

Coherence in Perceptions of a Romantic Relationship

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Abstract

When decision makers perceive all issues related to a decision as being consistent with their choice, they achieve *coherence*. Participants rated their agreement with different views of various issues related to a couple's relationship. Those who later decided whether the couple would get engaged or break up subsequently reinterpreted the issues to be consistent with their decision. Increasing the importance of the decision, highlighting coherent perspectives, or giving participants a prior preference did not strengthen the coherence shift, but coherence shifts did not occur without the chance to decide, suggesting that they occur in an all or nothing fashion. Individuals with higher need for cognition (Cacioppo & Petty, 1982) achieved a greater degree of coherence among facts associated with the relationship but not among more general beliefs about relationships.

Introduction

Early social psychologists attempted to develop a general model of cognitive functioning based on consistency maintenance (Festinger, 1957; Heider, 1946; Osgood & Tannenbaum, 1955; Newcomb, 1953). Those theories shared the assumption that cognition involves the interaction among elements, and that those elements tend to settle into stable states characterized by some type of *good form*, in which similar elements are interconnected and segregated from dissimilar elements. However, early consistency theories narrowly focused on small sets of two (Festinger, 1957) or three (Heider, 1946) elements at a time, and so were unable to represent the larger, more complex situations that people often encounter in their daily lives.

More recently, computer based models of multiple constraint satisfaction systems have begun to provide a mechanism for simulating maintenance of consistency throughout large, complex systems (Holyoak & Simon, 1999; Read, Vanman, & Miller, 1997; Simon, Snow, & Read, in press). In these models, units represent cognitive elements and links between units represent relations between elements, with excitatory links representing consistent relations and inhibitory links representing inconsistent relations. Dynamic processing is simulated by allowing units connected by excitatory links to increase each other's activation and units connected by inhibitory links to decrease each other's activation until the system settles in to a stable state of *coherence*, a kind of good form

in which a subset of mutually consistent elements are highly activated.

Drawing on constraint satisfaction systems, researchers have begun to show that cognition involves imposing consistency on related concepts. Simon and colleagues (Holyoak & Simon, 1999; Simon, Pham, Le, & Holyoak, 2001; Simon, Snow, & Read, in press) developed a paradigm showing how, when people think about the issues related to a legal case and then render a verdict, their perceptions of the issues shift to become consistent with their eventual verdict, thereby achieving a coherent understanding of the whole case.

The finding that perceptions of issues shift to become consistent with an emerging decision violates two important assumptions of algebraic models of information integration, such as Bayes theorem and Anderson's (1962) Information Integration Theory. Those models assume that (1) the value of one element is not affected by the values of other elements and that (2) the value of an element is not changed when it is integrated with other elements to arrive at a conclusion. Nevertheless, Simon and colleagues found that during decision making, evaluations of issues related to a legal case shift to become consistent with the emerging decision and with each other.

The present research adapts Simon and colleagues' paradigm to test for coherence outside the legal context. In the first phase (pretest) participants read vignettes describing different couples and ambiguous events in their relationships, and then rated their agreement with statements giving different interpretations of the events. Some of the statements were *factual* items that involved interpreting the meaning of an event and others were *belief* items that involved interpreting the general implications of an event. For example, one vignette described how Eric and Daniella spent a day with Daniella's aunt Rachel, enabling her to observe the couple's interactions and subsequently report that she thought their relationship was going well. A factual item related to that vignette asks participants to rate the extent to which they think Aunt Rachel's optimistic impression was correct and a belief item asks them to rate the extent to which they think that, in general, it is possible to get a good sense of a couple's relationship by observing them for a day.

In the second phase participants read a longer story about a couple, Jenny and Mark, that combined all of the issues

raised separately in the pretest. For example, one part of the story involved Jenny and Mark spending a day with Jenny's aunt Rose, so that the aunt formed an impression that the relationship was going well. In the third phase (posttest) participants decided whether Jenny and Mark would get engaged or break up and then rated their agreement with the different interpretations of the issues, now that they were all embedded in the context of a single story. For example, on the posttest a factual item asked participants to rate the extent to which they thought Aunt Rose's optimistic impression of Jenny and Mark's relationship was correct and a belief item asked them to rate the extent to which they think it is possible to get a good sense of a couple's relationship by observing them for a day.

We predicted a *coherence shift*, so that from pretest to posttest interpretations of ambiguous issues would shift to become consistent with the decision. Thus, we expected participants who decided that Jenny and Mark would get engaged to be increasingly likely to interpret issues in a manner suggesting that they would stay together, and we expected participants who decided that they would break up to be increasingly likely to interpret issues in a manner suggesting that they would not stay together.

Simon, Snow, & Read (in press) tested several variations on their paradigm in a legal context, but could not affect the strength of the coherence shift, so in the present research we introduced four manipulations designed to moderate the strength of the coherence shift. First, we tried to increase the strength of the coherence shift by increasing the perceived importance of the decision. In a *decision* (control) condition, participants simply read about Jenny and Mark's relationship and indicated whether they thought the couple would get engaged or break up. To increase the perceived importance of the decision, we asked participants in a *gift* condition to decide not simply whether they thought the couple would get engaged or break up, but whether they would spend a substantial amount of money to buy an engagement present. We predicted that the added importance associated with the decision would induce participants to think about the choice more extensively, leading to stronger coherence shifts than in the control condition.

The second way we tried to increase the strength of the coherence shift was by outlining the two coherent perspectives on the story. As in the control condition, participants were asked to decide whether they thought the couple would get engaged or break up, but in an *outline* condition they were also asked to imagine that they had talked to two friends who gave their perspectives on the couple's relationship. The friends' perspectives were presented in two lists, with one interpreting each of the ambiguous issues as suggesting that the couple would get engaged and the other interpreting each issue as suggesting that they would break up. We predicted that outlining the two coherent perspectives would help participants reach their own coherent perspective more quickly and proceed to achieve more extensive coherence shifts than participants in the control condition.

The third way we tried to increase the coherence shift was by giving participants a prior preference for one of the alternatives. Russo, Medvec, and Meloy (1996) gave participants an extraneous reason to prefer one of a pair of alternatives (called an "endowment") and then presented information on the alternatives one attribute at a time, asking participants to rate the extent to which it favored one alternative or the other, until they were ready to choose one. Russo, Medvec, and Meloy found that participants "distorted" the attribute information so that it favored the endowed alternative, thereby further increasing their preference for it until they chose it. We thought that if decision makers distort information to favor a prior preference within the pre-decision phase, their attitudes might also start shifting to become consistent with a prior preference within the pre-decision phase, producing a stronger coherence shift by the time they reach the post-decision phase. Therefore, we introduced two new conditions in which participants were given a prior preference for one alternative. As in the control condition, participants were asked to decide whether they thought the couple would get engaged or break up, but in an *endowment-engage* condition they were also asked to imagine that they knew Jenny and Mark and thought they *should* stay together, while in an *endowment-breakup* condition they were asked to assume that they thought Jenny and Mark *should* break up. We predicted that, compared to participants in the control condition, participants in the endowment-engage condition would be more likely to decide that the couple would in fact get engaged, participants in the endowment-breakup condition would be more likely to decide that the couple would break up, and that participants in both endowment conditions would report stronger coherence shifts.

A fourth manipulation was designed to decrease the strength of the coherence shift. We thought that, just as the degree of importance of a decision may affect the amount of processing, the degree of involvement in a decision task may also affect the amount of processing and the strength of the coherence shift. Therefore, we predicted that decreasing participants' involvement in the decision task would decrease the strength of the coherence shift. In a pair of *assigned decision* conditions participants were asked to think about whether to buy an engagement present (as in the gift condition), but they were not allowed to make their own choices; instead, participants in an *assigned-buy* condition were asked to assume that they had decided to buy the necklace and participants in an *assigned-not-buy* condition were asked to assume that they had decided not to buy the necklace. We predicted that depriving participants of the ability to reach their own decisions would decrease their involvement and amount of processing, leading to weaker coherence shifts in the assigned decision conditions than in the gift condition.

We also tested whether two personality dimensions moderate the strength of the coherence shift. First, need for cognition (NFC; Cacioppo & Petty, 1982) involves individual differences in the "tendency to engage in and

enjoy thinking” (p. 116). We thought that participants with greater NFC would think about the experimental materials more extensively, leading them to report stronger coherence shifts than participants with lower NFC. Second, personal need for structure (PNS; Neuberg & Newsom, 1993) may involve individual differences in desire for simple structure. We thought that participants with greater NFS would be more likely to impose a coherent good form on the information given to them, thereby achieving greater coherence than participants with lower NFS.

Methods

Participants and Design

This experiment ran on the Internet. Participants were recruited by e-mailing notices to people who asked to be notified of new experiments and giving each participant an entry in a lottery for a cash prize. Participants were randomly assigned to the decision ($n = 134$ usable data sets), gift (108), outline (118), assigned-buy (105), assigned-not-buy (132), endowment-engaged (110), and endowment-breakup (98) conditions.

Materials and Procedure

The pre-test had 12 vignettes, including seven that involved romantic relationships and five that involved legal cases (distracters). The seven relationship vignettes concerned (1) a woman (Michelle) who had broken off several previous relationships and may appear to have “a problem with commitment,” (2) a woman (Joanne) who declined to talk to her boyfriend about the future of their relationship, (3) a woman (Aunt Rachel) who spent a day with her niece and her niece’s boyfriend and thought that their relationship was going well, (4) a woman (Lisa) who was two hours late for a date with her current boyfriend because she was consoling a previous boyfriend who was upset about his mother’s illness, (5) a woman (Suzy) who was too busy at work to join her boyfriend and his parents for dinner, (6) a woman (Candice) who joined a gym after her boyfriend disparaged people who don’t exercise, and (7) a woman (Rona) who brought her boyfriend to a family party.

After each vignette, there were 1 to 4 statements interpreting the facts in the vignette or expressing related beliefs. Some of the statements expressed attitudes consistent with the view that the couple in the vignette would stay together (e.g. *Aunt Rachel’s favorable view of the relationship was correct*) and other statements expressed attitudes consistent with the view that they would break up (e.g. *Aunt Rachel’s favorable view of the relationship was influenced by the fact that on that day Daniella displayed particular affection towards Eric*). Participants rated the extent to which they agreed with each statement on an 11-point scale ranging from -5 (strongly disagree) to 0 (neutral) to 5 (strongly agree).

The next page presented a set of analogy word games (distracter task) and the following page introduced the experimental manipulations. In the decision condition, participants were asked to imagine that “Mark and Jenny

live in your town and are pretty close friends of yours. They have been involved in a relationship for over a year....” Participants were also informed that “after reading some information about the relationship, you will be asked to decide whether you think Jenny and Mark will get engaged or break up, and then to make some evaluations about the relationship....” Participants then read the story of Jenny and Mark, which combined the seven issues that had been raised in separate vignettes in the pretest. For example, the story described one incident when Jenny was too busy at work to join Mark and his parents for dinner and another incident when she brought him to a family party. After reading the story participants indicated whether they thought Jenny and Mark would get engaged or break up (by clicking on one of two radio buttons) and rated their confidence that they had made the best possible decision (5-point scale). The posttest appeared next; participants were asked to give their “impressions of the issues in Jenny and Mark’s relationship” and then there was a list of statements interpreting the facts in the story or expressing related beliefs. Some of the statements expressed attitudes consistent with the view that Jenny and Mark would stay together (e.g. *Aunt Rose’s favorable view of the relationship was correct*) and other statements expressed attitudes consistent with the view that they would break up (e.g. *Aunt Rose’s favorable view of the relationship was influenced by the fact that on that day Jenny displayed particular affection towards Mark*). Participants rated the extent to which they agreed with each statement on an 11-point scale. The order of items in the posttest was counterbalanced between participants. The posttest was followed by self-report measures of NFC (Cacioppo & Petty, 1982) and NFS (Neuberg & Newsom, 1993), and demographic questions.

The outline condition was the same as the decision condition, except that after reading the story participants were asked to imagine that, “you have talked to two other mutual friends and found that they have very different views on Jenny and Mark’s relationship.” The instructions continued, “Caitlin doesn’t think Jenny and Mark will get engaged. When you talked to Caitlin, she explained why she thinks Jenny and Mark are headed for a breakup” and then there was a bullet-list of statements interpreting the seven issues in a manner suggesting that the couple would break up. The instructions then continued, “Unlike Caitlin, Brian thinks Jenny and Mark will get engaged. When you talked to Brian, he explained why he thinks they will get engaged,” and then there was a list of statements interpreting the seven issues as suggesting that the couple would stay together. After reading the lists, participants made their decisions, confidence ratings, posttest ratings, and personality ratings.

The endowment conditions were the same as the decision condition, except that before reading the story participants were told that “we’re going to ask you to get more ‘involved’ with the story, by imagining that you know the people and playing a small role yourself.” Participants in the endowment-engage condition were told that “although they have had some problems (as most couples do), you think they are good for each other and you hope they work things

out,” while participants in the endowment-breakup condition were told that “although they have been fairly happy together until now, you think that they may be growing apart and it wouldn’t be a good idea for them to rush into a commitment.” After reading the story participants in the endowment-engaged condition were reminded, “you don’t know whether Jenny and Mark will get engaged or break up, but you think they are good for each other and you’d like to see their relationship work out” while participants in the endowment-breakup condition were reminded, “you don’t know whether Jenny and Mark will get engaged or break up, but you think that they are growing apart and shouldn’t rush into a commitment.” Participants in both conditions then went on to make their decisions, confidence ratings, posttest ratings, and personality ratings.

In the gift condition, participants were told that Jenny loved Zapotec jewelry, which was available in Cancun, where the participant was vacationing, so the decision was framed in terms of whether to buy a \$150 Zapotec necklace as an engagement present for Jenny; since “the necklace cannot be returned and you cannot think of anything else to do with it,” the participant should only buy the necklace if an engagement seemed likely. After reading the story, participants were reminded of their dilemma – whether the probability of an engagement was high enough to justify buying an expensive necklace as an engagement present for Jenny – and then they indicated whether they would buy the necklace. After that, participants made their confidence ratings, posttest ratings, and personality ratings.

The assigned decision conditions were the same as the gift condition, except that before reading the story, participants were asked to “get more ‘involved’ with the story, by imagining that you know the people and playing a small role yourself” and were instructed, “while you’re reading, think about your character’s dilemma – whether to buy the necklace for Jenny. At the end of the story we’ll tell you what your character decided.” After reading the story, participants were reminded of their character’s dilemma and those in the assigned-buy condition were asked to imagine that “you finally decided to go ahead and buy the necklace.... your sense was that they probably will get engaged, so it was worth it to buy Jenny an engagement gift you know she’ll love” while those in the assigned-not-buy condition were asked to imagine that “you finally decided against buying the necklace... your sense was that they probably won’t get engaged, so it wasn’t worth it to spend so much money on a necklace you have no use for.” Participants in both conditions then completed the posttest and personality measures.

Results and Discussion

Collapsing across all conditions (excluding the assigned decision conditions), participants were evenly split between deciding that Jenny and Mark would get engaged (49.5%) or that they would break up (49.8%), suggesting that the story was highly ambiguous. Average confidence ratings were fairly high among participants who decided that the couple

would get engaged (3.52) and those who decided they would break up (3.77). High confidence in a decision about an ambiguous situation is consistent with constraint satisfaction models, in which activation spreads until the system reaches a stable state of coherence.

In the control condition participants were evenly split between the alternatives (50.7% chose the *engaged* alternative). In the outline condition there was a tendency to favor *engaged* (61.0%) but the change from the control condition was not significant. Participants in the gift condition were significantly less likely to choose *engaged* (36.1%) than participants in the control condition, $\chi^2(1, 239) = 4.90, p < .03$, suggesting that people become more cautious when a decision has financial implications. Participants who were given an endowment favoring engagement were more likely to choose *engaged* (65.4%) than participants who were given an endowment favoring breakup (40.8%), $\chi^2(1, 207) = 4.72, p < .04$, suggesting that the endowment manipulation was effective, though the probability of choosing *engaged* was not significantly different in the endowment conditions than in the control condition. Scores on the NFC, $p = .55$, and PNS, $p = .98$, were not significantly correlated with decisions.

We first tested for an overall coherence shift by running a 2(pretest, posttest, within Ss) by 2(engagement, breakup items, within Ss) by 2(engage, breakup decision, between Ss) ANOVA, collapsing across the experimental conditions. We found a significant three-way interaction, $F(1, 799) = 84.51, p < .001$, suggesting that after participants decided whether they thought Jenny and Mark would get engaged or break up, their attitudes shifted to be more consistent with their decision. As shown in Figure 1, among participants who decided that the couple would get engaged, agreement with statements suggesting that the couple would get engaged increased from pretest to posttest, $t(385) = 3.94, p < .001$, and agreement with statements suggesting they would break up decreased, $t(385) = 4.46, p < .001$. In contrast, among participants who decided that the couple would break up, agreement with engagement statements decreased, $t(414) = 6.47, p < .001$, and agreement with breakup statements increased, $t(414) = 5.86, p < .001$.

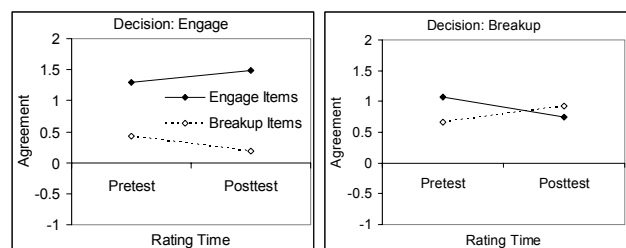


Figure 1: Agreement with Engage and Breakup items at Pretest and Posttest among participants who decided Engage (left) and participants who decided Breakup (right).

This pattern of results suggests that as participants thought about the story and made their decisions, their attitudes about the issues shifted to become more consistent

with their emerging decision and with each other. This would not have been predicted by algebraic information integration models (e.g. Anderson, 1962; Bayes' theorem), which assume that the value of an element is not affected by the values of other elements and does not change when it is integrated with other elements.

We then ran the analysis separately for items relating to facts and items relating to beliefs. For facts the three-way interaction was significant, $F(1, 799) = 73.75, p < .001$, and the pattern was similar to the overall analysis (Figure 2). Agreement with engagement items was initially higher than agreement with breakup items among participants who chose *engage*, $t(385) = 15.80, p < .001$, and among participants who chose *breakup*, $t(414) = 9.75, p < .001$, but among participants who chose *engage* agreement with the two types of items spread apart from pretest to posttest, while among participants who chose *breakup* agreement with the two types of items converged.

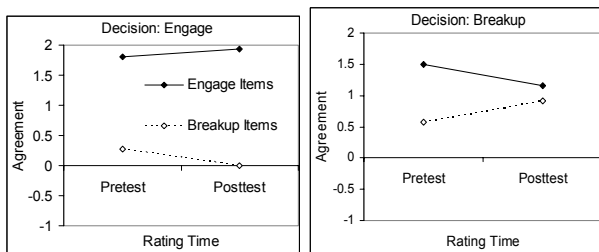


Figure 2: Agreement with Engage and Breakup fact items at Pretest and Posttest among participants who decided Engage (left) and participants who decided Breakup (right).

For beliefs the three-way interaction was significant, $F(1, 797) = 30.97, p < .001$, indicating the predicted coherence shift, but the pattern was somewhat different than for the facts (Figure 3). Agreement with engagement items was initially lower than agreement with breakup items among participants who chose engage, $t(385) = 6.60, p < .001$, and among participants who chose breakup, $t(414) = 6.72, p < .001$. Among participants who chose *engage* agreement with the two types of items converged, while among participants who chose *breakup* agreement with the two types of items spread apart.

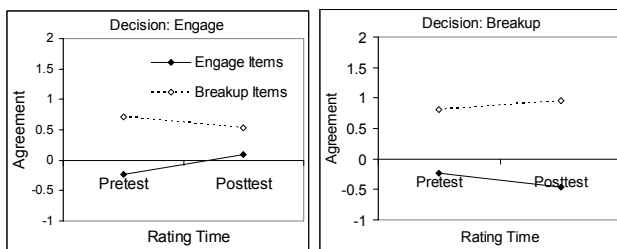


Figure 3: Agreement with Engage and Breakup belief items at Pretest and Posttest among participants who decided Engage (left) and participants who decided Breakup (right).

The unexpected difference in the patterns of results for facts and beliefs reveals that when people consider the facts of a specific couple's relationship they are initially optimistic about their future together, and those who go on to decide that the couple will get engaged become increasingly optimistic, but those who decide that the couple will break up become less optimistic. However, when it comes to abstract beliefs about relationships in general, people are initially pessimistic, and if they decide that a specific couple is likely to break up their beliefs become even more pessimistic, but if they decide that they are likely to get engaged their pessimism decreases. These data suggest that people are initially pessimistic about relationships in general but initially assume an optimistic outlook on specific cases. The data also suggest that regardless of initial attitude, when people reach a decision about a specific case their attitudes toward facts related to the case as well as their general beliefs about relationships shift in a coherent manner.

To test whether the experimental manipulations affected the strength of the coherence shift, we added a variable representing experimental condition, but did not find that it moderated the three-way interaction. We found three-way interactions of similar magnitude within the control, $F(1, 131) = 47.44, p < .001$, gift, $F(1, 104) = 23.98, p < .001$, and outline conditions, $F(1, 116) = 18.83, p < .001$, suggesting that increasing the material importance of a decision or outlining the coherent perspectives does not increase the strength of the coherence shift. The three-way interaction was significant in the endowment-engage, $F(1, 108) = 9.29, p > .01$, and endowment-breakup, $F(1, 95) = 14.45, p < .001$ conditions, suggesting that giving participants a prior preference within the pre-decision phase did not increase the strength of the coherence shift. The finding that introducing a prior preference within the pre-decision phase did not increase coherence shifts suggests that coherence seeking may generally operate within the pre-decision phase, even when there is no prior preference. Indeed, Simon and colleagues have found coherence shifts among participants who had not yet reached decisions (Holyoak & Simon, 1999; Simon et al., 2001; Simon, Snow, & Read, in press).

When we analyzed data from the two assigned decision conditions the three-way interaction was not significant, $p = .45$. The task in the assigned decision conditions was intended to minimize participants' involvement in the task, since they were simply waiting to be told what their character had decided. Thus, unlike Simon and colleagues' previous research on coherence shifts, in which participants expected to make a decision or had a memorization or communication goal (Simon et al., 2001), participants in the assigned decision conditions of the present research had no active processing goal. Our finding that participants in the assigned decision conditions were less likely to show coherence shifts, then, suggests that under minimal conditions, where participants think about a complex situation without any active processing goal, they may not achieve coherence.

Considering the results of the present research with those of previous research using the same type of paradigm in a legal context (Holyoak & Simon, 1999; Simon et al., 2001; Simon, Snow, & Read, in press) suggests that coherence shifts may occur in an all or nothing fashion. When participants think about a situation without an active processing goal (as in the forced decision conditions of the present research) they may not achieve coherence. However, if they do have an active processing goal (involving memorization, communication, or decision making) they are likely to report coherence shifts, and increasing the importance of the decision, outlining coherent perspectives, giving them a prior preference (as in the present research) or manipulating other aspects of the context (as in previous research) does not substantially affect the strength of the coherence shift. It appears, then, that whenever there is an active processing goal coherence shifts occur and that it may not be possible to further adjust their strength.

To test whether personality moderated the strength of the coherence shift, we added a variable representing personality measure. We found that PNS did not moderate the three-way interaction, $p < .5$, but NFC had a marginal effect overall, $F(1, 794) = 3.41, p < .07$, and a significant effect on fact items, $F(1, 794) = 4.39, p < .04$. Inspecting the means revealed that among participants who chose *engage*, those with higher NFC scores rated engagement facts higher at posttest than at pretest, $t(188) = 2.19, p < .04$, but those with lower NFC did not, $p < .3$. This finding suggests that people who have a greater “tendency to engage in and enjoy thinking” (Cacioppo & Petty, 1982, p. 116) may achieve a greater degree of coherence, though increased thought may only affect coherence among the facts of the issue currently being considered and may not affect more general beliefs.

Summary and Conclusions

We extended Simon et al.’s (2001; Simon, Snow, & Read, in press) paradigm to test for coherence shifts in perceptions of a romantic relationship. When participants thought about a couple’s future and decided whether they would get engaged or break up, their attitudes about facts in the relationship and their general beliefs about relationships shifted to become coherent with their decision. When participants were not able to make their own decisions coherence shifts did not occur, suggesting that an active processing goal may be necessary to activate coherence mechanisms. Increasing the importance of the decision, increasing the ease of perceiving coherent perspectives, and introducing a prior preference within the pre-decision phase did not increase the strength of coherence shifts, suggesting that once there is an active processing goal and coherence mechanisms are activated it may not be possible to alter their intensity. Together with previous research in legal contexts (Holyoak & Simon, 1999; Simon et al.; Simon, Snow, & Read, in press), these findings suggest that coherence seeking mechanisms operate within the pre-decision phase in an all or nothing fashion, being activated any time there is an active processing goal. Finally, we found that individuals with higher need for cognition, who

chronically engage in more cognitive processing, reported stronger coherence shifts in attitudes about facts of the current case, suggesting that individuals with higher NFC may achieve a greater degree of coherence across a broad range of situations in their daily lives.

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References

- Anderson, N. H. (1962). Application of an additive model to impression formation. *Science*, 138, 817-818.
- Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, 42(1), 116-131.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Heider, F. (1946). Attitudes and cognitive organization. *Journal of Psychology*, 21, 107-111.
- Holyoak, K. J., & Simon, D. (1999). Bidirectional reasoning in decision making by constraint satisfaction. *Journal of Experimental Psychology: General*, 128, 3-31.
- Osgood, C. E., & Tannenbaum, P. H. (1955). The principle of congruity in the prediction of attitude change. *Psychological Review*, 62, 42-55.
- Neuberg, S. L., & Newsom, J. T. (1993). Personal need for structure: Individual differences in the desire for simple structure. *Journal of Personality and Social Psychology*, 65(1), 113-131.
- Newcomb, T. M. (1953). An approach to the study of communicative acts. *Psychological Review*, 60, 393-404.
- Read, S. J., Vanman, E. J., & Miller, L. C. (1997). Connectionism, parallel constraint satisfaction processes, and gestalt principles: (Re)introducing cognitive dynamics to social psychology. *Personality and Social Psychology Review*, 1, 26-53.
- Russo, J. E., Medvec, V. H., & Meloy, M. G. (1996). The distortion of information during decisions. *Organizational Behavior and Human Decision Processes*, 66, 102-110.
- Simon, D., Pham, L. B., Le, Q. A., & Holyoak, K. J. (2001). The emergence of coherence over the course of decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27, 1250-1260.
- Simon, D., Snow, C. J., & Read, S. J. (in press). The redux of cognitive consistency theories: Evidence judgments by constraint satisfaction. *Journal of Personality and Social Psychology*.