On-Line Versus Memory-Based Processing: The Role of "Need to Evaluate" in Person Perception

Zakary L. Tormala
Richard E. Petty
Ohio State University

Two studies are reported examining individual differences in the need to evaluate as a determinant of memory-based versus on-line information processing. In each study, participants read statements describing the behaviors of a hypothetical target person and reported their attitudes toward this person. Consistent with expectations, high need to evaluate individuals formed attitudes in a spontaneous, on-line fashion, whereas low need to evaluate individuals formed them in a less spontaneous, more memory-based fashion. This conclusion was supported by two kinds of evidence: attitude-recall valence relationships (Experiments 1 and 2) and response latency measures (Experiment 2). These results suggest that evaluative responding in the domain of person perception is less pervasive than concluded in prior research.

A long-standing assumption in social psychology has been that evaluation is a fundamental part of human nature (e.g., Markus & Zajonc, 1985; Osgood, Suci, & Tannenbaum, 1957). Considerable empirical evidence has been mounted in support of this view. For instance, Fazio, Sanbonmatsu, Powell, and Kardes (1986) found that attitudes can be activated automatically given the mere presence of an attitude object, particularly when the attitude is strong. Bargh and colleagues (Bargh, Chaiken, Govender, & Pratto, 1992; Bargh, Chaiken, Raymond, & Hymes, 1996) furthered this argument, noting that automatic attitude activation can occur for virtually all attitude objects. Although there exist differences in the conditions that foster such activation (e.g., Glaser & Banaji, 1999), researchers clearly agree that automatic evaluation is a pervasive phenomenon.

Additional empirical support for this position comes from the domain of person perception. Spontaneous trait inference researchers (see Uleman, Newman, & Moskowitz, 1996, for a review) have shown that even when impressions (i.e., attitudes or evaluative beliefs about people) do not already exist in memory, they will be formed spontaneously whenever one encounters behavioral information describing a person. In fact, Uleman et al. (1996) argue that we form trait inferences "as naturally as we extract oxygen from the air" (p. 212). Work on on-line and memory-based impression formation also suggests that on-line evaluative processing of other people is the norm, although task constraints can disrupt it (e.g., Bargh & Thein, 1985; Hastie & Park, 1986; Lichtenstein & Srull, 1987). Hastie and Park (1986), for example, noted that they had difficulty finding any evidence of memory-based judgments until they "realized the importance of *preventing* subjects from making spontaneous on-line judgments" (p. 265, emphasis added).

Individual Differences in Evaluative Responding

Despite the apparent consensus regarding the extent to which people engage in evaluative responding—especially with respect to other people—work on the need to evaluate (Jarvis & Petty, 1996) challenges the notion that evaluative responding is so pervasive. The need to evaluate refers to the chronic tendency to engage in evaluative responding. In several studies demonstrating the predic-

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tive utility of this construct, Jarvis and Petty found evidence for individual differences in the extent to which people form evaluations. For example, when describing events from their previous day, people who scored highly on the Need to Evaluate Scale spontaneously generated a higher proportion of evaluative thoughts (e.g., "some of the songs at the concert were really good") than those who scored on the low end of the scale. Individuals low in their need to evaluate had a greater proportion of nonevaluative thoughts when describing their previous day (e.g., "woke up at 8:00 a.m. and took my dog out first thing"). Jarvis and Petty found that this relationship also emerged in people's responses to unfamiliar abstract paintings.

Research by Hermans and Eelen (2001) suggests that these differences also extend to the domain of automatic evaluative responding. Hermans and Eelen used a priming procedure in which positive or negative words (e.g., friendly, mean) preceded target words that were evaluatively congruent or incongruent with the primes (see Fazio et al., 1986). Participants were instructed to attend to the second word and evaluate it as quickly as possible as "positive" or "negative." They found that high need to evaluate individuals responded more quickly to evaluatively congruent than evaluatively incongruent target words. For those low in need to evaluate, however, there was no difference. Hermans and Eelen (2001) argued that high need to evaluate individuals have stronger object-evaluation associations due to their chronic evaluative responding. Further evidence for this view comes from research reported by Petty and Jarvis (1996), in which people high and low in the need to evaluate reported their attitudes toward nearly 100 familiar attitude objects (e.g., butterfly, landlords, spinach; see Bargh et al., 1992). The names of these objects were flashed on a computer screen and participants reported their evaluations on a dichotomous good/bad scale. Petty and Jarvis found those high in the need to evaluate reported their attitudes more quickly than those low in the need to evaluate.

This research demonstrates that there are individual differences in the general tendency to engage in evaluation; however, work on the need to evaluate has not explicitly examined individual differences in the evaluation of people. Because humans are social animals, evaluation of other people might be so fundamental that individual differences in the general propensity to evaluate would not moderate it. That is, even if we accept the notion that constant evaluation of objects and issues is not the rule, we are not in a position to reject the idea that evaluations of other people are more pervasive for everyone. Thus, one goal of the present research is to determine if individual differences in need to evaluate could moderate evaluative responding toward people.

Interestingly, a considerable body of research has demonstrated that individual differences do influence other aspects of person perception. The related constructs of personal need for structure (Neuberg & Newsom, 1993) and need for cognitive closure (Webster & Kruglanski, 1994), for example, appear to be important in this regard. Individuals high in need for structure (or closure) have been found to engage in more stereotyping (e.g., Neuberg & Newsom, 1993), form more spontaneous trait inferences (Moskowitz, 1993), demonstrate greater correspondence bias (Webster & Kruglanski, 1994), and be more susceptible to primacy effects in impression formation (Webster & Kruglanski, 1994) than those low in need for structure (or closure). These findings lend support to the notion that there may be detectable individual differences in evaluative responding toward people and also point to the desirability of distinguishing need to evaluate effects from those based on need for structure or closure (see Experiment 2).

The current research also has a second goal. Prior work has clearly shown that relative to high need to evaluate individuals, people low in need to evaluate show little evidence of evaluative thinking. Presumably, however, evaluation is sometimes necessary even for low need to evaluate individuals. For instance, when participating in psychology experiments (as when participating in real life), both low and high need to evaluate individuals are called on to express opinions, and both do express them. An important question, then, follows: If low need to evaluate individuals are not evaluating information actively as it is encountered (i.e., in an on-line fashion), on what basis are they forming their opinions? Work by Hastie and Park (1986) suggests that if opinions have not been formed on-line, they will be formed in a memory-based fashion when a judgment is required. Because no research has been conducted to explore the processes by which low need to evaluate individuals form attitudes or opinions when they are requested, we sought to examine these processes. We argue that whereas high need to evaluate individuals are likely to engage in on-line evaluation, those low in need to evaluate are likely to rely more on memory-based evaluative responding when the situation demands an evaluation.

The distinction between memory-based and on-line evaluation has important implications. For instance, the type of evaluative responding in which people engage may subject them to distinct types of biases. Anderson and Hubert (1963) found that although overall impressions are often susceptible to primacy effects, information recall is more susceptible to recency effects. Thus, to the extent that memory-based evaluations rely on information recall and on-line evaluations do not (e.g., Chartrand & Bargh, 1996; Hastie & Park, 1986; Lichtenstein & Srull, 1987; Mackie & Asuncion, 1990),

these differences might map onto recency and primacy effects, respectively. Moreover, considerable work on stereotyping indicates that situations inducing memory-based responding (e.g., cognitive load) also elicit increased reliance on stereotypes in both memory and judgment (e.g., Bodenhausen & Lichtenstein, 1987; Dijksterhuis & van Knippenberg, 1995; Macrae, Hewstone, & Griffiths, 1993). Thus, documenting individual differences in memory-based versus on-line evaluative responding is a potentially important task.

Assessing On-Line Versus Memory-Based Evaluative Responding

In prior research, two measures of on-line versus memory-based attitudes have been used: attitude-recall valence correlations and response latencies. The most common technique has been to assess the relationship between attitudes and the valence of information recalled (e.g., Hastie & Park, 1986; Lichtenstein & Srull, 1987). This technique is based on the notion that on-line attitudes are spontaneously formed and revised as information is received, whereas memory-based attitudes rely to a greater extent on the retrieval of information from long-term memory and the subsequent evaluation of that information. Because on-line attitudes are relatively less dependent on memory, they tend to have weak or nonsignificant correlations with the valence of information recalled. Because memory-based attitudes depend on memory by definition, however, they tend to have higher correlations with the valence of information recalled. In short, then, greater attitude-recall valence relationships are obtained for memory-based than for on-line attitudes.

On-line and memory-based attitude differences also have been assessed using response latency measures (e.g., Lingle & Ostrom, 1979; Mackie & Asuncion, 1990). Mackie and Asuncion (1990), for instance, found that on-line processing instructions produced shorter response latencies (i.e., faster responses) on attitude measures than did instructions designed to produce memory-based processing. The logic here is that memory-based attitudes take more time to report because the individual must think back to the information that can be recalled, evaluate this information, and then compute an attitude on the spot. Because on-line attitudes have presumably already been formed during information acquisition, they require no extra computation, making them much faster to report.

EXPERIMENT 1

The primary objective of Experiment 1 was to demonstrate that individual differences in the need to evaluate could determine memory-based versus on-line evaluations of people. All participants were exposed to behavioral information about a person and reported their attitudes toward the person and recalled as much information about him or her as they could. We expected to find stronger attitude-recall valence correspondence for low need to evaluate individuals (indicative of memory-based attitude formation) than for high need to evaluate individuals (indicative of spontaneous, on-line attitude formation). We also included a common experimental manipulation of memory-based versus on-line processing sets (see Hastie & Park, 1986) to provide a replication of prior research and examine the possibility of an interaction between situational and individual difference determinants of this processing distinction. A significant interaction could suggest that low need to evaluate individuals tend to engage in little on-line evaluation but that when instructed to do so, they readily change their processing style. On the other hand, the absence of an interaction also would be informative. Although an on-line instructional set should certainly cause even low need to evaluate individuals to consider the evaluative implications of each sentence as it is received, it is possible that they would still not compute their overall, global evaluation of the person until asked to do so. Thus, the global evaluation would still be memory dependent.

In addition, this study sought to determine the extent to which a related individual difference, the need for cognition (Cacioppo & Petty, 1982), could predict memory-based versus on-line attitude formation. Need for cognition refers to the tendency to engage in and enjoy effortful processing and has been found to be moderately correlated with the need to evaluate (Petty & Jarvis, 1996). Thus, we felt it was important to rule this construct out as an alternative explanation for any need to evaluate effects. Moreover, there was some possibility that need for cognition might possess independent predictive potential in this domain. In a persuasion paradigm, Haugtvedt and Petty (1992) found significant attitude-recall correlations for low but not high need for cognition individuals. Because the need to evaluate has been shown to be uniquely predictive of the extent of evaluative thinking (Jarvis & Petty, 1996), however, we expected to rule need for cognition out as an alternative explanation for need to evaluate effects.[1]

Method

PARTICIPANTS AND DESIGN

Participants included 140 undergraduates (65 men and 75 women) from the Ohio State University who participated in partial fulfillment of a course requirement. Participants were randomly assigned to instructional set conditions (memory-based vs. on-line) and then completed the Need to Evaluate and Need for Cognition Scales.

PROCEDURE

Participants were seated in a room with 10 cubicles partitioned such that visual contact between them was not permitted. They received instructions designed to induce either a memory-based or an on-line evaluation set. Following these instructions, all participants read the same 20 sentences about a hypothetical person named Ron. Of these 20 sentences, 10 described good behaviors and 10 described bad behaviors.[2] Two of the good sentences were as follows: "Ron lent money to a friend" and "As a result of his increasing interest in working with young children, Ron volunteered at the local youth center during his free time." Two of the bad sentences were as follows: "Ron stole $20" and "Ron did not like his neighbor's dog and one afternoon he kicked him as he was walking from his car to the front door of his house." The sentences were presented in a fixed random order across participants and were varied in terms of length and complexity to be consistent with the memory-based instructional set cover story. After rating each of the 20 sentences according to the instructions they received, participants completed questionnaires containing attitude and recall measures as well as the individual difference scales.

INDEPENDENT VARIABLES

Instructional set. Participants were randomly assigned to either the on-line or memory-based set condition. Instructions were adapted from those used by previous researchers (e.g., Hastie & Park, 1986). In the on-line set condition, participants were instructed to read the sentences about Ron and try to form an impression of him. They were told to focus on the kind of person they think Ron might be and then to rate each of the sentences on the degree to which they implied that Ron was either very likable or not at all likable. Participants in this condition also were told that they would be asked a series of questions regarding the attitudes they had formed toward Ron. They then read each sentence and rated it on a 1 to 7 scale of likability.

In the memory-based set condition, participants were instructed to read the sentences about Ron and to focus on the degree to which they were simple or complex. Participants were not told that they would be asked any questions regarding their impressions of Ron as a person. Instead, they were told to focus their attention on the simplicity or complexity of each sentence and were advised to consider things such as the number of verbs or adjectives contained within each sentence. Participants rated each sentence using a 1 to 7 scale ranging from *very simple* to *very complex*. This manipulation was designed to distract participants from on-line evaluation.

Need to evaluate. Following the dependent measures, participants completed the Need to Evaluate Scale containing 16 items, such as "I form opinions about everything" and "I enjoy strongly liking and disliking new things" (Jarvis & Petty, 1996). Participants responded to each item on a 5-point scale anchored at *extremely uncharacteristic* and *extremely characteristic*. The items on the Need to Evaluate Scale proved highly consistent ($\alpha = .86$); therefore, responses were summed to form one overall index for each participant. The range of scores was 32 to 80 (possible range is 16 to 80) and the median score was 50. Scores were not affected by the instructional set manipulation.

Need for cognition. Participants also completed the 18-item version of the Need for Cognition Scale (Cacioppo, Petty, & Kao, 1984). This scale contains items such as "I prefer complex to simple problems" and "Thinking is not my idea of fun" (reverse-scored). Participants responded to each item on a 5-point scale anchored at *extremely uncharacteristic* and *extremely characteristic*. Again, due to high internal consistency ($\alpha = .89$), scores were summed for each participant. The range of scores was 28 to 87 (possible range is 18 to 90) and the median score was 60. Scores were not affected by instructional set.

DEPENDENT MEASURES

Attitude index. Immediately following the 20 statements about Ron, participants' attitudes toward him were assessed using six 7-point attitude scales. These scales had the following anchors: *bad-good*, *would like him very much-would not like him at all* (reverse-scored), *negative-positive*, *honest-dishonest* (reverse-scored), *caring-uncaring* (reversed-scored), and *stupid-intelligent*. Scales were preceded by questions such as "In general, how good or bad a person do you think Ron might be?" "How much do you think you would like Ron?" and so on. The scales all ranged from 1 to 7, with 1 reflecting *a very negative attitude toward Ron* and 7 reflecting *a very positive attitude toward Ron* (after reverse-scoring the appropriate items). Responses to these scales were averaged to form one overall attitude index ($\alpha = .63$).[3]

Recall valence index. Following the attitude scales, participants engaged in a free recall task. Participants were asked to write down as many points as they could remember about Ron. They were told not to worry about exact wording, spelling, or grammar but to focus on the main idea of each point. They were given up to 5 minutes to recall as much as they could. Recall was later coded by a judge (blind to experimental condition and individual difference scores) as positive or negative toward Ron and these ratings were used for the recall index. In computing this index, only accurate recall was included. Each item recalled was considered accurate if it captured the gist of one of the behavioral statements.

For the recall valence index, a difference score was computed for each participant using the judge's rating.

Specifically, the number of negative points remembered about Ron was subtracted from the number of positive points remembered about Ron. Positive numbers thus indicated greater positivity in recall and negative numbers indicated greater negativity in recall. This index reflected our assumption that attitudes formed in the present experiment would be based on the explicit consideration of both positive and negative behaviors. Furthermore, it was based on previously used cognitive response valence indices computed in the same fashion (e.g., Mackie, 1987; Mackie & Asuncion, 1990; see also Petty, Priester, & Wegener, 1994).

To determine if participants' subjective assessments of the evaluative content of their own recall would produce different relationships with their attitudes than our a priori assessments of the evaluative implications of each behavior, we also asked participants to rate the sentences they listed. Following the recall task, participants were asked to return to each point recalled and rate it with a "+," "–," or "0," depending on whether they thought it was positive, negative, or neutral toward Ron. Unfortunately, a substantial number of participants (64% of the total sample) incorrectly completed this part of the experiment by returning to the original stimuli and rating those statements instead of their own recall. We did, however, compare the judge's ratings to the participants' ratings for those participants who completed this part of the experiment correctly. The ratings were not identical, suggesting that in some cases, participants recalled the gist of a sentence correctly but put their own evaluative spin on it; but they were highly correlated ($r = .83$, $p < .001$) and produced consistent results in subsequent analyses.

Results

Prior to analysis, we standardized all variables and measures and then followed the recommendation of Cohen and Cohen (1983) and removed outliers from the attitude and recall valence data that were at least three standard deviations above or below their respective means. For the preliminary analyses, only the specific outlying scores were eliminated; the corresponding participants' other data were retained for additional analyses. For our primary analysis of attitude-recall valence relationships, however, outlying scores on either measure resulted in the removal of a participant's entire data, because both attitude and recall valence scores were required to make the data relevant to our concerns. In other words, if an individual had an outlying score on either the attitude or recall valence index, the individual was eliminated from analysis because attitude-recall relationships cannot be determined without both attitude and recall data for each participant. Of importance, outliers were determined across all participants and were equally likely to be found in any condition. This analysis led to the removal of data from just 4 participants (2.9% of total), resulting in a total N of 136 for our primary analysis.

In all regression analyses, we again followed the recommendation of Cohen and Cohen (1983) and used a hierarchical approach in which a sequence of regression analyses of increasing complexity was run. Within each analysis, only the highest order terms were interpreted. In other words, we first tested only the main effects. In the second analysis, we included main effects and two-way interactions, interpreting only the two-way interactions, and so forth.

PRELIMINARY ANALYSES

In preliminary analyses, we examined the relationships between our independent variables and amount of recall and overall valence of recall. We first analyzed amount of recall and found a significant main effect for instructional set ($\beta = .62$, $p < .001$) such that participants given an on-line instructional set recalled significantly more information than participants given a memory-based instructional set, perhaps because the memory-based task was more taxing than the on-line task. However, amount of recall was not predicted by need to evaluate ($\beta = –.10$, $p = .18$), need for cognition ($\beta = –.07$, $p = .38$), or participant gender ($\beta = –.11$, $p = .14$), or by any of the interactions between these variables (ps $> .19$).

We also analyzed the overall valence of recall. This analysis revealed a marginally significant main effect for participant gender ($\beta = –.17$, $p = .06$) such that women showed slightly less positive recall than men. Valence of recall was not predicted by need to evaluate ($\beta = –.03$, $p = .76$), need for cognition ($\beta = –.12$, $p = .18$), or instructional set ($\beta = .08$, $p = .34$), or by any of the interactions between these variables.

Also, consistent with prior research, need to evaluate and need for cognition were moderately correlated ($r = .28$, $p = .001$). Thus, it was important to assess the degree to which the need for cognition could account for any need to evaluate effects obtained.

ATTITUDE-RECALL VALENCE RELATIONSHIPS

Of primary interest in the present study was the extent to which the need to evaluate predicted on-line versus memory-based attitude formation as judged by the relationship between attitudes and recall valence. The attitude-recall valence relationships were analyzed using a multiple regression predicting attitudes, where recall valence, need to evaluate, and need for cognition were treated as continuous predictor variables and instructional set and participant gender were dummy coded. Participant gender, instructional set, recall valence, need to evaluate, need for cognition, and all of the interaction terms were submitted hierarchically as predictors

of the attitude index (see Cohen & Cohen, 1983). Predictors were considered relevant to the present concerns if they contained the recall term. For example, the effect of need to evaluate on the attitude-recall valence relationship was represented by the interaction (i.e., cross-product) between recall valence and need to evaluate in the regression analysis predicting attitudes. The instructional set effect on the attitude-recall valence relationship was represented by the interaction between recall valence and the instructional set variable. Other effects were similarly represented.

In this analysis, we found that the overall attitude-recall valence relationship was positive and marginally significant ($\beta = .16$, $p = .07$), suggesting that the more positive information they recalled, the more favorable participants' attitudes were toward Ron. However, there was no relationship between attitudes and need to evaluate ($\beta = -.09$, $p = .32$), need for cognition ($\beta = .07$, $p = .46$), participant gender ($\beta = .06$, $p = .47$), or instructional set ($\beta = .13$, $p = .14$).

More pertinent to our primary interests, however, were the interaction terms between recall valence and the other predictors. As expected, two significant interactions emerged. First, a Recall Valence × Instructional Set interaction ($\beta = -.61$, $p < .05$) indicated that we replicated the basic effect of instructional set from prior research. As illustrated in the top panel of Figure 1, there was a stronger relationship between attitudes and recall valence under memory-based set conditions ($r = .29$, $p < .02$) than under on-line set conditions ($r = .02$, $p = .89$). Second, and more important, we found that the predicted interaction between recall valence and need to evaluate was significant as well ($\beta = -.72$, $p < .05$). As shown in the bottom panel of Figure 1, the relationship between attitudes and recall valence was greater for individuals low in need to evaluate ($r = .27$, $p < .03$) than for those high in need to evaluate ($r = .03$, $p = .83$), determined by a median split for illustrative purposes. Neither the Recall Valence × Need for Cognition interaction ($\beta = -.33$, $p = .38$) nor the Recall Valence × Participant Gender interaction ($\beta = .15$, $p = .62$) approached significance. Furthermore, none of the higher order interactions approached significance ($ps > .22$).[4] Of particular interest was the absence of a three-way interaction between recall valence, need to evaluate, and instructional set ($\beta = .14$, $p = .87$). Under memory-based set conditions, the attitude-recall valence correlation was significant for low ($r = .48$, $p < .01$) but not high need to evaluate individuals ($r = .07$, *ns*). Moreover, although the correlation was not significant for either group under on-line set conditions, it also tended to be greater for low ($r = .11$) than for high need to evaluate individuals ($r = .01$).

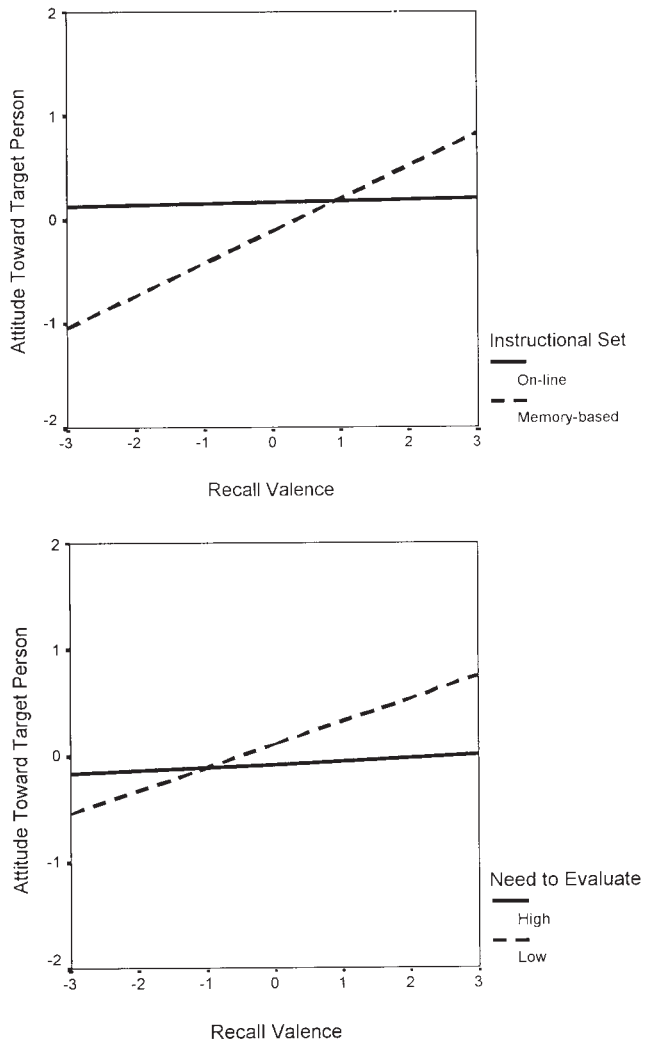

Figure 1 Top panel: Effects of instructional set on the relationship between attitudes and recall valence (Experiment 1). Bottom panel: Effects of need to evaluate on the relationship between attitudes and recall valence (Experiment 1).

Discussion

Our first experiment provided initial evidence that the need to evaluate predicts the extent of on-line versus memory-based attitude formation in person perception. Using attitude-recall valence correspondence as the criterion, Experiment 1 demonstrated that individuals high in need to evaluate engage in on-line attitude formation, whereas those low in need to evaluate engage in less on-line and more memory-based attitude formation. This finding suggests that there are individual differences in spontaneous evaluative processing of other people. High need to evaluate individuals evaluate during the acquisition of person information, whereas low need to evaluate individuals engage in less evaluation during

information acquisition and therefore depend more on the information they can recall when an evaluation question is posed. Furthermore, the findings in Experiment 1 suggest that need to evaluate is uniquely predictive of on-line versus memory-based evaluations, not being accounted for by its relationship with need for cognition. Interestingly, although analysis of the simple correlations revealed a nonsignificant attitude-recall valence relationship for low need to evaluate individuals in the on-line set condition, the interaction between need to evaluate, instructional set, and recall valence did not even approach significance in the regression analysis, which is the more reliable analysis because it did not involve a median split. Thus, it appears that an evaluative set (on-line instructions) can make low need to evaluate individuals a little more evaluative but that they are still relatively more reliant on memory than individuals who are higher in the need to evaluate. As mentioned earlier, it is possible that evaluative instructions cause low need to evaluate individuals to evaluate each piece of person information as it is received but not to actively synthesize this information into a global evaluation. Perhaps only when an evaluation is required does this synthesis occur. Thus, judgments remain somewhat dependent on memory.

EXPERIMENT 2

The purpose of Experiment 2 was to conceptually replicate and extend the findings from Experiment 1. Thus, in Experiment 2, we used a highly similar methodology with a few key differences. Specifically, a new hypothetical person ("Marie") was created, all of the behavioral statements were changed, and the instructional set manipulation was altered slightly. These changes were made to enhance the generality of our findings. Most important, however, Experiment 2 was conducted on computers to allow for the collection of response latency data. We sought to determine the extent to which need to evaluate could predict response latencies on attitude items in an impression formation paradigm. It was predicted that low need to evaluate individuals would take more time to formulate their evaluative responses (because they were computing them on the basis of the valence of information they could recall) than high need to evaluate individuals (who had presumably already formed them on-line).

Finally, in Experiment 2, we included the Personal Need for Structure Scale (Neuberg & Newsom, 1993), which assesses the general preference for cognitive simplicity. As mentioned earlier, need for structure has been shown to be important to other aspects of person perception. Thus, although uncorrelated with the need to evaluate in past research ($r = .03$) (Petty & Jarvis, 1996), we felt it was possible that the personal need for structure also might predict on-line versus memory-based evaluations. Because high need for structure individuals desire simplicity and closure (see Kruglanski et al., 1997), one possibility was that they would be more likely to form quick, on-line evaluations than low need for structure individuals, who are more tolerant of ambiguity and might wait until all the information was presented before forming an evaluation. We included this scale to test this possibility.

Method

PARTICIPANTS AND DESIGN

Participants included 165 undergraduates (67 men and 98 women) from the Ohio State University who participated in Experiment 2 to help meet a course requirement. Participants were randomly assigned to instructional set conditions and then completed the Need to Evaluate Scale, the Personal Need for Structure Scale, and the Need for Cognition Scale.

PROCEDURE

Participants were seated in a room with eight partitioned computers and read instructions displayed on their monitors. Participants read 20 sentences (pretested and selected using the same procedure as in the first experiment; see Note 2) about a hypothetical person named Marie. In total, there were 10 positive and 10 negative sentences, presented in a different random order for each participant. Examples of sentences with positive and negative implications for Marie, respectively, are as follows: "Marie bought groceries for her elderly neighbor during the snowstorm" and "When Marie scraped the side of the other car in the parking lot, she drove away without leaving a note." After reading each of the 20 sentences, participants completed attitude and recall measures and the individual difference inventories.

INDEPENDENT VARIABLES

Instructional set. Participants were randomly assigned to either the on-line set condition or the memory-based set condition. In the on-line set condition, participants were given instructions that were identical to those used in Experiment 1. In the memory-based set condition, participants read instructions that were adapted from Mackie and Asuncion (1990); that is, they were told to read the sentences about Marie and to focus on the degree to which they were dynamic or not dynamic. The meaning of the word *dynamic* was left ambiguous but participants were told that in making this assessment they should pay attention to the number and type of verbs contained in each sentence. Participants in this condition were not told that they would be asked any questions regarding their impressions of Marie as a person. They

rated each sentence using a 1 to 7 scale, ranging from *not at all dynamic* to *very dynamic*.

Need to evaluate. Following the dependent measures, all participants completed the Need to Evaluate Scale. Items on this scale showed adequate consistency (α = .78); therefore, responses to each item were summed to form one overall index for each participant. Scores ranged from 26 to 70 (*Mdn* = 51) and were unaffected by instructional set.

Personal need for structure. Participants then completed the Personal Need for Structure Scale (Neuberg & Newsom, 1993). This scale contains items such as "I don't like situations that are uncertain" and "I enjoy having a clear and structured mode of life." Participants responded to each item on a 6-point scale anchored at *strongly disagree* and *strongly agree*. Items were consistent (α = .72); therefore, we summed responses to form an overall index. Scores ranged from 23 to 60 (possible range is 11 to 66) and the median score was 42. Need for structure scores also were unaffected by instructional set.

Need for cognition. Participants also completed the 18-item version of the Need for Cognition Scale. The reliability of items on this scale was quite high (α = .89); therefore, we again summed them to form a single overall index. Scores ranged from 25 to 89 (*Mdn* = 57) and were unaffected by instructional set.

DEPENDENT MEASURES

Attitude index. Participants' attitudes toward Marie were assessed using seven 7-point attitude scales. These scales had the following anchors: *bad-good, negative-positive, would not like her at all-would like her very much, unfavorable-favorable, honest-dishonest* (reverse-scored), *caring-uncaring* (reverse-scored), and *stupid-intelligent*. Question wording for each item closely paralleled the wording used in the first study. Responses to these scales were averaged (α = .73) to form an overall attitude index.

Recall valence index. Following the attitude measure, participants engaged in a free recall task that was identical to that used in Experiment 1, except that they were not asked to rate the valence of the information they recalled. We then used a judge's rating to compute a recall valence index in the same way as in Experiment 1. Of importance, a second judge also coded recall for 58 randomly selected participants. These additional ratings were used to assess interrater reliability and were found to correlate highly with the ratings of the first judge (r = .94, $p < .001$). Thus, the ratings of the first judge were deemed reliable and were used for all analyses.

Response latency. Reaction times for attitude responses also were collected. Because a key distinction between memory-based and on-line evaluation is the point at which an attitude is formed, the response latency index was represented by the reaction time to the very first attitude item alone (i.e., the *good-bad* item). This item was placed first because of its global evaluative nature (i.e., it is not linked to any particular belief or feeling). Focusing our analysis on the first item was based on the notion that once a global evaluation is formed, it is stored and thus quicker to report (e.g., Lingle & Ostrom, 1979; see also Fazio, Chen, McDonel, & Sherman, 1982). Because the first attitude item required everyone to report an attitude, whether they had already formed one (i.e., on-line) or whether they formed one right then from memory, response latency differences should have disappeared (or become attenuated) after that item given that all participants had now produced evaluations.

Results

We again standardized all variables and measures prior to analysis. We then removed outliers from the attitude and recall valence data following the same criteria as in the first experiment. In total, data from 7 participants (3.6% of sample) were removed from the primary analysis of attitude-recall valence relationships, producing a final N of 158 for that analysis. Analyses in Experiment 2 were then conducted using the same hierarchical regression approach as in Experiment 1.

PRELIMINARY ANALYSES

We first examined the relationships between our independent variables and amount of recall. As in Experiment 1, there was a main effect for instructional set on the number of items of information recalled (β = .44, $p < .001$). Participants given the on-line instructional set recalled more information than those given the memory-based instructional set. There were no main effects for participant gender (β = .11, p = .13), need to evaluate (β = –.06, p = .40), need for cognition (β = .04, p = .59), or personal need for structure (β = –.02, p = .84). There was one significant interaction between participant gender and need for cognition (β = .48, p = .05) such that for women there tended to be a positive relationship between need for cognition and the amount of information recalled (β = .18, p = .07), whereas for men there was no relationship (β = –.13, p = .31). No further interactions were reliable (ps > .20).

We also examined the overall valence of recall. This analysis revealed one significant effect—a main effect for need to evaluate (β = –.16, $p < .05$)—indicating an inverse relationship between need to evaluate and positivity of recall. There were no main effects for participant gender (β = .13, p = .11), instructional set (β = .08, p = .30), need for cognition (β = –.08, p = .36), or personal need for structure (β = .03, p = .69), and there were no interactions between any of the predictor variables (ps > .11).

Consistent with past research (Petty & Jarvis, 1996), need to evaluate was positively correlated with need for cognition ($r = .28$, $p < .01$) and uncorrelated with need for structure ($r = -.01$), whereas need for cognition was negatively correlated with need for structure ($r = -.19$, $p = .02$).

ATTITUDE-RECALL VALENCE RELATIONSHIPS

We found that the overall attitude-recall valence relationship was marginally significant ($\beta = .13$, $p < .10$), again indicating a positive relationship between attitudes and recall valence. There was no relationship, however, between global attitudes and need to evaluate ($\beta = -.06$, $p = .45$), need for cognition ($\beta = .02$, $p = .85$), need for structure ($\beta = .10$, $p = .20$), or participant gender ($\beta = -.06$, $p = .42$). Attitudes were affected by instructional set ($\beta = .40$, $p < .001$), such that participants with an on-line instructional set had more favorable attitudes ($M = .41$) than those with a memory-based instructional set ($M = -.40$). Perhaps the on-line set was more enjoyable and thus produced positive affect that was transferred to the target person (see Schwarz & Clore, 1983).

Our primary concerns were with the interactions between recall valence and the other predictors. Most important, we replicated the first experiment and found a significant interaction between recall valence and need to evaluate ($\beta = -.62$, $p < .05$). As shown in Figure 2, the relationship between attitudes and recall valence was significant for individuals low in need to evaluate ($r = .31$, $p < .03$) but not for individuals high in need to evaluate ($r = .04$, $p = .76$), determined by a median split for illustration. Unlike Experiment 1, however, there was not a significant interaction between recall valence and instructional set ($\beta = -.17$, $p = .44$), although simple correlations were in the right direction and revealed that the attitude-recall valence relationship was significant in the memory-based set condition ($r = .24$, $p < .04$) but not the on-line set condition ($r = .06$, $p = .59$). There were no significant interactions between recall valence and gender ($\beta = .09$, $p = .70$), need for cognition ($\beta = .21$, $p = .49$), or need for structure ($\beta = -.18$, $p = .57$). Furthermore, there was only one significant higher order interaction—the three-way interaction between recall valence, instructional set, and gender ($\beta = 1.11$, $p < .02$). This interaction suggested that although men demonstrated the predicted interaction between instructional set and recall valence ($\beta = -.75$, $p = .02$), women did not ($\beta = .29$, $p = .32$). No further interactions were significant ($ps > .18$). As in Experiment 1, there was no three-way interaction between recall valence, need to evaluate, and instructional set ($\beta = .51$, $p = .56$). Under memory-based set conditions, the attitude-recall valence correlation was significant for low ($r = .45$, $p < .02$) but not high need to evaluate individuals ($r = .09$, *ns*). Furthermore, although the correlation was not significant for either group, low and high need to evaluate individuals were similarly spread under on-line set conditions ($rs = .21$ and $-.11$, respectively).

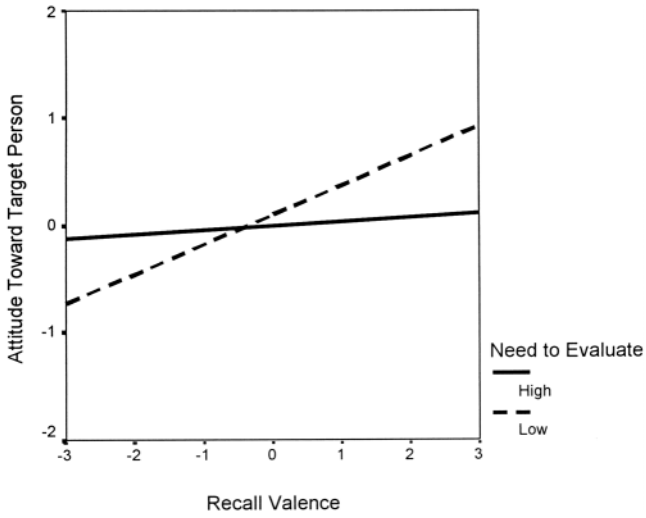

Figure 2 Effects of need to evaluate on the relationship between attitudes and recall valence (Experiment 2).

RESPONSE LATENCIES

Reaction times were expected to be slower for individuals engaging in relatively little on-line (and thus more memory-based) evaluative processing than for individuals engaging in extensive on-line evaluative processing. In other words, we predicted main effects for both need to evaluate and instructional set. Because outlying data in the previous analysis pertained to attitude and recall ratings per se, and not response latencies, we reanalyzed for outlying scores that were at least three standard deviations above or below the mean response latency across all participants. This analysis again resulted in the removal of seven (different) participants from the final analysis. Following the recommendation of Fazio (1990), we then performed a logarithmic transformation on reaction times to correct for any remaining skewness in their distribution.

These data were submitted to a hierarchical regression, predicting reaction times. Standardized need to evaluate, need for cognition, and need for structure scores served as continuous predictor variables, whereas instructional set and participant gender were dummy coded. No recall term was included in this analysis. As expected, this analysis revealed two significant effects. A

significant effect for instructional set ($\beta = -.17$, $p < .04$) indicated that individuals in the on-line set condition were significantly faster to report their attitudes (M = 6.49 seconds) than individuals in the memory-based set condition (M = 7.60 seconds). More important, a significant effect for need to evaluate ($\beta = -.17$, $p = .04$) indicated that as need to evaluate increased, response time decreased; that is, high need to evaluate individuals were faster to report their attitudes (M = 6.36 s) than those low in need to evaluate (M = 7.75 s), divided by a median split for illustrative purposes. Consistent with our other findings, reaction times were not predicted by need for cognition ($\beta = .05$, $p = .60$) or need for structure ($\beta = .02$, $p = .77$). There was, however, a marginally significant main effect for gender ($\beta = -.13$, $p < .10$), suggesting that women reported their attitudes more quickly than did men. Also consistent with our other findings, there was no interaction between need to evaluate and instructional set ($\beta = -.05$, $p = .86$). No other interactions were significant.[6]

As a final analysis, we averaged the reaction times to the remaining attitude items (i.e., beyond the first item), conducted a logarithmic transformation on these scores, and submitted the data to the same analysis. As expected, neither instructional set ($\beta = -.09$, $p = .26$) nor need to evaluate ($\beta = -.12$, $p = .14$) predicted this reaction time index. Similarly, this index was not predicted by need for structure ($\beta = -.12$, $p = .15$) or by gender ($\beta = .05$, $p = .55$). All other effects closely paralleled those from the analysis of the first item alone.

Discussion

Using both attitude-recall valence relationships and response latency measures, Experiment 2 replicated and extended the major findings from Experiment 1. We found a stronger attitude-recall valence relationship for low than for high need to evaluate individuals and also that low need to evaluate individuals were slower to report their attitudes than were high need to evaluate individuals. Both findings were consistent with the notion that low need to evaluate individuals engage in reduced on-line evaluative processing and thus relatively more memory-based evaluative processing. Of course, a bit of caution is warranted here because our reaction time index was based on responses to a single self-report item. Although we had reason to form the index from responses to the first item alone, future research using more controlled reaction time methodology, and perhaps a more reliable index, would be useful.

As in Experiment 1, we found no evidence of an interaction between instructional set and need to evaluate for either the attitude-recall data or the response latency data, despite changing the operationalization of the memory-based evaluative set. The absence of this interaction provides further evidence that even when provided with evaluation instructions (i.e., on-line set), the global attitudes of low need to evaluate individuals are still somewhat more dependent on memory than the attitudes of high need to evaluate individuals. Under such conditions, low need to evaluate individuals may evaluate the implications of each behavior individually without synthesizing, updating, and revising these "mini-assessments" on-line. Again, it is interesting to note that our analysis of the simple correlations did reveal an attenuation of the attitude-recall valence relationship for low need to evaluate individuals under on-line set conditions, consistent with the idea that evaluative instructions do cause them to engage in somewhat more on-line evaluation. We hesitate to put too much weight on this finding, however, given that it was based on a median split and inconsistent with the regression analysis.

It is worth addressing the possibility that our reaction time results could have stemmed from a tendency of high need to evaluate individuals to just respond more quickly in general; that is, it is conceivable that their higher motivation to evaluate makes them more likely to make quick decisions of all kinds, regardless of the extent to which they have evaluated something on-line. We believe, however, that the present data are inconsistent with this possibility. Specifically, the faster response times of high need to evaluate individuals did not extend beyond the first attitude item. If high need to evaluate individuals were simply faster in general than low need to evaluate individuals, this difference would be expected to hold over all items. Thus, this explanation does not appear to provide a viable alternative account for our findings.

GENERAL DISCUSSION

Research on the need to evaluate construct (Hermans & Eelen, 2001; Jarvis & Petty, 1996; Petty & Jarvis, 1996) suggests that meaningful individual differences exist in the extent to which people form evaluations. The primary goals of the present research were twofold: First, we sought to extend the work on the need to evaluate to the domain of person perception and demonstrate that individual differences exist even in the tendency to evaluate other individuals—a domain in which on-line evaluative responding has appeared to be particularly pervasive (e.g., Hastie & Park, 1986; Uleman et al., 1996). Second, we sought to apply this notion to the literature on on-line versus memory-based judgment formation, which has just begun to consider the role of individual differences in motivation (e.g., McConnell, 2001). In the present research, we accomplished each of these goals. Although people high in the need to evaluate engage in considerable on-line evaluation, people low in the need to evaluate are more prone to making global evaluative judg-

ments only when an evaluative question is posed and thus are relatively more dependent on the information they can recall at the time the judgment is required.

Curiously, we did not replicate the finding of the Instructional Set × Recall Valence interaction in Experiment 2. To further test the reliability of this effect, we combined the data from the two experiments to achieve maximum power and reanalyzed the attitude-recall valence data. Because the two experiments differed in time (i.e., they were conducted in separate academic terms), operationalization of the memory-based set, gender of target person, and the specific behavioral sentences used, this analysis provided a valuable test of the generality of our findings. Of importance, we explicitly included an "experiment" factor (dummy coded) to account for possible differences across experiments. We then conducted a hierarchical regression, predicting attitudes and including the predictors that appeared in both studies (i.e., recall, need to evaluate, need for cognition, instructional set, gender, and experiment).

Analysis revealed the same main effects for instructional set ($\beta = .28$, $p < .001$) and recall valence ($\beta = .11$, $p < .06$) that appeared in each experiment. Interestingly, there was also a marginally significant interaction between recall valence and experiment ($\beta = .37$, $p < .09$), indicating that the overall attitude-recall valence relationship was slightly stronger in the first experiment than in the second. Aside from this one marginal interaction, there were no significant effects at any level involving the experiment factor (ps > .17), need for cognition (ps > .12), or participant gender (ps > .41). There was, however, a significant interaction between instructional set and recall valence ($\beta = -.34$, $p < .05$). This interaction replicated the basic set effect from prior literature in that the relationship between attitudes and recall valence was significant under memory-based set conditions ($r = .23$, $p < .01$) but not under on-line set conditions ($r = .05$, $p = .51$). The interaction between need to evaluate and recall valence also was significant ($\beta = -.59$, $p < .02$) and indicated that the relationship between attitudes and recall valence was significant for low need to evaluate individuals ($r = .31$, $p = .001$) but not for high need to evaluate individuals ($r = .05$, $p = .61$). These findings suggest that across experiments, both instructional set and need to evaluate moderated the attitude-recall relationship. Notably, there was no three-way interaction between need to evaluate, instructional set, and recall valence ($\beta = -.15$, $p = .83$), consistent with the results from each individual experiment. Again, although it is reasonable to speculate that under some conditions low need to evaluate individuals could be motivated to engage in more extensive on-line evaluation and integration of social stimuli (e.g., undergraduates evaluating a real-life dating partner), the present research clearly suggests that they have a tendency to wait to form global evaluations of other people until asked to do so, even under evaluation instructions.

Why Does Need to Evaluate Matter?

As these analyses illustrate, both instructional set and the need to evaluate moderate the attitude-recall valence relationship. As explained by Srull and Wyer (1986), processing goals are the key to memory-based versus on-line evaluative responding. Although previous operationalizations of evaluative versus nonevaluative processing goals have come strictly in the form of instructional set manipulations, the need to evaluate also describes differences in this regard. When processing goals are evaluative in nature, as with an on-line set or high need to evaluate, on-line evaluation is more likely. When processing goals are nonevaluative, as with a memory-based set or low need to evaluate, on-line evaluation is less likely and memory-based evaluation is more likely. Similar to past research in this area, the present research does not address the specific processes by which on-line and memory-based attitude formation occur, but it does raise important questions. For example, on what information do high need to evaluate individuals base their attitudes? They appear to be forming attitudes on-line, but does that mean memory plays absolutely no role in the formation of their attitudes? Equally important, what exactly does it mean that low need to evaluate individuals engage in memory-based attitude formation?

HIGH NEED TO EVALUATE

Srull and Wyer (1989) outlined a series of processes they thought were relevant to on-line evaluations. They argued that when people have evaluative processing goals, they seek an evaluative organization of information in memory. Thus, they spontaneously encode behaviors as evaluative traits. These traits become unified as a single trait concept that is revised and updated as subsequent behaviors are encoded. This trait concept or representation gets stored separately in memory; so, when asked to report their attitude, people simply retrieve the summary evaluation they have already made. As a result, the evaluation is independent of the individual behaviors that can be recalled. This explanation is speculative but most likely approximates the general type of processing in which high need to evaluate individuals engage. At the very least, they appear to be integrating information into an evaluation as they receive it, thus reporting their attitudes quickly without scanning long-term memory for behaviors.

LOW NEED TO EVALUATE

According to Srull and Wyer (1989), when an evaluative processing goal is not in place, people do not spontaneously evaluate while information is presented

but instead rely on memory for information to form their attitudes when they are asked to report them. Under these conditions, the evaluation of a person is contingent on the specific behaviors stored in memory; that is, people who have not already formed an evaluation recall what they can about the person and then evaluate this information. If primarily positive behaviors are recalled, one's evaluation of the person will be favorable. If more negative behaviors are recalled, one's evaluation of the person will be unfavorable. Of course, this does not imply that there is no on-line evaluation whatsoever but just that there is a relatively greater reliance on memory for raw information. Because low need to evaluate individuals tend not to have an evaluative processing goal (Jarvis & Petty, 1996), a memory-based process more likely describes the evaluations they report.

As described earlier, it remains possible that low need to evaluate individuals are forming evaluations on-line (e.g., evaluations of each behavior) but for some reason, they are not synthesizing them into a single global evaluation until a judgment is required. In fact, our analysis of simple correlations suggested that evaluative instructions did produce at least some increase in on-line evaluative responding for these individuals. Perhaps because they do not enjoy engaging in evaluative responding, low need to evaluate individuals simply do less of it and thus fail to synthesize on-line evaluations. Alternatively, low need to evaluate individuals might form evaluations on-line but have less confidence in those evaluations, thus relying on them to a lesser degree. Other recent research (Petty, Briñol, & Tormala, in press) has indicated that people are less willing to rely on their evaluative thoughts in forming attitudes when they lack confidence in the validity of those thoughts. If low need to evaluate individuals lacked confidence in their on-line evaluations (perhaps because they have less practice forming them), it would be sensible for these individuals to refrain from forming global evaluative assessments until it is necessary to do so.

Another possibility is that the attitude-recall valence relationships in the present research suggest that low need to evaluate individuals are somehow more rational and thus retrieve information from memory to support their attitudes once they are formed; that is, it is possible that low need to evaluate individuals recall information selectively to justify the evaluations they form. The fact that our findings generalized to the response latency measure, however, reduces the likelihood of this possibility because latencies were recorded before participants even knew they would be asked to recall any information. Furthermore, there is no a priori reason to think that low need to evaluate individuals would be more rational than high need to evaluate individuals, particularly given the positive correlation between need to evaluate and need for cognition (which may map more accurately onto differences in rationality; see Cacioppo, Petty, Feinstein, & Jarvis, 1996). In any case, future research might vary the order of the attitude and recall measures to test the notion that recall is used as justification by low need to evaluate individuals.

New Questions and Future Directions

While answering some important questions, the present research also raises new ones. For example, is it possible that a more realistic situation in person perception would elicit more pervasive on-line evaluative responding? Perhaps in more lifelike or interpersonal situations, we are more generally inclined to spontaneously evaluate other people. The present studies were somewhat removed from the reality of our everyday experiences with others. They were, however, modeled after a paradigm common in this literature, and need to evaluate proved to be equally predictive across instructional set conditions. Future research using more real-world situations with others would be useful to address these questions. It would certainly be reasonable to find that some situations were so involving for all participants that need to evaluate would no longer moderate on-line versus memory-based attitude formation.

Another interesting path for future research would be to include additional measures that might further identify the different types of processes involved in the attitude formation strategies of individuals varying in the need to evaluate. Thought listings, for instance, might shed light on the nature of on-line attitude formation. According to Greenwald (1968), recall tends not to matter as much for attitudes when a person is actively generating arguments or evaluative thoughts. Thought listings or cognitive responses (see Petty, Ostrom, & Brock, 1981) could reveal the extent to which people are elaborating, counterarguing, accepting, or thinking favorable thoughts in response to the behaviors of another person. These types of cognitive responses, rather than recall, may be correlated with attitudes for people engaging in on-line attitude formation. Indeed, a great deal of previous research suggests that they are (Mackie & Asuncion, 1990; Petty & Cacioppo, 1986).

The present research also may have implications for areas of research not directly falling under the attitudes rubric. For example, our findings may be relevant to the stereotyping literature. As noted earlier, using both cognitive load and processing goal manipulations, a number of researchers have found that memory favors stereotype-consistent information under memory-based processing conditions (e.g., Dijksterhuis & van Knippenberg, 1995; Macrae et al., 1993; Stangor & Duan, 1991). Similarly, it has been found that judgments are more stereotypic (and correlated with memory)

under such circumstances (Bodenhausen & Lichtenstein, 1987; Dijksterhuis & van Knippenberg, 1995; Macrae et al., 1993). Interestingly, it may follow that the need to evaluate would predict stereotypic recall and the stereotypicality of judgments based on that recall. In particular, we would expect to find low need to evaluate individuals relying on stereotypes to a greater degree than high need to evaluate individuals. Future research might explore this possibility.

NOTES

1. It is important to note that Haugtvedt and Petty's (1992) findings do not necessarily speak directly to the present concerns. This is because the persuasive message used in their research contained only favorable (positive) information about the attitude object. Therefore, it is possible that the attitude-recall correlations were based as much on the mere number of arguments recalled as on the evaluative implications (i.e., valence) of those arguments. Counting the number of arguments is a cue-based process (Petty & Cacioppo, 1984) that does not necessarily imply either on-line or memory-based attitude formation. Indeed, such counting could occur during message presentation, whereby an individual keeps track of the approximate number of arguments as they are received, or after message presentation, whereby an individual counts up the arguments after they have all been received. In neither case would attitudes have been computed by a consideration of the valence of information stored in memory.

2. Of importance, the sentences (designed to be similar to those used in previous research in this area) were selected through pretesting, where they were identified from a slightly larger pool of sentences as similarly extreme. That is, overall, positive and negative sentences differed from neutrality to the same degree.

3. Due to their somewhat low reliability, we also conducted a factor analysis on the attitude items. We found that although there were two factors, most items still loaded onto the first. Using only those items as the attitude index do not change the results.

4. We also tested the effects of need for cognition in a model in which need for cognition was the only individual difference variable included. In this model as well, need for cognition was not a significant predictor of the attitude-recall relationship. Furthermore, we conducted two additional hierarchical regression analyses using different recall indices: one using positive recall alone and one using negative recall alone. No significant effects emerged from the analysis using positive recall as the recall index. When negative recall was used, however, one significant effect emerged: Participants in the on-line set condition reported more favorable attitudes than those in the memory-based set condition ($\beta = .25$, $p = .02$). No other effects were significant.

5. Consistent with the primary analysis, need for cognition and personal need for structure also failed to predict the attitude-recall relationship in separate regression models where they were the only individual difference variables entered. Furthermore, when positive recall alone was substituted as the recall index in the primary model (i.e., the model with all variables included), we found significant effects for instructional set ($\beta = .41$, $p < .001$) and the interaction between recall valence, instructional set, and participant gender ($\beta = 1.16$, $p < .02$), consistent with those in the main analysis. No other effects were significant. When negative recall alone was treated as the recall index, we found the same effect for instructional set ($\beta = .46$, $p < .001$), a marginally significant negative relationship between attitudes and recall ($\beta = -.14$, $p = .08$; indicating that as negative recall decreased, attitudes became more favorable), and a marginally significant interaction between recall and need to evaluate ($\beta = .60$, $p = .09$), suggesting that the attitude-recall relationship was stronger for low than high need to evaluate individuals. Given the apparent asymmetry between positive and negative recall in this experiment and Experiment 1, it could be useful in future research to address their independence in this context, perhaps by analyzing them as separate predictors.

6. The interaction between need for structure and instructional set approached significance ($\beta = .49$, $p = .08$) and indicated that the predicted effect for instructional set was found for individuals low in need for structure but not for those who scored more highly on this scale. Reaction times also were submitted to separate regression models in which need to evaluate, need for cognition, and personal need for structure were the only individual difference variables included. In these models as well, these variables were not significant predictors of reaction times.

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