The Tipping Point
When Do Motivated Reasoners Become Affectively Intelligent?

Karen M. Emmerson
karen-emmerson@uiowa.edu

Department of Political Science
University of Iowa
Iowa City, IA 52242

March 11th, 2006

Abstract

This paper describes a study that examines the role of affect in the voter decision-making process. Using a dynamic information board (Lau and Redlawsk, 2001), the study track voters emotional state, information searching, and candidate evaluations through a simulation of a presidential primary campaign. By manipulating the anxiety level and the amount of incongruent information a subject encounters, we can detect the influence of affect in information processing. We find evidence that affect has a non-linear relationship to candidate evaluation and are able to estimate the point at which voters cease to incorrectly update candidate evaluations because of their liking of a candidate and begin to more rationally account for negative information.

The Tipping Point
When Do Motivated Reasoners Become Affectively Intelligent?

In a perfect world, voters would be rational. They would know their own preferences, and they would choose the candidate that best represented them. There would be a rational formula that predicts a person's vote choice would make based on the information they encountered during a campaign. We know, however, that voters do not necessarily make rational and therefore "correct" vote choices (Lau and Redlawsk, 1997). Emotions, among other things, have a profound effect on vote choice. Classic political theory draws a clear distinction between reason and emotion, but recent research from neuroscience (for example Damasio, 1999) to political science (Marcus et al., 2000) demonstrate that emotions are an integral part of our decision-making processes.

Emotions, or affect, can color how we think about candidates or issues and how we process new information learned in a campaign. Based on rational updating, a negative piece of information should make us think worse of a candidate and a positive piece of information should make us think better of a candidate, but how does this change if the candidate is the voter's favorite? How about if the candidate is the voter's least favorite? Affect alters the cognitive process and can change how voters perceive and evaluate candidates. In this paper we present evidence that voters seemingly ignore some amount of negative information about their favorite candidate to the extent that voters even like their favorite candidate *more* after seeing some negative information. This behavioral disposition, contrary to classical notions of rational updating, is consistent with theories of motivated reasoning (Lodge et al., 1989), research on "conservative bias" (Steenbergen, 2001), and the concept of cognitive dissonance (Festinger,

1957). We demonstrate here that there is, however, a point at which voters stop reinforcing their preferences and start updating rationally. We call this the tipping point.

Theoretical Background

In looking for evidence of this tipping point, we are really examining how voters process information that they encounter in a campaign setting. Research in this area has primarily dealt with one of three major topics: information search (Downs, 1957; Lau & Redlawsk, 2001a; 2006), assessment and evaluation (Kelley & Mirer, 1974; Lodge et al., 1989; Zaller, 1992; Gerber & Green, 1999; Holbrook et al., 2001; Marcus et al., 2000; Lodge & Taber, 2000; Redlawsk, 2002; 2006), and choice (Kelley & Mirer, 1974; Redlawsk, 2001; Lau & Redlawsk, 2006). Here we are primarily concerned with the evaluation branch of this research, as our study examines how voters update their evaluations in the face of new information.

Kelley and Mirer first explained "the simple act of voting" as a model for voter evaluation of candidates (1974). Their theory suggests that voters first encounter information and store it in memory and then recall it much later at the moment of decision. It is only then that the voter organizes a pros-and-cons list for each candidate and chooses the candidate with the most net pros. This model argues that evaluation and choice are simultaneous. While the model is logical and attractively parsimonious, and it certainly does make some attempt to explain the internal mental processes of the voter, there is no clear delineation of exactly how the evaluation is made, how information is categorized as good or bad, or how it is weighted in the decision making process. One could also question whether or not the information is remembered accurately and completely when a voter goes to make an evaluation on Election Day.

Lodge et al. (1989) have posited a very different model for candidate evaluation. Their idea of "online processing" is more impression driven, with information evaluated as soon as it is encountered. Voters receive new information, evaluate it immediately as being either positive or negative, and update a running tally of these evaluations that is maintained for each candidate. At the moment of decision, the voter simply chooses the candidate with the highest tally or "score". This model is even simpler than Kelley and Mirer's, and it may even be more realistic in that it does not require voters to remember large amounts of information accurately for months before the election. The evaluation is still a logical, even mathematical process of aggregating all of a voter's impressions of a candidate, but it still does explicitly describe the updating process.

If evaluation is a dynamic process rather than a function of memory recall at the time of decision, understanding the updating of evaluations becomes of paramount concern. If the running tally changes with every new piece of information, then understanding how each piece is added in is essential. Each piece of information might not be weighted equally, so we need to understand what kind of information is more important in evaluations. If politics is as much about feeling as thinking, does how a voter feels about information or about a candidate make a difference in how the tally for the candidate is updated? We argue that it does.

Many early models do not account for affect in the decision-making and evaluating process. Green and Gerber (1999) describe a Bayesian updating process in which new information interacts with prior beliefs. New information that is in agreement with prior beliefs should strengthen those beliefs. Information that is contrary to prior beliefs should cause the opposite. In the case of voting, a voter's early positive impressions of a candidate should be strengthened by hearing that a candidate agrees with them on the issues. When a candidate

disagrees with the voter, the prior beliefs should be updated to account for the disagreement, and the voter's evaluation of the candidate should decrease. Nowhere in the Bayesian model is there any mention of affect towards the candidate as an impediment to changing prior beliefs. However, previous research done by Redlawsk (2002) and Redlawsk, Lau, and Civettini (forthcoming) has found evidence that evaluations of candidates are somewhat resistant to change, even in the face of negative information.

Zaller (1992) posits an alternative to the Bayesian updating process, the "Receive-Accept-Sample" or RAS model. The model is constructed around four basic axioms. The first is the Reception axiom, which suggests that individuals who are more cognitively engaged with an issue are more likely to perceive and comprehend messages relating to that issue. The Resistance axiom argues that individuals are resistant to arguments that run counter to their political predispositions, but only if the individuals actually understand that the message is contrary to their beliefs. Individuals who are less politically aware are more likely to accept messages that both disagree and agree with their predispositions. The Accessibility axiom states that recent considerations are the ones that will be retrieved when a question is posed, and the Response axiom claims that people will respond to questions by averaging all relevant considerations that come to mind. This amounts to the *reception* of new information, the decision of whether or not to *accept* it, and a *sampling* of considerations at the moment when a question is asked. Zaller developed this in relation to survey research, showing that for less politically aware individuals who accept contradicting information, it is more likely that small things like question wording and framing or other situational factors can sway their responses to questions. The resistance axiom seems consistent with findings that candidate evaluations are resistant to change. Perhaps this is a result of politically aware voters refusing to accept new

information. On the other hand, the incorrect updating of prior beliefs could be result of less engaged voters sampling only positive considerations when they make their evaluations. Either explanation is plausible, but again, there is no room for emotion.

Holbrook et al's (2001) Asymmetric Nonlinear Model (ANM) also addresses the difference between "positive" and "negative" information in the updating of evaluations. ANM suggests that positive information (i.e. any information or issue position with which the voter disagrees) carries less weight than negative information. In order to update evaluations, a voter must assess the direction of the information before adding it to an evaluation of a candidate. This assessment is still cognitive rather than affective. When a voter sees even a few pieces of information about a candidate with which the voter disagrees, we should see that information pull the evaluation of that candidate down even if the voter also sees an equivalent amount of positive information.

Since Festinger's (1957) research on cognitive dissonance and Heider's (1958) development of balance theory, studies have suggested that cognition is biased. The theory of hot cognition (Abelson, 1963) argues that affect and cognition are inexorably linked. For every concept or piece of information in memory there is an associated affective value. The cognitive value is then activated whenever the concept is accessed (Lodge & Taber, 2000). Whether positive or negative, these tags are part of our memory and cannot be separated from information, so theories that account for the processing of information are only telling half the story. Indeed, Zajonc's (1984) theory on the primacy of affect argues that affect comes even before we cognitively process information.

Marcus et al. (2000) have proposed the theory of affective intelligence to describe the effects on emotions on cognitive processes. They believe that emotional responses to political

candidates cannot be modeled simply by attaching an affective tag to cognition. Emotions are the result of dual processes: a behavioral inhibition system and a behavioral approach system (Marcus & MacKuen, 1993). The first system compares new stimuli to our existing expectations, and upon finding that these stimuli are incongruent with our expectations, it shifts our attention to the incoming information. Perceived threat generates anxiety, causing the behavioral inhibition system to interrupt normal processing to deal with the threat. This interruption leads to conscious processing, meaning that the individual is paying more attention to the new information and that it takes longer to process it. Anxiety, as they conceive it, motivates the individual to learn more about the environment in general. The behavior approach system provides feedback about ongoing activities and is responsible for generating enthusiasm.

Marcus et al. (2000) tested these effects using political candidates and NES data. Political candidates generate emotions, and in conditions where anxiety is generated, learning is enhanced. Enthusiasm, on the other hand, does not lead to greater learning or make individuals more careful in processing information. They did find, however, that enthusiasm led to greater political participation. Thinking about campaigns specifically, we would expect that anxious voters would be more attentive, more informed, and more correct voters.

Other research on affect and its effect on cognition is mixed. Holbrook (2004) used political ads to generate positive, negative, and neutral affect in subjects. Individuals in the high anxiety condition were more responsive to new information, but overall their ability to accurately recall information was lessened. Brader (2005) found results that were quite the opposite. Anxious subjects in his study, which also used political ads to generate affect, were more likely to recall information, specifically information that was related to the issue in the ads, but they were not more likely to seek out more information on the issues related to the ad. Isen's (2000)

research on affect and decision-making focused primarily on positive affect, arguing that positive affect can actually improve cognitive ability, which is contrary to what Marcus et al. found. Isen claims that positive affect increases an individual's ability to recall positive information, or information that is congruent with the subject's existing beliefs or expectations. However, these affectively positive individuals are more likely to ignore negative information, or information that is incongruent with their existing beliefs. Here again we find a possible explanation of why individuals resist change in their evaluations of candidates in the face of new negative information.

The idea of motivated reasoning (Kunda, 1990; Lodge & Taber, 2000) suggests a similar explanation. Motivated reasoners make an immediate evaluation of each new piece of information and maintain an on-line tally of these evaluations which constitutes their current affect toward the object (Hastie and Park, 1986; Lodge et al., 1989; Redlawsk 2001). In the case of a political candidate, a voter would evaluate each issue position and note their agreement or disagreement with it in order to update their tally for the candidate. Since new information does come with this affective tag and the related object has a running tally, the affective components interact so that the on-line tally actually influences the evaluation of the new information before the information is used to update the tally. For example, a voter's positive tally for a liked candidate would interact with new information carrying a negative affect, possibly causing the voter to weight the new information less heavily as it is added to the tally. This seems to be another way of expressing Isen's conclusions that positive information is weighted more heavily than negative information by individuals in a positive affective state. The previously developed idea of affective congruence (Bower, 1981; Niedenthal and Setterlund, 1994) also predicts that

the closer a voter's mood is to the affective tone of a message, the better received the message will be.

An even more intriguing phenomenon is the attitude strengthening effect (Lodge and Taber, 2000; Redlawsk, 2002). Some motivated reasoners seem to hold their existing evaluations so strongly that they improperly update their evaluations in the face of new information. Once individuals have a preference for an object, a new piece of information that is negative about that object can actually serve to *strengthen* the individual's preference for the object. Edwards and Smith (1996) find that when individuals are confronted with an argument that is in conflict with their prior beliefs they judge that argument to be weak, spend longer scrutinizing the argument, and generate a list of relevant thoughts and arguments that tend to refute the argument rather than support it. This process is consistent with strengthening effect. In the context of a campaign, a voter learning something negative about their favorite candidate might first denigrate or doubt the validity of the information, spend a long time reviewing it and trying to comprehend it, and in the process create a list of relevant thoughts, most of which argue why the information is either false or unimportant. This thought-listing task, in refuting the new piece of information, could call to mind many of the reasons for the initial liking of the candidate, leaving the voter with an overall better feeling about the candidate after encountering the negative information.

In all of these theories, there are a number of commonalities that form the basis of our study. We know that voters update their evaluations based on new information encountered during the campaign. We also know that affect influences this process in many ways. Voters with a positive affect towards a candidate should want to hold on to that evaluation and resist changing their opinion of their favorite. However, it has also been suggested that increasing a

voter's anxiety will increase information search and produce a more "rational" updating process. The question addressed in this paper is at what point do these motivated reasoners let go of their positive affect and succumb to influence of incongruent information and the anxiety it creates? We argue here that voters' evaluations of candidates should follow a pattern like the one seen in Figure 1. After an early preference is formed, a small amount of incongruent information

[Insert Figure 1 here.]

should make voters' evaluations of their candidates go up until the amount of incongruent information reaches the tipping point where more negative information will only sink the candidate in the voter's estimation. In our study, we find evidence that this describes voters' evaluations.

Methodology[1]

In order to understand how emotion affects learning, evaluation and choice in an election, we need to create an experimental environment in which the flow of information is completely controlled and the entire process of information gathering and decision-making is monitored from start to finish. While a decision may be a single choice made at one point in time, *decision-making* is a process that we need to trace as it happens to understand its complexities. A methodology known as process tracing has proved very appropriate for this task and has been used effectively in several areas outside of political science. Process tracing is based on this assumption that decision-making must be traced as an on-going process (Ford, Schitt, Schectman, Hults, and Doherty, 1989; Jacoby, Jacard, Kuss Troutman, and Mazursky, 1987). Experiments

[1] The study described here and from which I collected my data was first described in Civettini and Redlawsk (2005). It is part of a series of studies conducted by Redlawsk and Lau (see Lau, 1995; Lau and Redlawsk, 1997, 2001a, 2001b, Redlawsk 2001, 2002, 2004; Redlawsk, Civettini, and Lau, Forthcoming).

using this method usually make use of an information board, allowing subjects to choose exactly which information they would like to read or view. A few studies have been conducted using an information board approach to examine voting (Herstein, 1981), political decision-making (Riggle and Johnson, 1996), and information search in political environments (Huang, 2000; Huang and Price, 1998). There has been little use of this method in studying attitude formation and candidate evaluation, though it would seem that process tracing with an information board could yield great insights into these processes.

There are, however, some definite drawbacks in using the traditional information board to track political decision making. In its original design, the information board is *static* providing an organized and constant access to all pieces of information available. In the context of an election, this would mean that a voter would have the ability to access any piece of information about a candidate, be it a position on a particular issue or a personal characteristic, at any time and easily compare candidates on any attribute they choose. Information board designs also generally allow unlimited time for information search. In a real political situation like an election, information is much less organized, much more chaotic, and the time allowed for learning and information gathering is limited by Election Day. During a campaign, information comes and goes, and candidates do no make it easy for voters to do an objective comparison or even get a clear understanding of where they stand on issues. The static information board does not reflect these realities of the political environment, so a new method is required to properly trace the decision-making process.

The Lau and Redlawsk (2001) dynamic information board technology offers such a method and is used in this study. The dynamic board creates an ever-changing information environment that mimics the flow of information throughout a campaign. In contrast to the static

board, which gives subjects access to all available information at all times, the dynamic information board makes only limited amounts and types of information available at any point during the simulation, much like in an election campaign in which many issues are "here today, gone tomorrow." It also overwhelms subjects with unmanageable amounts of unorganized information in a way that resembles the media maelstrom in the real political environment. This new method still has the essential characteristics of traditional process tracing experiments in that it tracks the decision-making process as it happens and as information is acquired.

For our purposes, this experimental design works very well. Affective intelligence and motivated reasoning, two concepts central to our study, are easily and perhaps more effective tested in such an environment. For example, affective intelligence posits that subjects whose level of anxiety is increased should exhibit greater amounts of information seeking, while subjects who become angry should show signs of aversion by avoiding the candidate(s) that have caused their anger. Since we are recording all the information they gather, we can easily see if anxiety towards a particular candidate or overall has increased the number of items a subject reads about a candidate or in general. Conversely, we should see a drop off in information gathering if a subject has become angry or frustrated. In our experiment, we measured, among other things, the amount of information a subject looked at for each candidate and the accuracy with which they could place each candidate on a liberal to conservative scale after the end of the campaign simulation. This last measure was one of many we used to test for learning and memory. Using these measures as an example, we should see more information gathering for candidates that made a subject anxious, and consequently the subject should have learned more and understand better the candidates' positions on issues.

To generate anxiety, anger, or even enthusiasm, we manipulated subject-candidate agreement. Since we had complete control over the flow of information, we were able play with the distance between a subject's preferences and a candidate's position on issues, for example. When a candidate and a subject are very close on an issue, that should generate enthusiasm about the candidate. When the candidate is distant, the subject may become angry toward him. Anxiety should result when the candidate is far enough away from the subject to make him or her uneasy but not far enough to make the subject angry or cause them to give up on the candidate entirely. Evidence of these effects was found in Redlawsk (2002) and in this study as well. We asked subjects for their candidate preferences early in the campaign simulation and thereafter manipulated the voter-candidate agreement between the subjects and their most and least preferred candidates. We did this so that we could clearly see and test whether or not the above effects were present.

Using dynamic process tracing, we were able collect data on what information subjects accessed for each candidate, how long they spent on each piece of information, how they felt about each item, and the subjects' vote choices and evaluations of each candidate. These last measures were taken multiple times throughout the simulation in the form of telephone polls in which the subject was asked to choose a favorite candidate and rate each candidate on a feeling thermometer. Given all the measures we were able to monitor, this methodology clearly provides the best way, to date, of tracking the decision-making process in campaigns and the role that emotions play in the learning of new information and evaluation of candidates.

Experimental Design

A total of 207 subjects were recruited from the greater Iowa City area to participate in a mock presidential primary featuring four candidates from one party.[2] None of the subjects were undergraduates. All of the candidates in the primary were fictional but designed to be a realistic representation of the range of ideologies within their parties. Since the candidates were not real, subjects clearly had no prior knowledge about any of them, allowing them to base their evaluations only on the information provided during the simulation. Subjects were allowed to register for either party, Democratic or Republican, before being exposed to information for only candidates from the chosen party. As with any closed primary, subjects were only allowed to vote in the party for which they had registered.

There were three experimental manipulations in the election simulation. The one that primarily concerns us here is the manipulation that varied the amount of incongruent information a subject encountered during the simulation. Incongruent information refers to information that is at odds with the subject's own preferences or perceptions. For the candidate that the subject liked best, incongruent information would be any attribute or issue position held by that candidate and with which the subject disagreed. For example, if a subject was pro-choice, an incongruent piece of information about his or her most liked candidate would be that he was pro-life. Conversely, an incongruent piece of information about disliked candidate would be that he shared the subject's pro-choice position. About seven minutes into the simulation, subjects were polled and asked to indicate which candidate they would vote for if the election were held at that point.[3] Subjects were also asked to evaluate each candidate on a feeling thermometer, allowing

[2] Subjects were recruited in a variety of ways to ensure some level of diversity, specifically in age and income. We do not claim that the subject pool is representative of any particular population. Subject ranged in age from 18-88 years and had household incomes ranging from 7.5 to 100 thousand dollars per year. Fifty-six (56) percent of the subjects were female. Each subject who completed the study received $20 for their time.

[3] By the first poll, the average subject had looked at 15-20 pieces of information, which were generally evenly spread across the four candidates in his or her party.

us to assess the affect of the subject toward each candidate prior to the manipulation. After the first poll[4], subjects were randomly assigned to one of five levels of the incongruent information manipulation. Subjects in group 1 continued to see candidates that were not manipulated in anyway. These candidates were assigned issue positions that were ideologically consistent (i.e. the most liberal Democrat always taking the most liberal position or the moderate Democrat always taking the more conservative positions held by his party) and any incongruent information was not intentionally given to the subject. In group 2, subjects were deliberately given 10% incongruent information about their most and least liked candidates[5], subjects in group 3 received 20% incongruent information, and groups 4 and 5 faced 40% and 80% incongruent information, respectively.

To summarize the various experimental conditions under which our subjects participated, Figure 2 (Civettini and Redlawsk, 2005) outlines all three manipulations[6] and how they interacted in the experiment.

[Insert Figure 2 here.]

[4] Subjects were polled a total of three times during the 25 minute simulation. Each time they were asked to indicate vote choice and evaluate the candidates on the feeling thermometer. Subjects also evaluated the candidates one more time after the actual vote at the end of the simulation.

[5] The amount of incongruent information is based on the information made available to the subjects, not the information they actually accessed. These percentages were used only for assignment purposes, and a more specific measure of incongruent information was created for analysis. It will be fully discussed later in the paper.

[6] The second manipulation aimed to alter the overall emotional state of the subjects just before the simulation began. Approximately half of the subjects were given special instructions about the experiment to heighten their anxiety. The instructions suggested that the subjects' performance in the experiment was key to the continuation of our research funding. The other half of the subjects did not receive these instructions. Those subjects that were assigned the anxiety prompt should exhibit, overall, greater amounts of information processing and learning, as suggested by Marcus et al. (2000).

The third manipulation involved asking subjects how they felt about the pieces of information that they accessed. Approximately half of the subjects were asked immediately after viewing each item whether or not the information had made them feel more enthusiastic, anxious, and/or angry toward the candidate. They were also asked to try to recall the affect attached to information at the end of the study when they were shown the heading of each piece of information again. The other half of the subjects were only asked to recall their affect at the end of the study, well after the simulation had been completed. This manipulation was designed to test whether or not subjects, or voters in general, can really accurately recall the affect attached to information they learned during the election when they are asked about it after election day. Survey research often makes this assumption but it had not been formally tested.

When subjects arrived at our computer laboratory, they were seated at their own computers and given an oral introduction to the experiment by the experimenter[7]. Subjects then completed a questionnaire on the computer that measured their political preferences, knowledge, and interests. These questions allowed us to gauge each subject's ideological placement on the issues that would be used in the simulation and then manipulate the subject-candidate agreement for subjects assigned to groups that received incongruent information. After the subjects had been given a chance to practice with the program used in the simulation, they proceeded to the primary campaign where they had 25 minutes to learn about the four candidates in their primary and make a vote choice. After voting, they were asked a number of follow-up questions, including where they would place each candidate on the liberal-conservative spectrum and what memories they had about each candidate. Since they were not warned about these questions beforehand we are able to gauge how much they actually learned in the simulated campaign environment. Finally, subjects completed the cued recall portion of the study where they indicated what affect they remembered about each piece of information they had seen. They were then debriefed and dismissed.

Analysis of Data

Before the data could be used for analysis, a number of adjustments had to be made. To begin with, we dropped 8 individuals who either failed to complete the study or who did not take the study seriously.[8] We then removed all subjects who looked at fewer than 50 pieces of information (less than two per minute) or more than 200 pieces of information (more than eight per minute) over the course of the study. These 10 subjects were clear outliers when looking at

[7] About 10% of our subjects participated at remote locations though using the same computers (laptops) as were used in our lab.

[8] On the debriefing form, the experimenter was asked to code the degree of seriousness with which the subject approached the study, so the measure was based on observation of the subject's demeanor at the time of the study.

the distribution of the number of items accessed across all subjects. We were left with 189 subjects whose data was suitable for analysis.

To obtain a better measure of how much incongruent information subjects received during the simulation, we calculated the actual percent of the information that they read about their liked candidate that was incongruent with their affect. For each piece of information a subject encountered, we recorded a binomial variable indicating whether or not that item was congruent with the subject's earliest evaluation of the candidate.[9] For each issue position, we also calculated the distance between the subject and the candidate on a 1-7 liberal to conservative scale.[10] We used the distance measure to correct for any outliers or coding errors in the binomial indicator of incongruence.[11]

Subjects in the group that received ideologically consistent candidates (i.e. their issue positions were not manipulated to be congruent or incongruent) conceivably also saw some incongruent information, though the program was not designed to code congruence or incongruence for items viewed by these subjects. Many voters have inconsistent ideologies,

[9] This was only done for the most and least liked candidates. Candidates rated second or third in the initial poll were not manipulated and we did not record whether or not information viewed for these candidates was consistent with the subject's affect toward them.

[10] The issue position ratings were obtained by giving the list of positions to several graduate students and faculty members in the University of Iowa Political Science department. Each person coded all the items and the final rating was the average rating across all coders. The subject's placement was self-reported during the questionnaire at the beginning of the study.

[11] Certain pieces of information that were supposed to be congruent information for the subject's liked candidate were very distant from the subject's position, while other information that was supposed to be incongruent with the subject's preferences was very similar to the subject's own view. To correct for these "outliers", items that were very distant (distance >3.5) but marked as congruent were recoded as incongruent, and items that were very near to the subject's own view (distance<2.5) but recorded as incongruent were recoded to be congruent. These outliers occurred when a more appropriate piece of information was no longer available to be assigned to the candidate in question. When the subject selected a piece of information for the liked candidate that needed to be manipulated, the computer selected the nearest available issue position that had not already been assigned to a candidate. When the subject was supposed to see an incongruent piece of information, the computer selected the farthest available position. During the experiment, especially before the first poll was administered and the manipulation began, positions were assigned to candidates as the subject selected pieces of information to read. Since these positions could not be changed after the subject had viewed them, the computer had fewer options to choose when executing the manipulation. Hence the outlier pieces of information whose distance from the subject did not match their assigned congruence value.

being more liberal or conservative on some issues than others, so these subjects were bound to disagree with even their favorite candidate at times. To correct this, we again used the distance measure to code items as congruent or incongruent for the subject's favorite candidate. Items that were closer than 3.5 points away on the liberal-conservative spectrum were coded as congruent and items 3.5 or more points away on the spectrum were coded as incongruent.

To finally calculate the actual percentage of incongruent information for each subject, we divided the total number of incongruent items the subject viewed for the liked candidate by the total number of items that we could have manipulated for that candidate.[12] This included all issue positions that were on the subject questionnaire at the beginning of the study and a few personal attributes in the form of quotes about the candidate.[13] The congruence of the issue positions was determined as described above and the quotes were either clearly positive (i.e. "He is a kind and compassionate man.") or clearly negative (i.e. "He is an irrational, self-centered man.") toward the candidate. Figure 3 shows the distribution of the percent incongruent information the subjects experienced for their liked candidate. We also calculated the percent

[Insert Figure 3 here.]

incongruent information each subject experienced up to each poll so that it could be compared to the candidate evaluations we recorded at each poll.

We divided subjects into quartiles based on the percent incongruence they observed in the study, separating out those who saw absolutely no incongruent information. Since the percent calculated for each subject is not constant over the course of the simulation, we calculated separate quartiles for the levels of incongruence at each poll and placed each subject

[12] None of the information subjects viewed before the first poll was administered was manipulated so it was not included in this calculation.

[13] Other personal information, such as the candidate's religious affiliation, work experience, family history, etc., was assumed to be congruent, or at least not incongruent. It is conceivable that a subject did not like some of these characteristics about their favorite candidate, but we had no way of knowing when this was the case.

into a quartile based on the level of incongruence they had experienced up to that point in the simulation. For the first poll, we used the quartile that the subject was assigned to at the second poll since nothing was manipulated prior to the first poll. Table 1 shows the upper bound for each quartile at each point in the simulation. While it is unclear why the number of subjects

[Insert Table 1 here.]

seeing very high levels of incongruent information (over 50%) seems to decrease over the course of the simulation, one could speculate that the anxiety generated by the early high levels of incongruence prompted increased information search about the candidate causing the anxiety. This would cause the percent incongruence to settle around the level randomly assigned to the subject in our original manipulation. The highest level of incongruence a subject could see if he or she looked at all the information for a particular candidate was 80% by our design, and most subjects were assigned less.

Results

Our manipulation of incongruent information was designed to create anxiety towards the liked candidate, so we first checked to see if we were successful in altering the subjects' affective states. After the campaign simulation, we administered a test called the Positive and Negative Affect Scale (PANAS), which was developed by Watson, Clark, and Tellegen (1988). This instrument requires subjects to rate twenty affective words on a scale of 1-5, with 5 indicating that the word strongly describes the subject's current affective state. The words rated describe both positive and negative affect. Figure 4 shows the relationship between the negative affect found in the PANAS test and the quartiles of incongruent information that we have constructed.

[Insert Figure 4 here.]

We find that subjects in higher quartiles generally displayed more negative affect, which would include anxiety, at the end of our study. The decrease in negative affect for subjects in the fourth quartile is unexpected, but perhaps these subjects simply gave up their favorite candidate in the face of overwhelming negative information and made peace with the fact that their early evaluations were wrong. In any event, we have evidence that our manipulation of incongruent information caused an affective response in our subjects.

Using the quartiles we constructed, we can examine the behavior of subjects experiencing certain levels of incongruence over time. Figure 5 shows subjects' evaluations of their like candidates over time with one line for each quartile. Clearly, subjects experiencing different

[Insert Figure 5 here.]

levels of incongruent information evaluated their candidates differently. While all subjects besides those in the zero category saw some incongruent information, not all subjects' evaluations of their liked candidate decreased over time. The graph shows that subjects who saw no incongruent information tended to like their favorite candidates more by the last poll, but subjects in the first and second quartile of incongruence also showed an increase in the liking of their candidates at some point in the simulation, despite the fact that they were seeing some negative information. Subjects in the third and fourth quartiles only decreased in their liking of the candidates after the manipulation was administered. If all of the subjects were following a rational or Bayesian updating pattern, the subjects who received any amount of incongruent information would all show some decrease in their evaluations of the candidates over time. This is not the case.

Looking at the data a different way, Figure 6 plots the relationship of quartiles and candidate evaluations at polls 2 and 3, and the patterns are strikingly similar to the one hypothesized in Figure 1. The mean evaluation of the liked candidate is higher for subjects

[Insert Figure 6 here.]

experiencing a small amount of incongruent information than for those who see no incongruent information about their liked candidates. Again, this should not be the case if subjects were using Bayesian updating to adjust their candidate evaluations. Subjects seem to resist changing their initial opinions of candidates and even strengthen their liking of a candidate in the face of relatively low levels of incongruent information. People experiencing higher levels of incongruent information seem to update their evaluation to correctly reflect that they have learned negative things about their favorite candidates, so at what point does information processing change? So far we can see that there appears to be a tipping point, but we need to prove its existence and locate it.

To that end, we have devised a linear model to test for the effects of the level of incongruence a subject experienced on the updating of their evaluations. The relationship between levels of incongruence and individuals appears quadratic, so a model examining the predictors of the *change* in subjects' evaluations would be the linear first derivative of the quadratic. The x-intercept of the linear model, if our hypothesis is correct and the percent incongruence is a significant predictor, would then be the tipping point at which subjects begin to correctly update their candidate evaluations for negative information.

In addition to using the percent incongruent information as a predictor of the change in candidate evaluations, we have also included a dummy variable for the anxiety manipulation described earlier(see footnote 6). If anxiety generates greater information searching and more

learning, then subjects who received the anxiety prompt should have a lower tipping point and begin to accurately update their evaluations with less resistance to changing their initial opinions. Both the principle effect and the interaction with our other predictor are included in the model.

The first model we constructed predicts the change in candidate evaluation between poll 1 and poll 2 from the percent of information they saw in that time period that was incongruent, an indicator of whether or not they experienced the anxiety manipulation, and the interaction between those two predictors:

$$change1 = \beta_1(pct.incong.) + \beta_2(anxiety) + \beta_3(pct.incong.*anxiety) + \beta_0$$

In fitting this model (see Table 2), we find that the while the combination of independent variables was significant as a group (F = 4.77, p=.0032), none of the individual factors was significant (p>.10). Perhaps at this early stage of the manipulation, subjects had not yet been overwhelmed by information and were still cautious and correct in the updating of their evaluations. Indeed, between the first poll, when the manipulation began, and the second poll, the mean number of items that each subject looked at for the liked candidate was only, while the mean between the first and third polls was approximately 11 items.

Fortunately, the subjects evaluated the candidates three times during the simulation, so we ran another model predicting the change in evaluation of the liked candidate between polls 2 and 3. In this model we included the variables from the first and controlled for the change the subject had already made in their evaluation. The percent incongruence is cumulative, encompassing all the information viewed since the first poll, so the adjustment that the subject already made at the second poll has to be taken into account. The equation for this model is:

$$change2 = \beta_1(pct.incong.) + \beta_2(anxiety) + \beta_3(pct.incong.*anxiety) + \beta_4(change1) + \beta_0$$

In this model (see Table 3), the percent incongruent variable is significant (p=.0373), but the anxiety manipulation is still not. Predictably, the variable controlling for the previous change in evaluation is also significant. By holding it constant[14], we derive the equation for change in evaluation between polls 2 and 3 as a function of the percent incongruent information the subject experienced. We end up with the following equation for calculating the tipping point:

$$change2 = -.0787(pct.incong.) + 2.1204$$

The x-intercept for this equation is 26.94%, which is our estimate of the tipping point. This would suggest that subjects, or potentially voters, could tolerate more than 1 in 4 pieces of information that are negative about their liked candidate before they begin to correctly update their evaluations.

Discussion

Evidence presented here suggests that voters are far from "rational", at least under certain conditions. Our model combines the ideas of motivated reasoning and affective intelligence, asserting that voters are first motivated reasoners, resisting change of their early opinions, but that after a while even the most motivated become anxious in the face of significant amounts of negative information about their candidates and begin to process new information more accurately.

Thinking back to the other models of decision-making, our evidence has varying implications. The Bayesian theory, in assuming that updating is purely cognitive, ignores the effect that emotions like anxiety can have on the process. We have shown, essentially, that affect may dictate the strength of prior beliefs and their resistance to certain types of affectively charged information. In the case of Holbrook et al.'s (2001) ANM, which suggested that

[14] We used the average value of change1 (-3.13) in the model in order to calculate the tipping point.

negative or incongruent information should carry more weight with voters, our evidence seems to contradict the model. If negative information carries more weight than positive, voters should be more responsive to incongruent information about their favored candidate and update their evaluations accordingly, which is not the case here. Only voters experiencing high levels of incongruence (i.e. high levels of anxiety) seem to respond this way to new negative information. In each case, our results suggest that other models of evaluation and updating are only conditionally applicable, and their validity is conditioned on the affective state of the voter. This is a strong argument for continued research on affect in political decision-making.

If we believe that voters are, in fact, somewhat immune to small amounts of negative information about their favored candidates, what are the implications in the real political setting? Should candidates not worry about minor mess-ups, flip-flops, and fleeting scandals, or is the atmosphere of the modern campaign already so negative that most voters are pushed way past the tipping point months before Election Day? A closer look at the modern campaigning environment might help answer that question, but the fact remains that for a while at least, a candidate's early supporters should resist attempts to change their minds. Candidates who need to win new voters without alienating their bases should be able to lean to the middle, as long as they don't lean too far. However, in a real campaign where prior beliefs about candidates are long standing and based on much more information than subjects in our study were exposed to early on, the tipping point may be even higher. It is easy to imagine a long-time fan of a presidential candidate rejecting virtually all negative information about him or her and sticking to an early evaluation.

The estimate calculated here is only a first attempt to quantify the limits of motivated reasoners. While the dynamic information board is arguably the best methodology, other studies

may use different measures or manipulations to test the theory of the tipping point. In the future, we plan to delve more into our data and data from past studies to continue to test the existence and location of the tipping point. We also want to derive an equation for the updating of evaluations similar to Holbrook et al.'s (2001), which was based only on survey data and pieces of information recalled after the election. It will also be helpful to look more at the relationship between affect and learning/memory to understand the underlying processes that seem to cause subjects with higher levels of anxiety to be more "accurate" voters.

References

Bower, G.H. (1981). Mood and Memory. *American Psychologist, 36,*129-148.

Brader, Ted. 2005. "Striking a Responsive Chord: How Political Ads Motivate and Persuade Voters by Appealing to Emotions. *American Journal of Political Science* 49:2, 388.

Civettini, Andrew and Redlawsk, David P. (2005) "A Feeling Person's Game: Affect and Voter Information Processing and Learning in a Campaign." Paper presented at APSA '05.

Downs, Anthony (1957). *An Economic Theory of Democracy*. New York: Harper and Brothers.

Edwards, K., Smith, E., (1996) "A Disconfirmation Bias in the Evaluation of Arguments" *Journal of Personality and Social Psychology*, Vol. 7(1): 5-24.

Festinger, Leon. 1957. *A Theory of Cognitive Dissonance*. Stanford, CA: Stanford University

Ford, J. K., N. Schmitt, S. L Schechtman, B. M. Hults, and M. L. Doherty. 1989. Process Tracing Methods: Contributions, Problems, and Neglected Research Questions. *Organizational Behavior and Human Decision Processes* 43:75 117.

Green, Donald and Alan Gerber. 1999. Misperceptions about Perceptual Bias. *Annual Review of Political Science* 2: 189-210.

Hastie, R and Park, B. 1986. The relationship between memory and judgment depends on whether the task is memory-based or on-line. *Psychological Review*, 93, 258-268.

Heider, Fritz. 1958. *The Psychology of Interpersonal Relations*. New York: Wiley.

Herstein, J.A. 1981. Keeping the voter's limits in mind: A cognitive process analysis of decision making in voting. *Journal of Personality and Social Psychology* 40:843-861.

Hollbrook, Allyson L., Jon A. Krosnick, Penny S. Visser, Wendi L. Gardner, and John T. Cacioppo (2001). Attitudes toward Presidential Candidates and Political Parties: Initial Optimism, Inertial First Impressions, and a Focus on Flaws. *American Journal of Political Science* 45 (4): 930-50.

Hollbrooke, R. Andrew. The Double-Edged Sword of Anxiety in Campaign Advertisements. Working Paper Presented at 3rd Annual Pre-APSA Conference on PoliticalCommunication, September 1, 2004, Chicago, Illinois. http://www.uic.edu/depts/pols/PolComConf/Holbrook%202004%20Pre-APSA.pdf

Huang, Li-Ning and Vincent Price. 1998. Motivations, Information Search, and Memory Structure about Political Candidates. Paper presented at ICA '98.

Huang, Li-Ning. 2000. Examining Candidate Information Search Processes: The Impact of Processing Goals and Sophistication. *Journal of Communication* 50(Winter): 93-114.

Isen, A.M. (2000). Positive affect and decision making. In M. Lewis & J. Haviland-Jones (Eds.). *Handbook of Emotions*, 2nd Edition (pp. 417-435. New York: Guilford.

Jacoby, J., J. Jaccard, A. Kuss, T. Troutman, and D. Mazursky. 1987. New directions in behavioral process research: Implications for social psychology. *Journal of Experimental Social Psychology* 23:146 175.

Kelley, Stanley and Mirer, Thad W. (1974). The simple act of voting. *American Political Science*

Review 68: 572-591.

Kunda, Ziva. 1990. The Case for Motivated Political Reasoning. *Psychological Bulletin* 108(3): 480-498.

Lau, R. R. 1995. Information search during an election campaign: Introducing a process tracing methodology for political scientists." In M. Lodge and K. McGraw (Eds.) *Political judgment: Structure and Process* (pp. 179-206). Ann Arbor, MI: University of Michigan Press.

Lau, R.R., and Redlawsk, D.P. 1997. Voting correctly. *American Political Science Review* 91:585-598.

Lau, R.R., and Redlawsk, D.P. 2001a. An experimental study of information search, memory, and decision making during a political campaign. In J. Kuklinski (ed.), *Political psychology and public opinion*. New York: Cambridge University Press.

Lau, R.R., and Redlawsk, D.P. 2001b. Advantages and disadvantages of cognitive heuristics in political decision making. *American Journal of Political Science*, 45: 951 - 971.

Lau, R.R., and Redlawsk, D. P. 2006. How voters decide: Information processing in an election campaign. New York: Cambridge University Press.

Lodge, M. and Taber, C. S. 2000. Three steps toward a theory of motivated political reasoning. In A. Lupia, M. McCubbins, and S. Popkin (Eds.), *Elements of Reason: Cognition, Choice, and the Bounds of Rationality* (pp. 183-213). London: Cambridge University Press.

Lodge, M., McGraw, K., and Stroh, P. 1989. An impression-driven model of candidate evaluation. *American Political Science Review* 83:399-419.

Marcus, George E., and Michael MacKuen. 1993. Anxiety, enthusiasm, and the vote: The emotional underpinnings of learning and involvement during presidential campaigns. *American Political Science Review* 87(September): 672-685.

Marcus, George E., W. Russell Neuman, and Michael MacKuen. 2000. *Affective Intelligence and Political Judgment*. Chicago: University of Chicago Press.

Niedenthal, P. M., & Showers, C. (1991). Ther perception and processing of affective information and its influences on social judgment. In J. P. Forgas (Ed.), *Emotion and social judgments* (pp. 125-143). Oxford, England: Pergamon.

Redlawsk, D.P. 2001. You must remember this: A test of the on-line voting model. *Journal of Politics* 63: 29-58.

Redlawsk, D.P. 2002. Hot cognition or cool consideration? Testing the effects of motivated reasoning on political decision making. *Journal of Politics* 64: 1021-1044.

Redlawsk, D. P. 2004. What Voters Do. *Political Psychology*.

Redlawsk, David P, Andrew Civettini, and Richard R. Lau. Forthcoming. Affective Intelligence and Voting Information Processing and Learning in a Campaign. In *The Affect Effect: Dynamics of Emotion in Political Thinking and Behavior*, eds. Ann Crigler, Michael MacKuen, George E. Marcus, and W. Russell Neuman. Chicago, IL: University of Chicago Press.

Riggle, Ellen D. B. and Mitzi M. S. Johnson. 1996. Age Differences in Political Decision

Making: Strategies for Evaluating Political Candidates. *Political Behavior*.

Steenbergen, Marco. 2001. The Reverend Bayes Meets J.Q. Public: Patterns of Political Belief Updating in Citizens. Presented at the annual meet-ing of the International Society of Political Psychology. Cuernavaca, Mexico.

Watson, David, Lee A. Clark, and Auke Tellegen. 1988. "Development and Validation of Brief Measures of Positive and Negative Affect." *Journal of Personality and Social Psychology* 54(6):1063-1070.

Zajonc, R.B. 1984. On the primacy of affect. *American Psychologist* 39(2): 117-23.

Zaller, John R.1992. The Nature and Origins of Mass Opinion. New York: Cambridge University Press.

Figure 1: Favored candidate evaluation vs. amount of incongruent (negative) information.

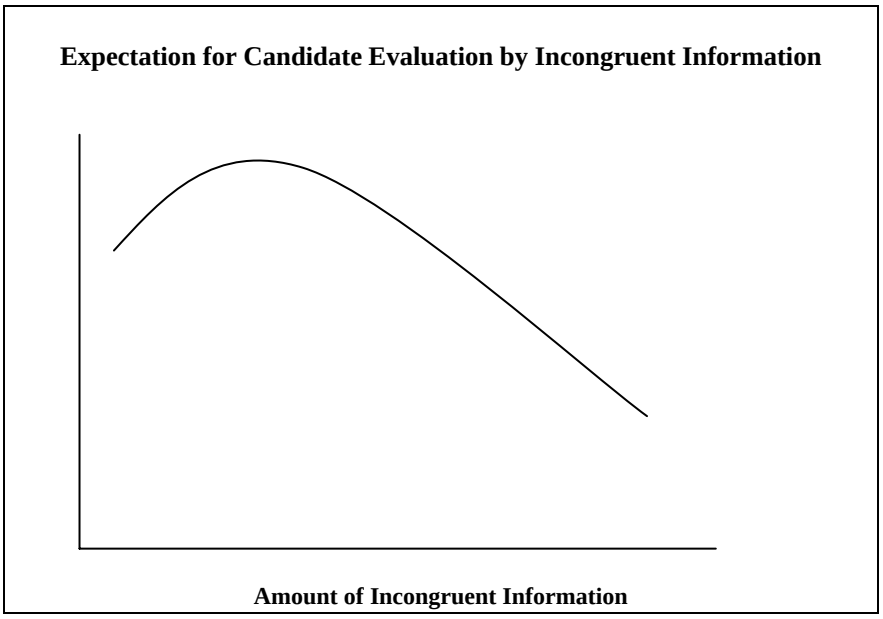


Figure 2: Summary of experimental manipulations (Civettini and Redlawsk, 2005)

	Initial Global Anxiety Prompt YES		*Initial Global Anxiety Prompt* NO	
	Immediate Emotion Report YES	*Immediate Emotion Report* NO	*Immediate Emotion Report* YES	*Immediate Emotion Report* NO
Incongruent Information	No Manipulation	No Manipulation	No Manipulation	No Manipulation
	10%	10%	10%	10%
	20%	20%	20%	20%
	40%	40%	40%	40%
	80%	80%	80%	80%

Figure 3: Distribution of the percent incongruent information experiences by the subjects for their liked candidate

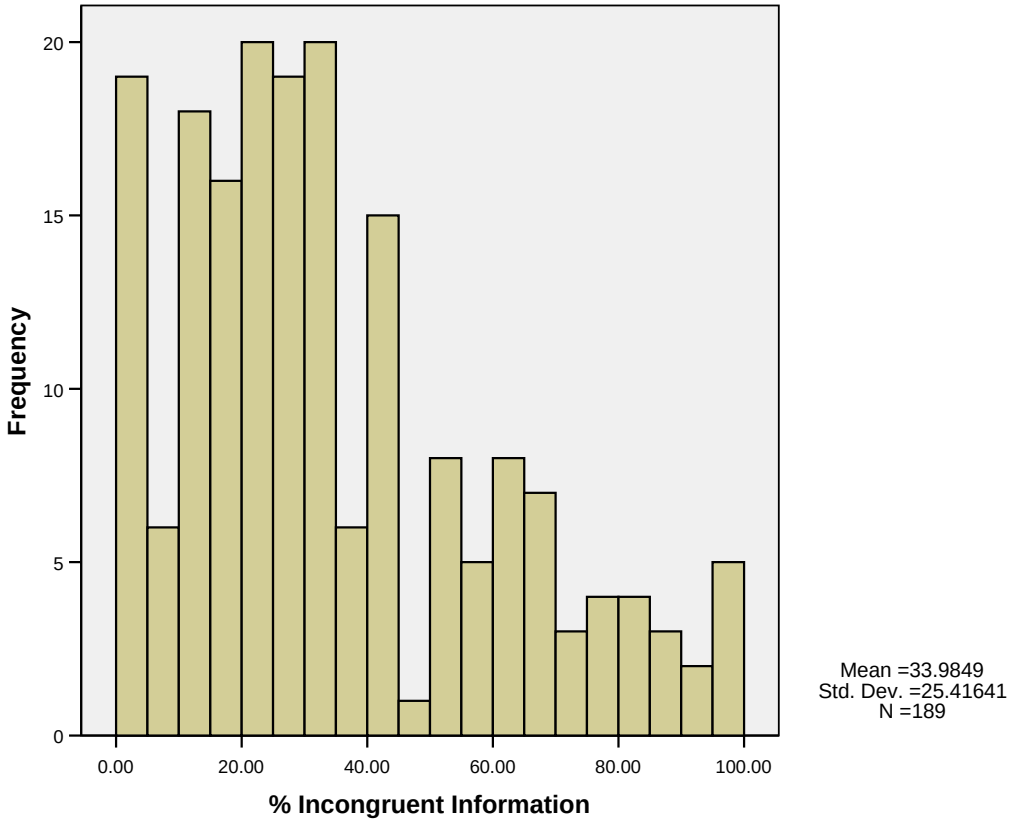


Table 1: Upper bound of quartiles for percent incongruent information about the liked candidate

	Poll		Vote
QUARTLE	**1 & 2**	**3**	
0	0	0	0
1	33.33	25	20
2	50	36.36	31.58
3	99.99	62.5	50
4	100	100	100

Figure 4: Negative affect post-test versus quartiles of incongruence.

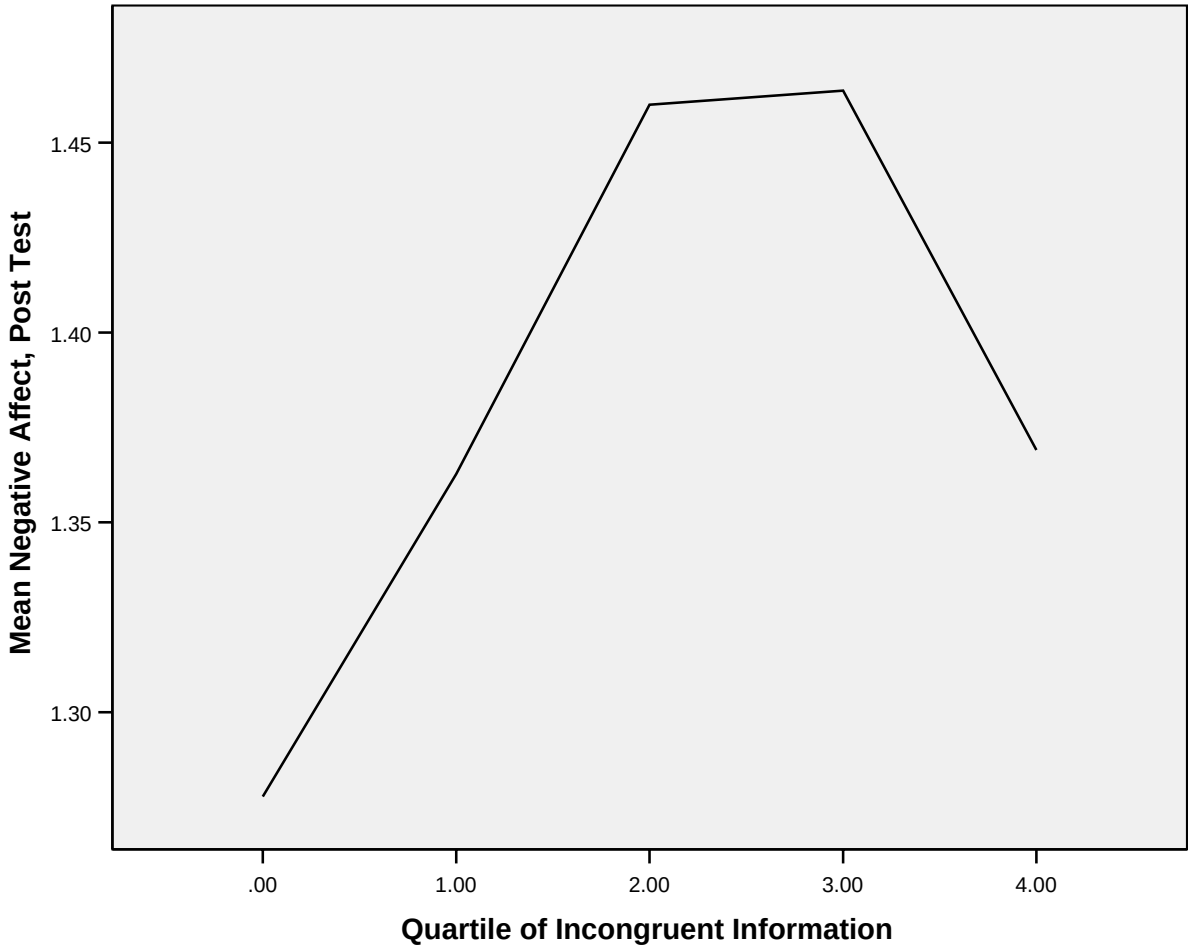


Figure 5: Subjects' evaluation of the most liked candidate over time

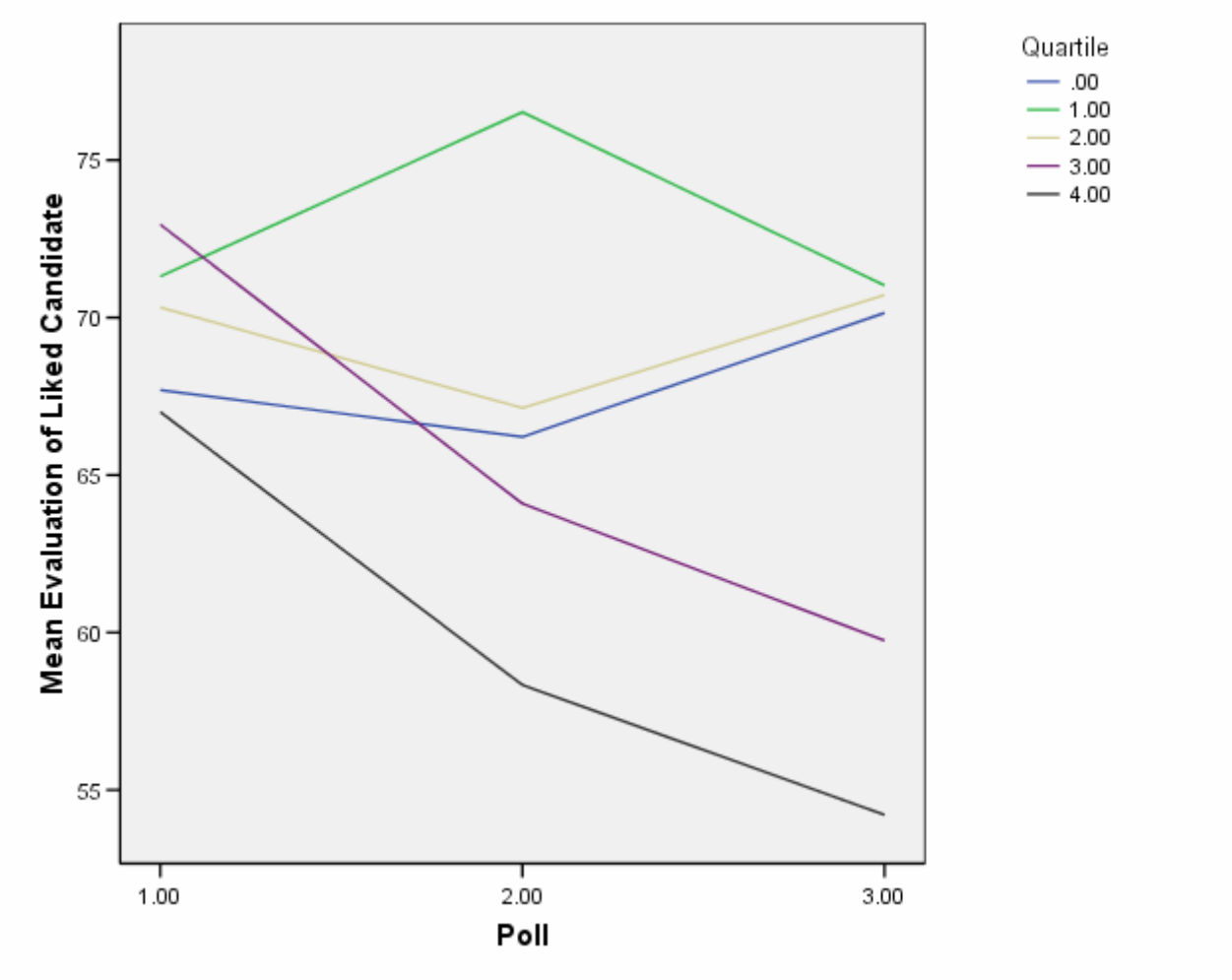
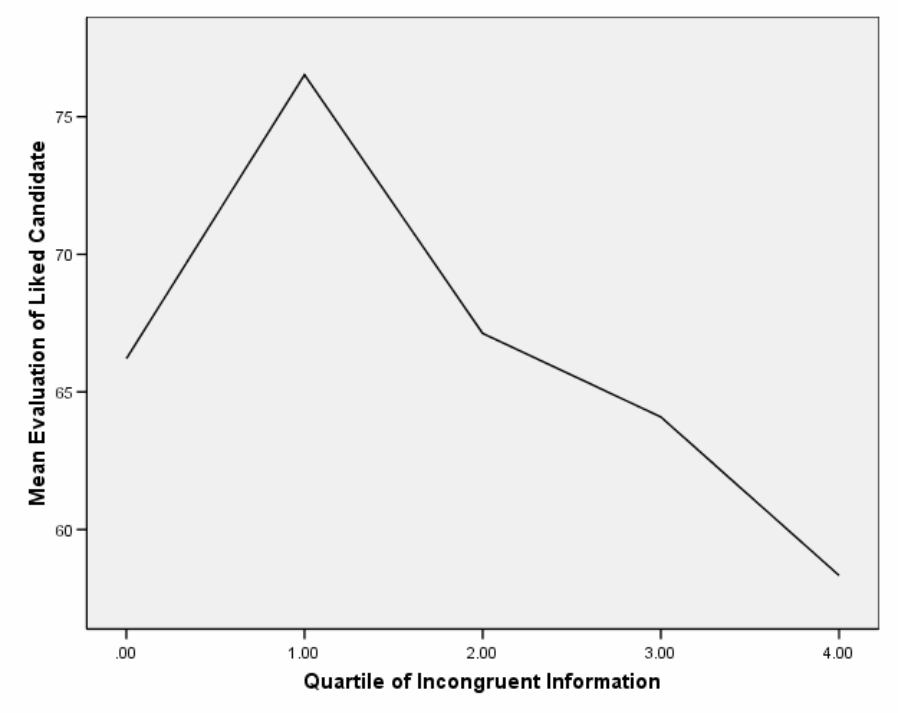


Figure 6: Mean candidate rating vs. quartile of percent incongruent information.

Poll 2 Evaluations



Poll 3 Evaluations

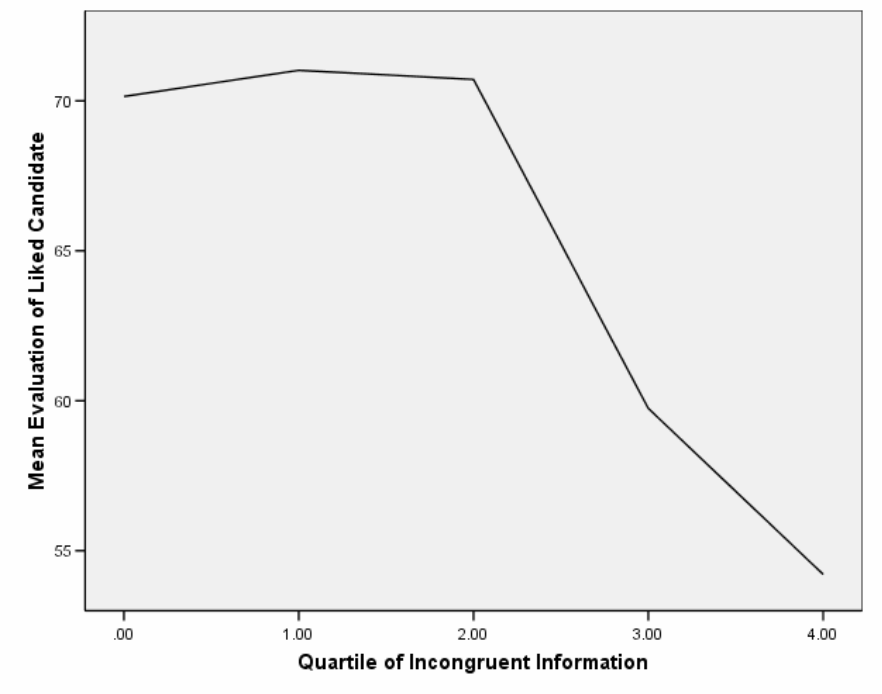


Table 2: Model Fit Statistics for the Change in Eval. Between Poll 1 and 2

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F-statistic**	**p-value**
Model	3	2753.9672	917.9689	4.77	0.0032
Error	183	35190.9525	192.3003		
Corr. Total	185	37944.9198			

Parameter Estimates					
Variable	**DF**	**Estimate**	**Std. Error**	**t-statistic**	**p-value (one-tailed)**
Intercept	1	-0.2925	2.0780	-0.14	0.4441
Pct. Incongruent	1	-0.0519	0.0409	-1.27	0.1030
Anxiety	1	1.8231	2.9825	0.61	0.2709
Interaction	1	-0.0814	0.0563	-1.45	0.0750

Table 3: Model Fit Statistics for the Change in Eval. Between Poll 1 and 3

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F-statistic**	**p-value**
Model	4	1988.8463	497.2116	3.71	0.0062
Error	182	24373.7205	133.9215		
Corr. Total	186	26362.5668			

Parameter Estimates					
Variable	**DF**	**Estimate**	**Std. Error**	**t-statistic**	**p-value (one-tailed)**
Intercept	1	1.5425	2.0037	0.77	0.2212
Pct. Incongruent	1	-0.0787	0.0439	-1.79	0.0373
Anxiety	1	1.0267	2.7126	0.38	0.3528
Interaction	1	-0.0241	0.0567	-0.43	0.3356
Change 1	1	-0.1845	0.0622	-2.97	0.0017