated with post-test uncertainty (β=-.28, p<.001).

Hypothesis five. Hypothesis five suggested that more information seeking would be associated with greater recall of information presented on the website. The data supported this hypothesis. There was a significant positive relationship between information seeking and recall (β=.39, p<.001) such that individuals who spent more time on the website were better able to recall the information presented on that site.

Extrication of theoretical effects. A 2x2x2 ANOVA was proposed to extricate theoretical effects and the complete results can be found in table 7. Participants were placed into one of eight groups based on their responses to items about uncertainty, uncertainty tolerance, and predicted outcome value (see figure 3). For example, an individual who scored high on uncertainty, low on uncertainty tolerance, and low on predicted outcome value would be placed in group three. Participants were sorted into high and low categories based on a median split of the data.

Table 7

Means, standard deviations, and sample size for a 2x2x2 of the effects of uncertainty, uncertainty tolerance, and predicted outcome value on information seeking

LOW UNCERTAINTY			**HIGH UNCERTAINTY**		
	Lo UTol	**Hi UTol**		**Lo UTol**	**Hi UTol**
Lo POV	*M*=98.62 *SD*=179.13 N=21	*M*=54.77 *SD*=98.44 N=22	**Lo POV**	*M*=116.59 *SD*=179.81 N=39	*M*=73.21 *SD*=179.13 N=
Hi POV	*M*=194.56 *SD*=315.22 N=41	*M*=96.29 *SD*=161.98 N=34	**Hi POV**	*M*=117.15 *SD*=218.21 N=53	*M*=221.71 *SD*=337.86 N=17

F(7, 257)=1.91, p=.07

Research question ten. Research question ten asked which theoretical constructs would have the strongest effect on information seeking. The omnibus 2x2x2 ANOVA test approached, but failed to reach significance [$F(7, 257)=1.91$, $p=.07$]; however, descriptive statistics suggest there may be significant differences between specific cells. For example, an independent sample t-test comparing the groups with the lowest and highest information seeking means (i.e., group two and group eight) demonstrates that the two groups significantly differed in how much time was spent seeking information, $t(37)=2.21$, $p<.05$. However, one limitation of the current dataset is the unequal distribution of participants across conditions (e.g., 17 in one group and 53 in another); this makes comparisons across groups difficult without violating test assumptions.

Table 7 clearly shows that group two (i.e., low uncertainty, high uncertainty tolerance, low predicted outcome value) spent the least amount of time on the website (M=54.77, SD=98.44) while group eight (i.e., high uncertainty, high uncertainty tolerance, high predicted outcome value) spent the most time seeking information (M=221.71, SD=337.86). Group two would be expected to have the lowest information seeking time because individuals who are certain, have a high tolerance for uncertainty, and believe information would not be useful would be unlikely to spend much time seeking information. In fact, 16 of the 22 individuals in this group did not access the site at all and only three participants spent more than a minute on the website.

Contrarily, the group that spent the longest amount of time seeking information was group eight, and only eight of the 17 individuals in this group failed to use the website; all other participants spent over a minute on the site. This finding provides evidence that predicted outcome value and uncertainty are motivators of information

seeking, but uncertainty tolerance is less influential. Participants in this group were uncertain and believed the information would be valuable, but also had high uncertainty tolerance levels. In this case, the relative strength of uncertainty and predicted outcome value may have outweighed the effect of uncertainty tolerance.

Investigation of other groups suggests that predicted outcome value may be the primary driver of information seeking. In fact, the groups with the three highest levels of information seeking were those with participants who reported high predicted outcome value. The cell that would provide evidence for all theoretical perspectives working together (i.e., group seven) demonstrated the third most information seeking (M=117.15, SD=218.21).

Discussion

Research about how individuals seek and are affected by health care reform information is essential as reform continues to be implemented. The promise of health care reform may have seemed like little more than political posturing and rhetoric several years ago, but now that health care reform is being implemented it is imperative researchers and practitioners better understand how citizens want to receive information, what motivates them to access that information, and what effects information seeking has on the public. The current research used two studies containing self-report measures and web based information seeking tracking data to provide novel insight into this situation. The following section summarizes results, discusses theoretical and practical implications, outlines limitations, and provides recommendations for future research.

Summary of results

Assessing model variables. Before testing the proposed model and extricating the effects of different theoretical constructs, variables of interest were measured in both study one and study two to assess baseline values and ensure adequate measurement. Specifically, research questions one through five asked about the levels of uncertainty, uncertainty tolerance, predicted outcome value, knowledge, and involvement. The levels of most of these variables maintained stability across both studies. That is, participants in study one and study two reported similar responses to the same items. This suggests stability of measurement which was one of the main purposes of assessing model variables prior to model testing. Additionally, measuring these variables at two separate time points allowed for more in depth investigation into whether macro level measures of model variables (e.g., general health care uncertainty) were representative of more focused measured (e.g., financial uncertainty) or if more targeted measures (e.g., health care reform uncertainty tolerance) were more appropriate than overarching scales (e.g., general uncertainty tolerance).

Uncertainty. The data show that all mean values for uncertainty scales were above the midpoint of the scale, indicating greater uncertainty than certainty. Although there were nuanced differences between the scales (e.g., uncertainty about effects after graduation was highest across studies), the data suggest that participants were not overwhelmingly uncertain, but also not particularly certain about health care reform. This result is not surprising as the Patient Protection and Affordable Care Act was passed approximately a year prior to these data collections, and the text ran thousands of pages in length. Additionally, partisan posturing has resulted in the proliferation of considerable

information about health care reform, but not all that information provides utility (e.g., the death panel controversy). This result that citizens have uncertainty may not be surprising, but it is important as URT would predict that a certain public would not be motivated to seek information. Additionally, it provides a theory driven validation of uncertainty data reported by the Robert Wood Johnson Foundation (2010).

Uncertainty tolerance. The three uncertainty tolerance scales remained relatively stable across study one and study two, but did not appear to group together in their assessment of the same construct. For example, individuals appeared to be able to tolerate more uncertainty about health care reform than political issues, or just in general. Individuals reported they were less able to tolerate uncertainty in general situations (e.g., "It frustrates me to not have all the information I need") than in a specific political (e.g., "I find satisfaction in gathering political information) or health (e.g., "It frustrates me to not have all the health care reform information I need") context.

Although a more macro conceptualization of uncertainty tolerance has been advocated by Kellerman and Reynolds (1990), Kramer (1999) has suggested that a targeted measure of situation specific uncertainty tolerance is necessary. The data presented in this research demonstrate the necessity of assessing domain specific uncertainty tolerance and not relying on macro-level measurement of this construct. For example, a conscientious individual with low general uncertainty tolerance and stable health care coverage may care little about the effects of health care reform and thusly be able to tolerate a great deal of uncertainty specifically related to health care reform even while generally requiring great certainty.

Predicted outcome value. Levels of predicted outcome value varied widely and after examining average scores for *predicted outcome value of health care reform* in general (see table 1), it became clear that scale focused more on the approval of health care reform than the value of information related to the issue. Given that the current study was focused on predicted outcome value associated with the information, not the issue itself, the health care reform information predicted outcome value measured was utilized for model testing. On average, participant scores were higher on the predicted outcome value scales than any other model variables. This indicates that participants believed there was value associated with health care information.

The fact that participants ascribed value to health care reform information is an indication of predicted outcome value, but may also suggest participants have high levels of response efficacy associated with health care reform information. Response efficacy indicates how effective an individual believes a specific recommended response to be (Bandura, 1986). In this case, participants believe seeking health care reform information would effectively help them relieve their uncertainty. This idea will be explored more in the section outlining theoretical implications.

Knowledge. Knowledge levels were low, but interestingly, knowledge appeared to increase from study one to study two. The data indicated that participants do not know very much about health care reform. In fact, on average, participants were unable to answer even half of the questions correctly. This may not be surprising when considering the depth and breadth of health care reform. The knowledge items selected for this research were based on those used in large national surveys and were fairly cursory in nature, but it is not unreasonable that an average college student would not know about

health care tax credits to small business owners. Participants had three options for all knowledge items (i.e., the bill does this, the bill does not do this, and I don't know) and it is important to note that as much as 57% of the sample reported not knowing the answer to any single item. These responses along with incorrect answers were more prevalent than correct answers, even when not considering any participants who may have guessed and been counted as false positives. In sum, health care reform knowledge levels were low in the current research.

Involvement. Involvement was assessed using thirteen items in both study one and study two. Levels of involvement remained stable across studies and indicate that participants reported being somewhat involved with health care reform. Average involvement scores were above and statistically distinguishable from the scale midpoint. Although there are certainly groups that would indicate higher levels of involvement with health care reform (e.g., health care professionals, chronically ill persons), the sample in the current study was still moderately involved with the topic.

Information format. Participants cited interpersonal formats and sources to be most preferred. They wanted to hear information from their friends and family in a face to face atmosphere. This is a very useful finding; even though friends and family may not be the most reliable sources, these data suggest the potential utility of a two step flow campaign (see Lazarsfeld, Berelson, & Gaudet, 1944). Following interpersonal sources, the internet was the more preferred channel. This may reflect the desired of an educated young sample, but also suggests the information for this study was presented in a way that is accessible and preferable to the target population. Additionally, participants cited a desire to receive health care reform information in the form of statistics and fact sheets

instead of narratives or other formats. This type of fact based information may be particularly useful for alleviating uncertainty.

Model testing. The data did not fit the proposed model, but several meaningful relationships between variables were uncovered. The following sections describe a) the relationships between exogenous variables (i.e., uncertainty, uncertainty tolerance, predicted outcome value, knowledge, involvement), b) the effects of those exogenous variables on information seeking, and c) the effect of information seeking on post-test uncertainty and recall.

Relationships between exogenous variables. The model allowed for relationships between the exogenous variables and several research questions asked how those variables would be associated. There were significant positive relationships between predicted outcome value and knowledge, involvement and knowledge, and predicted outcome value and involvement. Significant negative relationships were found between uncertainty and involvement, predicted outcome value and uncertainty, uncertainty tolerance and predicted outcome value, uncertainty and knowledge, and involvement and uncertainty tolerance. Relationships between uncertainty and uncertainty tolerance, and knowledge and uncertainty tolerance were non-significant.

Predicted outcome value was positively related to both knowledge and involvement. This indicates that participants who knew more about health care reform were more likely to think health care reform information would be valuable. Perhaps this is because these more knowledgeable individuals had some experience with information on the topic and had already found it to hold value. Additionally, participants who were more involved ascribed more value to health care reform. There was also a positive

relationship between knowledge and involvement, indicating that more informed participants were also more involved. The positive relationship between these three variables seems very organic and may even serve as an indication of convergent validity. That is, one would assume that knowledge would be highly correlated with involvement and evidence of this only increases confidence in the measurement models for both variables.

Uncertainty was negatively related to predicted outcome value, knowledge, and involvement. This indicates that more uncertain individuals had lower levels of knowledge and involvement, but also perceived health care reform information to carry less value. Uncertainty, or the lack of complete information, almost necessarily implies a lower level of knowledge, so this negative relationship is not unexpected. Additionally, an involved individual would likely be relatively certain about that topic. The data suggest an individual who finds an issue to be appealing, interesting, and important is likely to have a better handle on that topic. This means that increasing issue involvement may also be an effective way to reduce uncertainty.

Explaining the significant negative relationship between uncertainty and predicted outcome value is not simple. This result suggests that individuals who think information will be useful were more certain about health care reform. The connection here is not obvious, but may be related to past information seeking behavior. Consider a situation where an individual had searched the internet for information about health care reform after the bill passed and found that information to be useful in informing them of the major tenets of the bill. That individual would likely be more certain about health care reform than the average participant, and would also ascribe value to health care reform

information based on past experience. In fact, this scenario makes perfect sense when considering that knowledge is positively associated with predicted outcome value and negatively related to uncertainty. Thus, these relationships with knowledge may help illuminate the less intuitive result of uncertainty and predicted outcome value being negatively related.

Uncertainty tolerance was negatively related to predicted outcome value and involvement which indicates that individuals who are less tolerant of uncertainty are more involved and believe health care reform information is valuable. The negative relationship between involvement and uncertainty tolerance seems reasonable; it is not unexpected that participants who are more involved with an issue would be less tolerant of uncertainty related to that issue. For example, very involved individuals like health care providers are unlikely to tolerate much uncertainty about the issue because it is so important to them. The relationship between uncertainty tolerance and predicted outcome value suggests that participants who were tolerant of uncertainty found little value in health care reform information.

Finally, the data suggested non-significant relationships between uncertainty tolerance, uncertainty and knowledge. That is, participants who were less tolerant of uncertainty did not vary in their uncertainty or knowledge. This is somewhat unexpected as individuals who are intolerant of uncertainty could possibly be more certain because they desire more certainty, but it may be that these individuals have different perceptions about certainty than high uncertainty tolerance participants. That is, one participant with low uncertainty tolerance and one with high uncertainty tolerance who are equal in all other ways may vary in assessments of their own uncertainty. The low uncertainty

tolerance individual may feel very uncertain because they cannot handle much uncertainty, while the high uncertainty tolerance individual may feel relatively certain. The data also suggest that individuals with high levels of knowledge are no more or less tolerant of uncertainty. This means that being more or less informed about health care reform is unrelated to an individual's tolerance of uncertainty.

Effects on information seeking. Several hypotheses and research questions were focused on the effects of exogenous variables on information seeking. Specifically, positive relationships were predicted between uncertainty and information seeking as well as predicted outcome value and information seeking. A negative relationship was expected between uncertainty tolerance and information seeking. Research questions asked how knowledge and involvement would be associated with information seeking. The only significant relationship was a positive relationship between predicted outcome value and information seeking. This result suggests that individuals who believed health care reform information was more valuable spent more time seeking information. The non-significant relationships for all other exogenous variables suggest that despite theoretical support, the data did not demonstrate any meaningful relationships with information seeking. The significant positive relationship between predicted outcome value and information seeking in conjunction with the other null findings suggests that URT and MRU do not explain mediated information seeking as well as POV. In fact, predicted outcome value was the only significant predictor of information seeking. This result affirms uncertainty alone is not enough to motivate information seeking.

Effects of information seeking. Two hypotheses predicted that more information seeking would be related to less post-test uncertainty and more information recall

respectively. The data supported both of these hypotheses. These results confirm the utility of information seeking and suggest reliable measurement. That is, if participants who spent more time seeking information were more uncertain and less able to recall information, the usefulness of that information as well as the accuracy of information seeking measurement could be questioned.

The significant negative relationship between information seeking and post-test uncertainty is useful in that it demonstrates that information decreases uncertainty. Although this seems intuitive, there are certainly situations where seeking information may increase uncertainty. For example, consider a situation where an individual seeks information on the internet and is confronted with conflicting sources. This individual's level of uncertainty may actually increase with more information seeking; that would be a good example of information that was not useful. It is also important that, on average, uncertainty decreased between the pre and post-test by approximately half a point (see table 1). The data presented in the current research suggest the website constructed and utilized for the current study contained useful information that reduced uncertainty.

Information recall was also significantly predicted by information seeking, again indicating the effectiveness of information provided on the website. If participants who spent more time seeking information were less able to accurately recall facts presented on the website that would be an indication of information with little utility. The website for study two appears to have effective information that participants were able to recall.

Extrication of theoretical effects. Testing of the 2x2x2 (See Figure 2; high/low uncertainty, high/low uncertainty tolerance, and high/low predicted outcome value) ANOVA demonstrated that high uncertainty participants who perceived health care

reform information to have value and had high tolerance for uncertainty spent the most time seeking information. This result suggests the predictive utility of predicted outcome value and uncertainty over uncertainty tolerance. Investigation of mean cell values reveals differences, but variance in cell sample size makes meaningful comparison difficult. Despite sampling to ensure adequate sample size to detect significant effects (i.e., over twenty participants per cell), distribution of participants was uneven across groups (e.g., 17 participants in group eight and 53 in group seven). Despite this variation, and knowing that significance testing may be inaccurate, clear trends did emerge in the data.

The three cells with the highest information seeking were high predicted outcome value cells and three of the top four were high uncertainty cells as well. Additionally, the three cells with the least information seeking included participants with high uncertainty tolerance. The trends are clear and reflect theoretical predictions, specifically pointing to the predictive power of predicted outcome value as a motivator of information seeking. Testing of the proposed model also illustrated the relative strength of predicted outcome value as a predictor of information seeking. Ensuring larger cell sample sizes may make these trends even clearer and provide necessary power to detect significant differences between groups.

Theoretical impact

The current study was unique in that it incorporated central constructs of several uncertainty theories to examine how they affected information seeking and related to each other. The data suggest the supremacy of POV over URT and MRU regarding prediction of information seeking. This may also draw from Berger's concepts of

anticipation of future interaction and incentive value, but most clearly shows that maximization of beneficial outcomes is the primary motivator of information seeking. This finding that uncertainty alone does not motivate information seeking is not unique (see Douglas, 1985; Gudykunst, 1985; Gudykunst & Nishida, 1984; Kellerman & Reynolds, 1990; Neuberger, 2010b) but it does provide further evidence to suggest that this widely believed and largely intuitive axiom may be inaccurate in practice.

The emergence of predicted outcome value of a significant predictor of information seeking may be related to concepts of efficacy. Specifically, response efficacy, or the belief that a recommended response will be effective, is very similar to predicted outcome value (Bandura, 1986). An individual who ascribes a high level of predicted outcome value of health care reform information believes accessing that information would have great value. Interestingly, an individual who believes health care reform information to have high response efficacy would think that information could help them perform a specified response (e.g., increased knowledge, decreased uncertainty). These two constructs, while couched in separate theories, are very similar and their similarities and differences in health care reform and other contexts could be very valuable.

Additionally, the RAS model suggests that individuals with higher levels of knowledge receive more information (Zaller, 1992), but the current study suggests that this trend does not extend to information seeking behavior. This may illuminate a very important distinction between information reception and information seeking as noted in recent work by Neuberger (2010b). The RAS posits that high knowledge individuals will receive more information but does not distinguish between passive information reception

and active information seeking. That is, individuals with high levels of knowledge may passively receive more information but do not necessarily actively seek out that information. For example, consider a participant who has a physician in their immediate family. That participant may have a high level of knowledge about health care reform based on conversations with that physician, and may receive a great deal of information from that source; but that is different from *information seeking*. In this example, the individual may be no more or less motivated to seek information on the issue. Data from this research affirm this difference and suggest passive reception and active seeking be considered separately.

The current research also suggests a two-step flow approach (see Lazarsfeld, Berelson, & Gaudet, 1944) may be beneficial for health care reform. Participants reported wanting to hear about health care reform from interpersonal sources (e.g., friends, family). Unfortunately, these individuals may not always be the best sources of information, so campaigns that inform and encourage additional message transmission may be effective. For instance, running television advertisements or creating websites that provide some information about health care reform and encourage viewers to share that information with their friends and family may be a successful way to reach individuals via their preferred channels. Additionally, campaigns with both mediated and interpersonal sources of influence have proven effective (e.g., Stanford Five-City Study).

Finally, this study affirms one of the most foundational components of uncertainty and information research; that is, information is an uncertainty reducing agent (Shannon & Weaver, 1949). Participants who spent more time seeking information in the current research were less uncertain. The strength of this relationship demonstrates why it is so

important to uncover antecedents to information seeking. If information seeking can be increased, then uncertainty, which is generally conceptualized as undesirable by uncertainty theories, can effectively be reduced.

Practical implications

This research provides valuable insight into the theoretical connections between uncertainty and information seeking, but also importantly provides useful information for those trying to more effectively communicate about health care reform. Data from study one provide a summary of preferred channels, sources, and formats of health care reform information that could be very useful to any individual or group interested in communicating about health care reform. For example, although it seems that much of the national discussion about health care is led by politicians, participants in this research did not favor that group as a source of information. If a political organization or health care provider wanted to supply health care reform information, it would be advisable to consult the findings presented in this research regarding preferred channels, sources and formats of health care reformation information. Using a website, presenting information on fact sheets, supplying statistics, and encouraging users to communicate with their friends and family about the issue would be advisable.

One of the most important implications of this research is that it confirmed the utility of information seeking as a predictor of beneficial outcomes. That is, individuals who spent more time seeking information were both less uncertain and better able to recall website information. As communicators, successful transmission of information and reduction of uncertainty related to a specific topic is essential. If a message increases

uncertainty and people are unable to remember it, it cannot be effective. The fact that this was not the case in the current study also suggests the strength of the website.

The website constructed for this research was constructed based on the reported desires of the target population uncovered in study one; this targeting resulted in a website that, when used, was effective in alleviating uncertainty and increasing recall. The value of this tailoring is a practical implication that should be considered by information providers. Additionally, model testing demonstrated that participants would spend more time seeking information if they thought the information would be valuable. The information on the website used in study two was demonstrated to have value through uncertainty reduction and increased recall, but it is important to ensure this is the case. Individuals will not spend time seeking information if they do not perceive there to be value associated with that information seeking. It is important to remember this when constructing information resources for the public; increasing awareness of resources is essential, but convincing the target population that the resources are useful may be equally important. That is, increasing the perceived value of information provides great potential for beneficial impact.

Limitations

The current research is limited in several ways and most are directly attributable to sampling issues. The current research relied on the participation of undergraduate students who are younger, more educated, more technology savvy, and less diverse than the general population. In addition, undergraduate students may be less engaged with health care reform as many of them are covered by their parents' health care policies and health care reform is not a very salient concern. In an attempt to alleviate this concern,

the study website was tailored specifically to college students who will likely be making health care coverage decisions upon their graduation. Additionally, the recent extension of parental coverage to individuals up to age 26 may have increased the salience of health care reform in the minds of participants.

Study two provided participants with a link to a website about health care reform and allowed them to access it at their leisure (if at all) over a 48 hour time period. Although this is a more naturalistic context than bringing participants into a lab and monitoring their information seeking in a controlled environment, it also has some drawbacks. Specifically, it is unclear how closely participants were attending to the information when they had their web browsers open to the website. In a lab, a researcher could directly observe eye gaze as an indicator of attention, but that was not possible in the current study. In a tradeoff between a tightly restrictive but more internally valid lab measurement of information seeking, and a more externally valid and naturalistic measurement of organic information seeking, the current study focused on the latter. This decision was primarily made to avoid demand characteristics. That is, participants in a lab setting would necessarily utilize the website when the researcher asked them, and may spend more time seeking information just to appease the researcher. In the current study, participants were allowed to access the website if they wanted to, but were not forced to do so. This design, while imperfect is much more organic to a real life information seeking context.

Finally, the sample size may have limited power to detect significant effects. Although the sample size was adequate for model testing (i.e., 200 cases necessary for SEM, 20 per cell for ANOVA) and assessment of research questions, additional

participants could have assured more equal sample size across groups when testing the 2x2x2 ANOVA and for more in depth examination of the potential effect of political affiliation. The sample size was adequate to detect effects in the 2x2x2 ANOVA (i.e., 20 per cell and 8 cells = 160 participants), but participants were unequally distributed across groups with as many as 53 in one group and as few as 17 in another. Thus, results regarding the extrication of theoretical effects should be interpreted with caution. Additionally, running separate models to investigate differences between individuals identifying with different political parties may have illuminated differences in the proposed model, but sample size in the current study was inadequate to test these models independently (i.e., under 100 participants in each political group).

Future research

The data provided in this study help clarify how different perspectives on uncertainty may affect information seeking and also provides insight into the effects of information seeking. While this research has great value, continued investigation in this area is necessary. Similar studies with samples drawn from the general population and priority populations would be very valuable. Although young adults are a priority audience for health care reform information with the extension of parental benefits to age 26, and changes likely to occur after graduation during the transition into the job market, there are several other priority groups that should be studied. For example, uninsured persons, the elderly, and individuals with chronic diseases would be important populations to target in future research. These groups may vary greatly in their levels of uncertainty, uncertainty tolerance, and predicted outcome value. Additionally, they may have very different desires regarding sources and formats of health care reform

information. While college students preferred the internet format and were able to use the website with ease, an older population may prefer to hear from health professionals or traditional media outlets instead of online.

Additionally, cross validating these results with data from a lab that directly observes participants seeking information may provide valuable insight into how individuals are seeking information and either validate or call into question the measurement of information seeking in the current research. Future research in a lab setting could also allow for more organic information seeking instead of tethering participants to one specific website. For example, participants could use a lab computer to complete an online pre-test and then be allowed to search for information if they care to before completing an online post-test. All the movements on that computer could then be recorded and coded. This data could demonstrate not only how much time participants spend seeking information, but also shed more light on the information seeking process. For example, knowing what terms participants search for, what websites they visit, and how long they stay could provide an even more complete picture about health care reform information seeking.

Finally, the incorporation of self and response efficacy into uncertainty reduction research may prove valuable in the future. Perhaps some participants make no attempt to reduce their uncertainty about specific topics because either they do not perceive themselves to be able to alleviate their own uncertainty (i.e., low self efficacy) or because they believe the available information options will not help reduce their uncertainty (i.e., low response efficacy). Future research should consider these theoretical components alongside the uncertainty related constructs presented in the present research.

Conclusion

This research uncovered trends about uncertainty and information seeking related to health care reform that have both practical and theoretical applications. Theoretically, the current research demonstrates the importance of predicted outcome value when trying to motivate information seeking. Practically, it provides data suggesting that providing health care reform information on a tailored website can help alleviate uncertainty. This data will be useful as health care reform is implemented over the next seven years and varied groups ranging from the federal government to insurance companies and local public health organizations will be trying to effectively provide information to the public.

APPENDICES

Appendix A

Study One Measures

All measures used 7 point likert scales ranging from 1=strongly disagree to 7=strongly agree, unless otherwise specified.

Uncertainty

Macro level:

- I generally understand health care reform.

- I am well acquainted with the major components of health care reform.

- I am confident that I comprehend health care reform.

- I am certain about the implications of health care reform.

- Health care reform is very clear to me.

-I generally do not understand health care reform very well

Personal effects:

- I know how health care reform will affect me.

- I am certain about the influence of health care reform on me.

- I understand how health care reform will influence me.

- I am confident that I comprehend how health care reform will affect me.

-I am uncertain about the effects of health care reform.

- I know how health care reform will affect me financially.

- I am certain about the influence of health care reform on me financially.

- I understand how health care reform will influence me financially.

- I am confident that I comprehend how health care reform will affect me financially.

- I am uncertain about the influence of health care reform on me financially.

- I know how health care reform will affect the quality of my health care.

- I am certain about the influence of health care reform on the quality of my health care.

- I understand how health care reform will influence the quality of my health care.

- I am confident that I comprehend how health care reform will affect the quality of my care.

- I am uncertain about the influence of health care reform on the quality of my health care.

- I know how health care reform will affect the availability of health care.

- I am certain about the influence of health care reform on the availability of health care.

- I understand how health care reform will influence the availability of health care.

- I am confident that I comprehend how health care reform will affect the availability of health care.

- I am uncertain about the influence of health care reform on the availability of health care.

Post-graduation:

- I am certain about how health care reform will influence my health care options after college.

- I know how health care reform will affect me upon graduation.

- I understand how health care reform will influence my health care options when I graduate.

- How health care reform will affect my health coverage after graduation is very clear to me.

- I am uncertain about how health care reform will influence my health care options after college.

Uncertainty tolerance

General (from Buhr & Dugas, 2002):

-Uncertainty stops me from having a strong opinion.

-It frustrates me to not have all the information I need.

-When I am uncertain I can't function very well.

-I always want to know what the future has in store for me.

-I generally try to avoid situations where I am uncertain.

-Being uncertain means I lack confidence.

Political (NFPI from Neuberger, 2010b):

-I enjoy hearing about political issues and events.

-I actively seek out political information.

-I like the responsibility of gathering political information.

-I find satisfaction in gathering political information.

Health care specific:

-Uncertainty stops me from having an opinion about health care reform.

-It frustrates me to not have all the information about health care reform I need.

-When I am uncertain about health care reform I can't function very well.

-I want to learn a lot about health care reform.

-I am very interested in information about health care reform.

-I want to have a lot of knowledge related to health care reform.

-I need to learn more about health care reform.

-I don't need to know much about health care reform.

-I have all the information about health care reform that I need.

-Even when I have gotten sufficient information about health care reform to fully understand it, I will probably still be interested in learning more about it.

Predicted outcome value

-Health care reform will negatively impact the quality of health care I will receive in the future.

-Health care reform will help me have affordable health care in the future.

-Health care reform will improve the quality of care that I receive from health care providers.

-Health care reform will make it more difficult for me to obtain health care coverage.

Information specific:

-Health care reform information will help me make better decisions about my care.

-Health care reform information would be valuable to me.

-I think health care reform information will be useful for me.

-Health care reform information is useless.

Future interaction:

-I will be influenced by health care reform in the future.

-Health care reform will have an effect on my life.

-Health care reform will affect me in the future.

-My life will be influenced directly by health care reform.

-I will be influenced by health care reform.

Deviance:

-Health care reform is too erratic and unpredictable to worry about.

-Health care reform laws are likely to change.

-How health care reform policies will influence me is unpredictable.

-It is impossible to know how health care reform will be implemented.

-Health care reform will never actually be implemented.

-Health care reform lacks staying power.

-It is just a matter of time before major changes to the current health care reform law occur.

Incentive value:

-Information about health care reform will be useful for me in the future.

-Knowing more about health care reform may have benefits.

-There are positive outcomes associated with knowing about health care reform.

-Being more informed about health care reform would be beneficial.

Knowledge

(Answer options: the law will do this/the law will not do this/don't know)

-Health care reform will make health insurance available for sale so that any American can buy it if he or she wants to.

-Health are reform will prevent a health insurance company from limiting the amount of money that it will pay for a person's health care cost during his or her life.

-Health care reform will allow young adults to get health insurance by being included in their parents' health insurance policies until they turn 26.

-Health care reform will require fast food restaurants that sell unhealthy food or drinks to pay a fee to the federal government.

-Health care reform will create committees of people who will review the medical histories of some people and decide whether they can get medical care paid for by the federal government.

-Health care reform will require each state in the U.S. to create a new program that can sell health insurance at a low price to U.S. citizens who have very low incomes.

-Health care reform will give federal tax credits to some very small companies if they buy health insurance for their employees.

-The following will be also assessed with each knowledge item:

-*Specific Area Uncertainty:* Each item will also include "How sure are you about that?" question – answer options include not sure at all, slightly sure, moderately sure, very sure, and extremely sure.

-*Specific Area Concern for Uncertainty*: Each item will also include – "My lack of knowledge about this area of health care reform is: question – answer options include: unconcerning – I understand it well, unconcerning, I don't understand but I don't care, mostly unconcerning – I probably know all I need to know, somewhat concerning – I should probably be more informed, and very concerning – I am worried about how uninformed I am

Involvement

-To me, health care reform is:

unimportant __ __ __ __ __ important
boring __ __ __ __ __ interesting
irrelevant __ __ __ __ __ relevant
unexciting __ __ __ __ __ exciting
means nothing __ __ __ __ __ means a lot to me
unappealing __ __ __ __ __ appealing
dull __ __ __ __ __ fascinating
uninvolving __ __ __ __ __ involving
unnecessary __ __ __ __ __ necessary
inessential __ __ __ __ __ essential
irresponsible __ __ __ __ __ responsible
useless __ __ __ __ __ useful
unpredictable __ __ __ __ __ predictable

Projected information seeking

-I plan to seek information about health care reform.

-The government of health care organizations will provide me with everything I need to know about health care reform

-I am confident that the information I need to know about health care reform will find its way to me without me having to go look for it. (R)

-I have already started seeking information about health care reform.

-I plan to consult many different sources for information about health care reform.

-I will probably look for some information about health care reform.

-How likely are you to seek information about health care reform *before* graduation? (very unlikely to very likely)

-How likely are you to seek information about health care reform *after* you graduate? (very unlikely to very likely)

Many different groups provide information about health care reform. Please rank your preference of the following sources of information from 1 to 5, with 1 = very undesirable and 5 = very desirable.

Insurance companies _____	Newspapers _____
TV News _____	Politicians _____
Health Organizations _____	Non-Profits _____
Internet Sources _____	Friends _____
Family _____	Opinion Pieces _____

Please list other preferred sources: _____

-Would you prefer that these sources be affiliated with: *(select one)*

□ Democratic Party	□ Republican Party
□ Both Democratic and Republican Parties	□ Neither party
□ Other (please specify) _____	

with a specific party, that the sources be non-partisan or a mix of the two?

Information about health care reform is presented in many different formats. Please rank your preference of the following formats of health care information from 1 to 5, with 1 = very undesirable and 5 = very desirable.

Narrative (stories) _____	Political speech _____

Statistics _____ Decision Guide _____

Legislation _____ Fact Sheet _____

Website _____ Advertisements _____

Please list other preferred formats: _____

Demographics

I am _____ years old.

I am □ Male □ Female

I am a:
□ Freshman □ Sophomore
□ Junior □ Senior
□ Other

My major is: _____

Which option best describes your ethnicity/race?
□ White/European/Caucasian □ Native American
□ Chicano/Latino/Hispanic □ Middle Eastern
□ Black/African American/African □ Mixed
□ Asian □ Other
□ Pacific Islander

How would you characterize your political affiliation?
□ Strong Democrat □ Strong Republican
□ Weak Democrat □ Weak Republican
□ Independent Democrat □ Independent Republican
□ Independent □ Apolitical
□ Other _____

Do you have health care coverage? □ Yes □ No

If YES, which of the following best described your coverage?
□ Covered under parents plan
□ Provided by the university
□ Government provided
□ Privately purchased
□ N/A

Overall, how do you feel about health care reform?
□ Strongly disapprove

□ Somewhat disapprove
□ Neither disapprove nor approve
□ Somewhat approve
□ Strongly approve

Which of the following best expresses your view of the health care law that Congress passed last March?
□ I oppose most or all of the changes made by the law
□ I oppose a few of the changes made by the law
□ I favor most or all of the changes made by the law, but I think the law doesn't do enough to improve the health care system

Appendix B

Study Two Pre-test Measures

All measures used 7 point likert scales ranging from 1=strongly disagree to 7=strongly agree, unless otherwise specified.

Uncertainty

Macro level:

- I generally understand health care reform.

- I am well acquainted with the major components of health care reform.

- I am confident that I comprehend health care reform.

- I am certain about the implications of health care reform.

- Health care reform is very clear to me.

-I generally do not understand health care reform very well

Personal effects:

- I know how health care reform will affect me.

- I am certain about the influence of health care reform on me.

- I understand how health care reform will influence me.

- I am confident that I comprehend how health care reform will affect me.

-I am uncertain about the effects of health care reform.

- I know how health care reform will affect me financially.

- I am certain about the influence of health care reform on me financially.

- I understand how health care reform will influence me financially.

- I am confident that I comprehend how health care reform will affect me financially.

- I am uncertain about the influence of health care reform on me financially.

- I know how health care reform will affect the quality of my health care.

- I am certain about the influence of health care reform on the quality of my health care.

- I understand how health care reform will influence the quality of my health care.

- I am confident that I comprehend how health care reform will affect the quality of my care.

- I am uncertain about the influence of health care reform on the quality of my health care.

- I know how health care reform will affect the availability of health care.

- I am certain about the influence of health care reform on the availability of health care.

- I understand how health care reform will influence the availability of health care.

- I am confident that I comprehend how health care reform will affect the availability of health care.

- I am uncertain about the influence of health care reform on the availability of health care.

Post-graduation:

- I am certain about how health care reform will influence my health care options after college.

- I know how health care reform will affect me upon graduation.

- I understand how health care reform will influence my health care options when I graduate.

- How health care reform will affect my health coverage after graduation is very clear to me.

- I am uncertain about how health care reform will influence my health care options after college.

Uncertainty tolerance

General (from Buhr & Dugas, 2002):

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-I always want to know what the future has in store for me.

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-I need to learn more about health care reform.

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Deviance:

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-Health care reform laws are likely to change.

-How health care reform policies will influence me is unpredictable.

-It is impossible to know how health care reform will be implemented.

-Health care reform will never actually be implemented.

-Health care reform lacks staying power.

-It is just a matter of time before major changes to the current health care reform law occur.

Incentive value:

-Information about health care reform will be useful for me in the future.

-Knowing more about health care reform may have benefits.

-There are positive outcomes associated with knowing about health care reform.

-Being more informed about health care reform would be beneficial.

Knowledge

(Answer options: the law will do this/the law will not do this/don't know)

-Health care reform will make health insurance available for sale so that any American can buy it if he or she wants to.

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-Health care reform will require fast food restaurants that sell unhealthy food or drinks to pay a fee to the federal government.

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-*Specific Area Concern for Uncertainty*: Each item will also include – "My lack of knowledge about this area of health care reform is: question – answer options include: unconcerning – I understand it well, unconcerning, I don't understand but I don't care, mostly unconcerning – I probably know all I need to know, somewhat concerning – I should probably be more informed, and very concerning – I am worried about how uninformed I am

Involvement

-To me, health care reform is:

unimportant __ __ __ __ __ important
boring __ __ __ __ __ interesting
irrelevant __ __ __ __ __ relevant
unexciting __ __ __ __ __ exciting
means nothing __ __ __ __ __ means a lot to me
unappealing __ __ __ __ __ appealing
dull __ __ __ __ __ fascinating
uninvolving __ __ __ __ __ involving
unnecessary __ __ __ __ __ necessary
inessential __ __ __ __ __ essential
irresponsible __ __ __ __ __ responsible
useless __ __ __ __ __ useful
unpredictable __ __ __ __ __ predictable

Projected information seeking

-I plan to seek information about health care reform.

-The government of health care organizations will provide me with everything I need to know about health care reform

-I am confident that the information I need to know about health care reform will find its way to me without me having to go look for it. (R)

-I have already started seeking information about health care reform.

-I plan to consult many different sources for information about health care reform.

-I will probably look for some information about health care reform.

-How likely are you to seek information about health care reform *before* graduation? (very unlikely to very likely)

-How likely are you to seek information about health care reform *after* you graduate? (very unlikely to very likely)

Many different groups provide information about health care reform. Please rank your preference of the following sources of information from 1 to 5, with 1 = very undesirable and 5 = very desirable.

Insurance companies _____	Newspapers _____
TV News _____	Politicians _____
Health Organizations _____	Non-Profits _____
Internet Sources _____	Friends _____
Family _____	Opinion Pieces _____

Please list other preferred sources: _____

-Would you prefer that these sources be affiliated with: *(select one)*

□ Democratic Party	□ Republican Party
□ Both Democratic and Republican Parties	□ Neither party
□ Other (please specify) _____	

with a specific party, that the sources be non-partisan or a mix of the two?

Information about health care reform is presented in many different formats. Please rank your preference of the following formats of health care information from 1 to 5, with 1 = very undesirable and 5 = very desirable.

Narrative (stories) _____	Political speech _____

Statistics _____ Decision Guide _____

Legislation _____ Fact Sheet _____

Website _____ Advertisements _____

Please list other preferred formats: _____

Demographics

I am _____ years old.

I am □ Male □ Female

I am a:
□ Freshman □ Sophomore
□ Junior □ Senior
□ Other

My major is: _____

Which option best describes your ethnicity/race?
□ White/European/Caucasian □ Native American
□ Chicano/Latino/Hispanic □ Middle Eastern
□ Black/African American/African □ Mixed
□ Asian □ Other
□ Pacific Islander

How would you characterize your political affiliation?
□ Strong Democrat □ Strong Republican
□ Weak Democrat □ Weak Republican
□ Independent Democrat □ Independent Republican
□ Independent □ Apolitical
□ Other _____

Do you have health care coverage? □ Yes □ No

If YES, which of the following best described your coverage?
□ Covered under parents plan
□ Provided by the university
□ Government provided
□ Privately purchased
□ N/A

Overall, how do you feel about health care reform?
□ Strongly disapprove

□ Somewhat disapprove
□ Neither disapprove nor approve
□ Somewhat approve
□ Strongly approve

Which of the following best expresses your view of the health care law that Congress passed last March?
□ I oppose most or all of the changes made by the law
□ I oppose a few of the changes made by the law
□ I favor most or all of the changes made by the law, but I think the law doesn't do enough to improve the health care system

Appendix C

Study two post-test measures

All measures used 7 point likert scales ranging from 1=strongly disagree to 7=strongly agree, unless otherwise specified.

Website use

- Did you access the website about healthcare reform that was emailed to you? *(Yes or No)*

-Approximately how many minutes did you spend on the website? (*open ended response)*

-Why did you go to the website? (*open ended response)*

-Did you watch the video? *(Yes or no)*

-Which was your favorite page? (*Homepage, By the numbers, MSU student experience, In the media, FAQ)*

-I generally liked the website.

-What did you like about the website? (*open ended response)*

-What did you dislike about the website? (*open ended response)*

-I learned something from the website.

-What information not present on the website would have been useful? (*open ended response)*

-I would use a website like this in the future.

Recall

-Which of the following is closest to the estimated cost of health care reform over the next ten years? *(answer options coded 0 for incorrect, 1 for correct)*

-Which age group is often referred to as the "invincibles"? *(answer options coded 0 for incorrect, 1 for correct)*

-Why did MSU student Erick get a phone call from president Obama? *(answer options coded 0 for incorrect, 1 for correct)*

-Which of the following is not true about health care reform? *(answer options coded 0 for incorrect, 1 for correct)*

Uncertainty

Macro level:

- I generally understand health care reform.

- I am well acquainted with the major components of health care reform.

- I am confident that I comprehend health care reform.

- I am certain about the implications of health care reform.

- Health care reform is very clear to me.

Personal effects:

- I know how health care reform will affect me.

- I am certain about the influence of health care reform on me.

- I understand how health care reform will influence me.

- I am confident that I comprehend how health care reform will affect me.

- I know how health care reform will affect me financially.

- I am certain about the influence of health care reform on me financially.

- I understand how health care reform will influence me financially.

- I am confident that I comprehend how health care reform will affect me financially.

- I know how health care reform will affect the quality of my health care.

- I am certain about the influence of health care reform on the quality of my health care.

- I understand how health care reform will influence the quality of my health care.

- I am confident that I comprehend how health care reform will affect the quality of my care.

- I know how health care reform will affect the availability of health care.

- I am certain about the influence of health care reform on the availability of health care.

- I understand how health care reform will influence the availability of health care.

- I am confident that I comprehend how health care reform will affect the availability of health care.

Post-graduation:

- I am certain about how health care reform will influence my health care options after college.

- I know how health care reform will affect me upon graduation.

- I understand how health care reform will influence my health care options when I graduate.

- How health care reform will affect my health coverage after graduation is very clear to me.

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