

Memory-based versus on-line processing: Implications for attitude strength

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Abstract

Three experiments tested whether the manner in which attitudes are created—through on-line or memory-based processing—can impact the resultant strength of those attitudes. In each study, participants were presented with 20 behavioral statements about a person named Marie. Whereas some participants were asked to continually evaluate Marie based upon each sentence and then report their overall evaluation (on-line processing), others were asked to focus on the sentence structure and to evaluate Marie only after they had read all the sentences (memory-based processing). Even when controlling for attitude accessibility, attitudes created through on-line processing were stronger than attitudes created through memory-based processing: Experiment 1 showed that participants in the on-line condition felt more certain of their attitudes, Experiment 2 showed that on-line attitudes were better predictors of participants' evaluative preferences, while Experiment 3 showed that on-line attitudes manifested stronger attitude-behavior intention correspondence.

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The social world is filled with an abundance of stimuli that individuals are capable of evaluating. Although some information is likely to be evaluated on the spot, situational as well as personality factors sometimes lead people to evaluate information only at a later point in time when an evaluation is required. This distinction has been discussed as one of on-line than following memory-based evaluation (Hastie & Park, 1986). *On-line* attitudes have been defined as attitudes that result when people evaluate individual pieces of information as they are received and integrate these evaluations into an overall attitude by the time processing terminates. Thus, when a judgment is required, an individual simply retrieves the overall evaluation that has already been formed (see Srull & Wyer, 1989). *Memory-based* attitudes have been

defined as attitudes that involve relatively less on-line evaluation. That is, when attitudes are formed in a memory-based fashion, information is not evaluated as much as it is received; rather, it is stored in memory. When a judgment is required, individuals retrieve as much of this information from memory as they can, evaluate the individual pieces of information, and then synthesize these “mini-assessments” into a global evaluation based on that retrieved information. In essence, whereas on-line attitudes are thought to consist of an evaluation created during information reception, making them relatively independent of recalled information, memory-based attitudes are thought to consist of an evaluation created at the time a judgment is required, making them more dependent on recalled information. In general, research has shown that on-line attitudes are most likely to occur when an individual has both the goal of forming and the resources to form an evaluation as he or she processes relevant information (Hastie & Park, 1986).

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To date, the literature has addressed two major differences between attitudes based upon on-line versus more memory-based processes. First, memory-based attitudes, compared to on-line attitudes, are more strongly (positively) correlated with the valence of the information that individuals recall about the attitude object (see Chartrand & Bargh, 1996; Hastie & Park, 1986; Lichtenstein & Srull, 1987; Mackie & Asuncion, 1990; Tormala & Petty, 2001). This is likely because memory-based attitudes, by definition, are relatively dependent on the specific information extracted from memory. Conversely, on-line attitudes are less reliant on information from memory (e.g., recalled traits, behavioral information; see Anderson & Hubert, 1963; Srull & Wyer, 1989) and more reliant on the evaluation that was formed at the time of initial encoding.

Second, on-line attitudes tend to be more accessible than memory-based attitudes—that is, they manifest shorter response latencies when being reported. Because on-line attitudes are formed as information is received, individuals simply need to retrieve the evaluation that was formed at the time of encoding. To report memory-based attitudes, individuals must retrieve each piece of information they can recall about the attitude object and then compute an attitude from the retrieved information. Thus, memory-based attitudes typically require both retrieval of multiple items and computation, creating a longer lag in reporting attitudes relative to on-line attitudes, which only require retrieval of the previously stored evaluation. Various studies have demonstrated that attitudes are reported more quickly following on-line than following memory based processing (e.g., Lingle & Ostrom, 1979; Mackie & Asuncion, 1990; Tormala & Petty, 2001).

Consequences for attitude strength

Although past research has shown these two features to be reliable consequences of on-line versus memory-based processing, little research has probed beyond these basic findings. The present research seeks to do so by testing the hypothesis that attitudes formed through on-line processing will manifest greater attitude strength in ways beyond heightened accessibility. Krosnick and Petty (1995) defined strong attitudes as those that are durable and impactful. In terms of durability, strong attitudes tend to be more persistent across time (e.g., Bassili, 1996) and more resistant to persuasion (e.g., Bassili, 1996; Eagly & Chaiken, 1995; Haugtvedt & Petty, 1992; Tormala & Petty, 2002; Wu & Shaffer, 1987). Strong attitudes also exert greater impact on thought and behavior. That is, as attitude strength increases, attitudes have a greater biasing effect on thought (i.e., they lead to more attitude-congruent thinking; e.g., Pomerantz, Chaiken, & Tordesillas, 1995) and are more predictive of behavior (i.e., they lead to greater attitude-behavior correspondence; e.g., Fazio & Zanna, 1978; Rucker & Petty, 2004; Tormala & Petty, 2002).

In short, attitude strength is associated with a variety of important consequences. Prior research showing that on-line attitudes are more accessible than memory-based attitudes,

however, does not reveal whether on-line attitudes have additional strength effects as well, nor whether these effects are independent of accessibility. Although attitude accessibility is a well-established feature of attitude strength, known to contribute to the durability and impact of attitudes (see Fazio, 1995), accessibility differences between on-line and memory-based attitudes typically exist only the first time an attitude is reported (e.g., on the first in a series of attitude items; see Tormala & Petty, 2001). Once attitudes have been formed and reported that first time, accessibility differences may be reduced or eliminated. Indeed, repeated expression of an attitude should make it more accessible for everyone (Fazio, Chen, McDonel, & Sherman, 1982), regardless of how it was initially formed. Thus, it remains to be determined if on-line attitudes differ from memory-based attitudes in their underlying strength *downstream*—that is, after they have already been formed and reported. The present research addresses this issue for the first time.

The primary objective of the current research is to determine if on-line processing increases attitude strength as assessed in a variety of ways, or if it merely enhances attitude accessibility at the initial time an attitude is reported. We expect that attitudes formed through on-line processing will prove generally stronger than attitudes formed through memory-based processing, and we expect that these effects will be independent of initial, even short-lived, differences in attitude accessibility. We suspect that this is likely to occur given a number of unique inferences that might accompany on-line attitude formation, a point which we will explore in greater detail in the General discussion.

Across experiments, we assessed different features associated with strong attitudes. In past research, such features have been categorized as being either operative or meta-attitudinal in nature (e.g., Bassili, 1996), accessibility being the most studied of the operative features and attitude certainty being the most studied of the meta-attitudinal features. Thus, in Experiment 1, we examined attitude certainty and sought to establish its independence from initial differences in attitude accessibility. In the next two experiments, we examined important downstream features of strength—attitude-preference consistency in Experiment 2 and attitude-behavioral intention correspondence in Experiment 3. We expected that attitudes would prove more predictive of other preferences and behavioral intentions following on-line as opposed to memory-based processing.

Experiment 1

Method

Participants and procedure

One-hundred thirty-six participants enrolled in psychology classes at a medium-sized Midwestern university took part to fulfill a course requirement. Upon entering the laboratory, participants were seated at computers presenting all materials using MediaLab software (Jarvis, 2002). Participants were randomly assigned to receive instructions

designed to induce either on-line or memory-based processing, and were then exposed to a list of 20 sentences describing the behaviors of a hypothetical target person named Marie (these sentences were identical to those used by Tormala & Petty, 2001, Experiment 2). Ten sentences described positive behaviors (e.g., “Marie bought groceries for her elderly neighbor during the snowstorm”), and ten sentences described negative behaviors (e.g., “Marie became aggressive one night after drinking heavily”). These statements were presented in the same order, which had been randomized, for all participants. Following the sentences, all participants completed dependent measures, and then were asked to recall as many of Marie’s behaviors as possible. After listing all of the behaviors they could, participants were presented with each of the behaviors they listed (i.e., their own responses) and were asked to classify each as positive, negative, or neutral with respect to Marie.

Instructional set manipulation

Instructional set—on-line versus memory-based—was induced using the classic procedure developed by Hastie and Park (1986; see also Mackie and Asuncion, 1990; Tormala and Petty, 2001). In the on-line condition, participants were told that the experiment was designed to examine impression formation. Participants were told that they would read a series of sentences about a person named Marie, and that they should try to form an impression of her. After reading each sentence, participants were asked to indicate the extent to which the sentence implied that Marie was likable on a seven-point scale. These participants were also told that they would be asked to report their impression of Marie after reading the sentences.

In the memory-based condition, participants were led to believe the experiment was designed to examine sentence structure. They read the same sentences about Marie, but were not told that they would be asked any questions about their impressions of her. Instead, they were asked to focus on how “dynamic” each sentence was, considering aspects such as the complexity of its verbs. Participants then read the sentences, rating each on a seven-point dynamism scale. This instructional set was designed to prevent participants from forming attitudes toward Marie as they encountered each behavior.

Dependent measures

Attitudes

Participants were asked four questions: “In general, how good or bad a person do you think Marie might be?” “In general, how positive or negative would you say your impression of Marie is?” “How much do you think you would like Marie?” and “How favorable or unfavorable is your impression of Marie?” Whereas answers to the first item were reported on a 1-to-6 scale, the remaining items were reported on a 1-to-7 scale. Anchors were as follows: *very bad–very good, very negative–very positive, do not like her at all–like her very much, very unfavorable–very favor-*

able. On each scale, higher numbers indicated more favorable attitudes. An average of the standardized scores of the four measures was created as an aggregate attitude measure (Cronbach’s $\alpha = .93$; variables loaded on a single factor accounting for 77% of the variance).

Attitude certainty

Attitude certainty was assessed using two items adapted from past research (e.g., Fazio & Zanna, 1978; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993): “How certain are you of your attitude about Marie?” and “How sure are you that your current impression of Marie is correct?” Responses to both items were provided on 1-to-5 scales (1 = Not at all certain [sure], 5 = Extremely certain [sure]). The two items were collapsed to form an aggregate certainty measure (Cronbach’s $\alpha = .79$).

Attitude accessibility

We utilized the time it took participants to report their attitudes toward Marie on the first attitude item as our measure of attitude accessibility. We used only the first item because later latencies might be contaminated if repeated expression of attitudes made those attitudes highly accessible for everyone (see Fazio et al., 1982; Tormala & Petty, 2001). We utilized response latencies from the second, third, and fourth attitude items as measures of subsequent attitude accessibility, with the expectation that there would be no difference in response latencies in these later measures as a function of instructional set. Demonstrating that accessibility is constant immediately after initial attitude reports would suggest that later attitude strength effects were not a function of differential attitude accessibility in the immediate situation.

Results and discussion

Preliminary analyses

Our first task was to assess the extent to which we replicated the results of prior research. We began by analyzing the recall data, and then submitted the attitude data to analysis. To examine the recall data, we created an index of recall valence. Based on participants’ assessments of their own recall, we subtracted the number of negative behaviors recalled from the number of positive behaviors recalled and divided this difference by the total number of behaviors recalled (i.e., $[P - N]/\text{total}$). This index was based on previous indices used to examine individuals’ cognitive responses (e.g., Petty, Fleming, & White, 1999; Petty, Briñol, & Tormala, 2002). We then submitted the recall valence index to analysis. There was no difference in recall valence across conditions, $F < 1$. Consistent with past research (e.g., Hamilton, Katz, & Leirer, 1980; Tormala & Petty, 2001), however, there was a difference in the total number of behaviors recalled, $F(1, 134) = 30.38, p < .001, \eta^2 = .19$. Participants in the on-line condition recalled significantly more items about Marie ($M = 6.58, SD = 2.58$) than did participants in the memory-based condition ($M = 4.43, SD = 1.92$).

We then submitted the attitude data to a hierarchical regression analysis (following the procedures outlined by Cohen & Cohen, 1983), in which instructional set (dummy coded: 0 = memory-based, 1 = on-line), recall valence, and the interaction (i.e., cross-product) served as predictors. We entered instructional set and recall valence in the first step, and the interaction in the second step. The outcome of this analysis was consistent with predictions. Overall, there was a significant positive relationship between attitudes and recall valence ($b = .33$, $t(131) = 4.52$, $p < .001$) indicating that as the proportion of positive behaviors recalled increased, attitudes became more favorable. In addition, attitudes were more favorable in the on-line condition ($M = .41$, $SD = .59$) than in the memory-based condition ($M = -.40$, $SD = .93$), ($b = .44$, $t(131) = 6.08$, $p < .001$) (see Tormala & Petty, 2001 for a similar finding). It is possible that the on-line condition was more pleasant for participants than was the memory-based condition, and this positive affect generalized to attitudes toward the target person (see Schwarz & Clore, 1983).

Of greater conceptual interest and more germane to the current concerns, these effects were qualified by an interaction between instructional set and recall valence ($b = -.42$, $t(130) = -1.93$, $p = .056$). The relation between recall valence and attitudes was significant among participants in the memory-based set condition ($b = .46$, $t(68) = 4.27$, $p < .001$) but not among participants in the on-line set condition ($b = .12$, $t(64) < 1$) *ns*. Thus, it appeared that our experimental induction of on-line versus memory-based processing was successful in determining the extent to which participants' attitudes were memory-dependent.

Attitude strength

To examine attitude strength, we first assessed whether on-line attitudes showed higher attitude accessibility than did memory-based attitudes. Response latencies on the first attitude item were indeed shorter for participants assigned to the on-line condition ($M = 6.20$ s, $SD = 2.60$) than for participants assigned to the memory-based condition ($M = 7.25$ s, $SD = 3.31$), $F(1, 136) = 4.18$, $p = .04$, $\eta^2 = .03$. As expected, the second, third, and fourth response latencies did not differ as a function of processing style, $F_s < 1$, presumably due to the effect of attitude expression on accessibility for participants assigned to both conditions (Fazio et al., 1982).

Next, we assessed whether instructional set affected the certainty with which participants held their attitudes. As predicted, participants in the on-line condition reported being more certain about their attitudes ($M = 3.09$, $SD = .64$) than did participants in the memory-based condition ($M = 2.67$, $SD = .59$), $F(1, 134) = 16.62$, $p < .001$, $\eta^2 = .11$. Of course, given the attitude accessibility effect, it was important to assess the extent to which the attitude certainty effect remained significant when controlling for response latencies. To address this issue, we conducted an analysis of covariance (ANCOVA), treating condition as the independent variable and attitude accessibility as the covariate. Consistent with expectations, when controlling

for response latencies on the first attitude item, the effect of condition on certainty remained significant, $F(1, 136) = 15.41$, $p < .001$, $\eta^2 = .10$. Because there were no differences in response latencies on subsequent attitude items, subsequent accessibility also could not, and did not, account for the attitude certainty effect.

Finally, we computed an attitude extremity index (i.e., the absolute value of the difference between the attitude rating and the midpoint of the attitude scale) and reanalyzed the effects of condition on the strength measures with attitude extremity as a covariate. The effect of condition on both strength features remained significant, $F(1, 133) = 19.13$, $p < .001$, $\eta^2 = .13$ for certainty; and $F(1, 133) = 3.80$, $p = .053$, $\eta^2 = .03$ for accessibility.

Summary

In short, Experiment 1 replicated past research on memory-based versus on-line processing in terms of both attitude-recall valence correlations and initial attitude accessibility. Importantly, though, Experiment 1 extends past research by demonstrating for the first time that attitudes formed on-line are stronger than attitudes formed from memory in ways that go beyond attitude accessibility. In particular, this experiment revealed that on-line attitudes were held with significantly greater *certainty* than were memory-based attitudes and, importantly, this effect was completely independent of any differences in attitude accessibility or attitude extremity across conditions. Again, even after statistically controlling for these variables, a significant attitude certainty effect was obtained. Thus, Experiment 1 demonstrates that attitude strength differs "downstream" following on-line versus memory-based processing, persisting beyond the initial attitude report and initial accessibility differences.

Experiment 2

In Experiment 1, attitudes formed on-line were held with greater certainty than attitudes formed from memory, and this difference could not be attributed to attitude accessibility or extremity. However, it remains to be seen whether attitudes formed on-line have the traditional consequences associated with attitude strength. Indeed, a primary reason why researchers are interested in attitude strength is that strong attitudes tend to have other important consequences. For example, stronger attitudes are more predictive of other evaluative responses (e.g., attitudes at later points in time, other evaluative preference judgments, behavioral intentions; Krosnick & Petty, 1995). In the present experiment, we will explore the notion that on-line attitudes are more predictive of later evaluative preferences than are memory-based attitudes.

Method

Participants and procedure

Sixty-six participants enrolled in introductory psychology classes at a medium-sized Midwestern university took

part in what was essentially a replication of Experiment 1, with the addition of a measure of evaluative preference immediately following attitude assessment. Specifically, participants were asked, “Based on what you know about each of the following people, indicate where you would rank Marie in terms of who you would prefer to be friends with: Marie, Hillary Clinton, Martha Stewart, Gweneth Paltrow, Connie Chung, Oprah Winfrey.” Participants then indicated, on a 1-to-6 scale, where they would rank Marie. For example, Point 1 was labeled “Marie would be first,” Point 2 was labeled, “Marie would be second,” and so on. Thus, lower values indicated greater preferences for Marie. The hypothesis was that participants’ attitudes would prove more predictive of their rankings of Marie (i.e., they would show greater impact on evaluative preferences) in the on-line rather than memory-based condition.¹

Results and discussion

Attitude items were again standardized and combined to form a single composite index (Cronbach’s $\alpha = .91$). As in Experiment 1, there was a significant effect of condition on attitudes, $F(1,64) = 6.54$, $p = .01$, $\eta^2 = .09$, such that attitudes were significantly more favorable in the on-line set condition ($M = .27$, $SD = .69$) than in the memory-based set condition ($M = -.27$, $SD = 1.01$). Unlike Experiment 1, however, there was no effect of condition on response latencies to the first attitude item, $F(1,64) = 1.54$, *ns*. Thus, attitude accessibility did not differ as a function of condition.

Following these preliminary analyses, participants’ rankings of Marie were reverse-scored such that higher numbers would indicate a greater preference to befriend Marie. We then conducted a hierarchical linear regression to examine the effect of attitudes, instructional set, and the interaction (attitude \times instructional set) in predicting responses to the ranking measure. In the first step, we tested whether rankings were predicted by attitudes and instructional set. In this step, attitudes significantly predicted ranking ($b = .59$, $t(63) = 2.94$, $p = .005$), but instructional set did not ($b = .29$, $t(63) = .81$, *ns*). The positive direction of the attitude relation suggests that as attitudes toward Marie became more favorable, participants were more likely to rank Marie favorably. In the second step, rankings were predicted using the attitude \times instructional set interaction. This interaction was significant ($b = 1.07$, $t(62) = 2.61$, $p = .01$), revealing that attitudes were most predictive of evaluative preference in the on-line condition (see Fig. 1). In fact, whereas the relation between initial attitude and later preference was significant among participants in the on-line condition ($b = 1.31$, $t(31) = 4.30$, $p < .001$), the association

¹ Having already shown that certainty is affected by on-line versus memory-based processing sets in Experiment 1, and recognizing the potential for demand effects if the certainty items were included before attitude strength consequences were tested, certainty was not measured in Experiments 2 or 3.

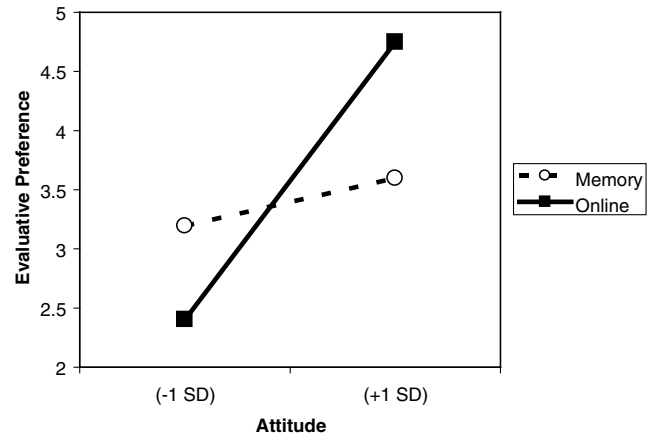


Fig. 1. Relationship between attitudes and evaluative preference as a function of on-line versus memory based attitude formation. Attitudes are predicted means at $\pm 1SD$ (Aiken & West, 1991).

was nonsignificant among participants in the memory-based condition ($b = .25$, $t(31) < 1$, *ns*).²

These results provide additional evidence that on-line attitudes are stronger than memory-based attitudes in that attitudes had more predictive utility in the former condition than in the latter. That is, on-line attitudes predicted whether participants would prefer to spend time with Marie, but memory-based attitudes did not. Furthermore, as explained in Footnote 2, this effect could not be attributed to differences in attitude accessibility.

Experiment 3

Experiments 1 and 2 provided evidence that attitudes formed on-line are stronger than attitudes formed in a more memory-based fashion. In Experiment 3, we sought to provide yet another demonstration of this effect by examining whether attitudes formed on-line would prove more predictive of behavior. For the sake of experimental efficiency, we operationalized behavior in terms of behavioral intentions, which have been found to be the single best and most proximal predictor of actual behavior (e.g., Fishbein & Ajzen, 1975). In this experiment, we replicated the procedure used in the first two experiments, but instead of attitude certainty (Experiment 1) or the relation between attitudes and evaluative preferences (Experiment 2), we included a short battery of behavioral-intention items. We expected attitudes in the on-line condition to exert a greater

² Moderation can also be tested through a comparison of correlations using the Fisher r -to- z transformation (Cohen & Cohen, 1983). Using this procedure, the difference in attitude-preference correlations was significant ($z = 2.00$, $p < .05$), replicating the other analyses. Also important, because there were no differences in response latencies in Experiment 2, accessibility could not account for the key attitude strength effects. Consistent with this logic, the condition \times attitude interaction on evaluative preference remained significant after controlling for attitude accessibility ($b = .58$, $t(62) = 2.91$, $p = .005$). This was true in Experiment 3 as well ($b = .52$, $t(115) = 4.90$, $p < .001$), so we do not discuss these analyses further.

impact on behavioral intentions (i.e., increased attitude–behavior correspondence) as compared to attitudes in the memory-based condition.

Method

Participants and procedure

One hundred nineteen participants enrolled in psychology classes at a medium-sized Midwestern university took part to fulfill a course requirement. After being randomly assigned to a memory-based or on-line instructional set condition, using the same procedure as the first two experiments, participants reported their overall attitudes toward Marie on the same items as in the previous experiments (Cronbach's $\alpha = .86$). Then, following a 15-min filler task, participants were asked a series of questions to assess behavioral intentions (Cronbach's $\alpha = .81$). These questions, as shown in Appendix A, assessed how participants felt they would behave toward Marie in various social contexts.

Results and discussion

Our first task was to assess whether instructional set influenced the composite attitude measure, which was standardized prior to analysis. Participants assigned to the on-line condition again showed more favorable attitudes ($M = .41$, $SD = .67$) than did participants assigned to the memory-based condition ($M = -.47$, $SD = .76$), $F(1, 117) = 43.0$, $p < .001$, $\eta^2 = .27$. As with Experiment 2, attitude accessibility did not differ between conditions, $F(1, 117) < 1$. Of primary interest, we assessed whether instructional set moderated attitude–behavioral intention correlations. First, a composite of the seven behavioral-intention items was created, with higher numbers indicating more favorable behavioral intentions toward Marie. In the first step of a hierarchical regression analysis, we entered both instructional set and attitudes as predictors of behavioral intentions. Both attitudes ($b = .52$, $t(116) = 4.90$, $p < .001$) and instructional set ($b = .41$, $t(116) = 2.37$, $p = .02$) were significant predictors. As expected, behavioral intentions were more favorable as attitudes became more favorable. Furthermore, behavioral intentions were more favorable in the on-line rather than memory-based condition. Most relevant to the current concerns, there was a significant interaction between attitudes and instructional set in predicting intentions ($b = .44$, $t(116) = 2.10$, $p = .04$).³ As seen in Fig. 2, the attitude–behavioral intention correlation was stronger among participants in the on-line ($b = .74$, $t(62) = 5.49$,

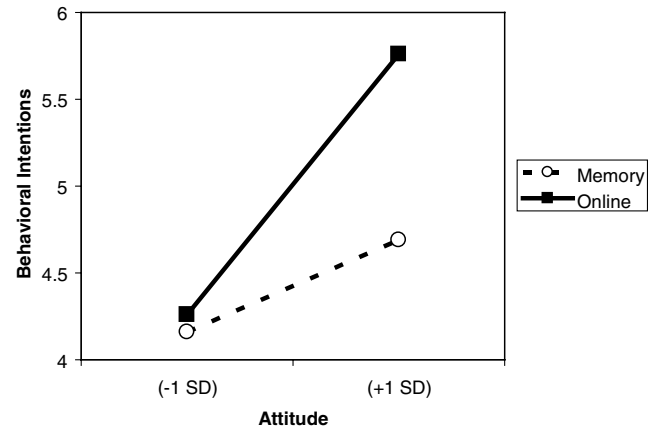


Fig. 2. Relationship between attitudes and behavioral intentions as a function of on-line versus memory based attitude formation. Attitudes are predicted means at $\pm 1SD$ (Aiken & West, 1991).

$p < .001$) rather than memory-based ($b = .31$, $t(53) = 1.88$, $p = .07$) condition.⁴

By demonstrating moderation of the attitude–behavioral intention relationship, the findings of Experiment 3 provide further evidence that attitudes formed in an on-line fashion are stronger than attitudes formed in a more memory-based fashion. Indeed, the effects of processing strategy on attitude strength appear to be real and durable beyond the initial reporting of the attitude itself. Furthermore, the effects again emerged in the absence of any differences in attitude accessibility.

General discussion

The present experiments replicated past research on on-line versus memory-based processing (e.g., Hastie & Park, 1986; Mackie & Asuncion, 1990; Tormala & Petty, 2001), but also extended it by demonstrating that this distinction has implications for underlying attitude strength beyond the previously documented differences in attitude accessibility. Experiment 1 demonstrated that attitudes formed through on-line processing were held with more certainty than were attitudes formed through memory-based processing. Experiment 2 demonstrated that attitudes created through on-line processing manifested greater correlations with other evaluative responses. Experiment 3 showed that on-line attitudes were more predictive of behavioral intentions. Of importance, these effects did not simply stem from heightened attitude accessibility. As described earlier, whether attitudes are formed on-line or from memory, they manifest equivalent levels of accessibility after they have been formed and reported just once. Of even greater importance, in Experiment 1 we obtained an initial attitude accessibility effect, but found that it could not account for the

³ This effect could not be explained by a difference in variance of the predictor variable (i.e., attitudes) or the predicted variable (evaluative preference, Experiment 2; behavioral intentions, Experiment 3). Across experiments, a series of Levene's tests for the equality of variances indicated that in no case was there significantly more variance in any variable in the online condition than in the memory-based condition.

⁴ Using the Fisher r -to- z transformation (Cohen & Cohen, 1983), the difference between correlations was found to be significant ($z = 3.64$, $p < .01$).

attitude certainty finding. Thus, accessibility differences were not responsible for the attitude strength effects.

Interestingly, in Experiments 2 and 3 there was no effect of condition on response latencies, despite methods which were identical to those used in the first experiment. Although we are not certain why accessibility differences failed to emerge, we view this outcome as further evidence that accessibility differences in this paradigm can be short-lived (in this case, so short-lived that they did not even emerge on the first attitude item). Thus, although it was not predicted, the absence of accessibility differences in the second and third experiment ultimately bolsters the argument that they do not account for attitude strength effects that occur “downstream.”

Mechanism

If the present findings do not stem from simple differences in attitude accessibility, then why are attitudes formed in an on-line fashion stronger than those formed from memory? Several general possibilities are worth noting. First, it is possible that on-line attitudes *feel* easier to report than do memory-based attitudes, and that this perceived ease or fluency of processing leads to greater attitude strength (see Haddock, Rothman, Reber, & Schwarz, 1999; Tormala, Petty, & Briñol, 2002). In other words, the effect may not be mediated by the actual speed with which attitudes are reported, but rather by a perception of ease of report that operates independently of attitude accessibility. Second, on-line attitudes may be perceived as having been formed through more intense or elaborative processing, which could feed attitude strength. Third, participants assigned to the memory-based condition may realize they have forgotten some of Marie’s behaviors, which would undermine attitude strength if people think their attitudes are based on incomplete information. Fourth, people might trust their attitudes more when they can be directly retrieved (on-line condition) rather than when they are newly formed as an attitude question is posed (memory-based condition). Such a difference in attitude “trustworthiness” could account for the attitude strength effect.

Ultimately, we suspect that the mechanism(s) behind the attitude strength effects will have implications for identifying and understanding moderators of and boundary conditions for these effects. If the mechanism turns out to be perceived ease of reporting the attitude, for example, then variables that disrupt the reporting of on-line attitudes (e.g., distraction or cognitive load) might attenuate the effect. In any case, pinpointing the mechanism or mechanisms behind the present effects would be a useful direction for future work.

Conclusion

Although the on-line versus memory-based processing distinction was made two decades ago (e.g., Hastie & Park, 1986), research to date has focused overwhelmingly on

uncovering predictors of the two processing strategies. Furthermore, only two consequences for these processing strategies have been examined: attitude-recall valence correlations and attitude response latencies. In the present research, we proposed and found support for the notion that on-line versus memory-based processing can influence the underlying strength of the attitude in ways that extend beyond, and are independent of, initial differences in accessibility. We view the current findings as not only establishing new consequences of processing strategies for people’s attitudes, but also expanding our understanding of the origins of attitude strength. In so doing, the current research takes new steps in two areas of considerable interest to social psychologists, and also opens the door to new questions and avenues for further exploration.

Appendix A. Behavioral-intention items used in Experiment 3

1. If Marie was running for student office, would you vote for her?
2. If Marie asked you if she could borrow a dollar to buy a soda, would you let her?
3. If you were having lunch at the food court with some of your friends and Marie asked if she could join you, would you let her?
4. If you and Marie were in the same class and she asked to copy your notes, would you let her?
5. Imagine that you have a car and are about to head to Wal-Mart to buy a few things. If Marie asked to “bum a ride,” would you let her?
6. Imagine that Marie is walking the halls of your dormitory collecting donations for the Red Cross. Would you put a dollar in the donation box?
7. Imagine that you don’t know which professor to take for a calculus class. Marie overhears you telling a friend this and recommends a particular professor. What would you do?

Note. Items 1–6 were measured on a seven-point scale anchored with “definitely no” through “definitely yes.” Item 7 was measured on a five-point scale labeled with “Completely ignore her opinion,” “Take her opinion with a grain of salt,” “Pay some attention to her opinion,” “Take her opinion very seriously,” and “Do what she says—choose that professor.”

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