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Implicit Theories: Consequences for Social Judgments of Individuals

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The implications of implicit theories for social information processing were examined. Implicit theory proposes that entity theorists see others' traits as fixed and stable, whereas incremental theorists see others' traits as malleable and changeable. It was found that entity theorists formed on-line judgments and incremental theorists formed memory-based judgments of target individuals. These process differences were observed in amount of recall, primacy effects in recall, memory–judgment relations, and illusory correlation formation using natural differences in perceivers' implicit theories (Experiment 1) and by manipulating their implicit theories (Experiment 2). Results indicate that implicit theories affect the process by which perceivers form impressions of others. The implications of these findings for the relation between implicit theory and social perception are discussed. © 2001 Academic Press

A major thrust of social cognition research has focused on how people process information about individuals when evaluating them and recalling information about them. One theme that has emerged from this work is that a "one size fits all" approach to impression formation does not seem to exist. For instance, the nature of the social target encountered has been shown to affect social information processing. Even when the same social information is presented about a social target, very different patterns of recall and judgment result based on whether the target is an individual or a group and based on how the target is expected to vary in behavioral consistency (e.g., McConnell, Sherman, & Hamilton, 1994b, 1997). In addition to the nature of the social target, transitory factors affecting the perceiver such as processing goals (e.g., Devine, Sedikides, & Fuhrman, 1989), cognitive load (e.g., Srull, 1981), and time delays before judgment (e.g., Srull, 1983) influence the nature of impression formation.

Although the important implications of target-relevant factors and temporary perceiver-relevant circumstances on social judgments of individuals have been explored extensively in the social cognition literature, very little attention has been given to stable perceiver-relevant characteristics that might affect impression formation. The current study addresses how one important individual difference factor affects social information processing about individuals. Specifically, this research explores how implicit theories (e.g., Dweck, 2000; Dweck, Hong, & Chiu, 1993; Dweck & Leggett, 1988) influence the social information processes by which people form impressions of individuals. This work tests a process account and examines its implications for both social memory and judgment. Before discussing implicit theories, we first describe the proposed underlying psychological mechanism.

The On-Line versus Memory-Based Distinction

A great deal of research has shown that many discrepant findings in the person memory, impression formation, stereotype development, and illusory correlation formation literatures can be reconciled and integrated by considering that social judgments lie along an on-line versus memory-based continuum (for a review, see Hamilton & Sherman, 1996). When on-line judgments occur, perceivers form an

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impression of the target at the time they initially process and encode target-relevant behaviors. As a result, early behavioral information is especially influential in impression formation and is better recalled than target behaviors that are encountered after an initial impression develops. Also, perceivers should recall a relatively large amount of information about the target because the active integration of target-relevant behaviors during encoding and impression formation will result in many associative links in memory, aiding information retrieval (Hamilton, Katz, & Leirer, 1980; Srull, 1981; Srull, Lichtenstein, & Rothbart, 1985).

On the other hand, memory-based judgments are not rendered until the time that judgment is required. Instead of forming an integrated impression of the target, perceivers encode but do not integrate the target-relevant information in an evaluative fashion. This lack of elaborative encoding leads to poorer overall memory for the target's behaviors, and recall is relatively better for the most recently encountered target-relevant information. Moreover, because memory-based judgments are based on a memory search at the time of judgment, there is a correspondence between judgment and the content of what information is available in memory (Hastie & Park, 1986; Sherman, Zehner, Johnson, & Hirt, 1983).

In addition to speaking to memory representation and recall and to the relation between recall and judgment, the on-line versus memory-based distinction has important implications for the nature of evaluations drawn about others. For example, it has been shown that memory-based judgments can result in the formation of distinctiveness-based illusory correlations (Hamilton & Gifford, 1976; for reviews see Hamilton & Sherman, 1989; Mullen & Johnson, 1990). In illusory correlation experiments, participants read behavioral statements about two social targets. Both targets engage in the same proportion of desirable to undesirable behaviors (usually 2 to 1), but more information is presented about one target (the frequently encountered target) than the other (the infrequently encountered target). Despite the equal proportions of desirable to undesirable behaviors, participants typically evaluate the frequently encountered target more favorably than the infrequently encountered target.

Illusory correlations can occur because infrequent information categories are salient, and the distinctiveness (based on infrequency) of infrequently encountered social targets and of infrequently encountered behaviors (typically negative) leads to enhanced encoding of these items at the time of encounter (Stroessner, Hamilton, & Mackie, 1992) or at a subsequent time once their eventual infrequency is apparent (McConnell, Sherman, & Hamilton, 1994a). When memory-based judgments occur, these highly available behaviors lead to overestimations of the number of undesirable behaviors performed by infrequently encountered social targets, which in turn, bias target evaluations. However, when perceivers form judgments on-line, the bias is attenuated or even reversed (e.g., McConnell et al., 1994b; Sanbonmatsu, Sherman, & Hamilton, 1987). Although there are alternative accounts for illusory correlation production (e.g., Berndsen, Spears, McGarty, & van der Plight, 1998; Fiedler, 1991; Smith, 1991), numerous studies have shown that memory-based judgments reliably produce the effect (for a review, see Hamilton & Sherman, 1996).

Thus, the on-line versus memory-based judgment distinction makes clear predictions about differences in the amount of recall, primacy effects in recall, the correspondence between memory and judgment, and the formation of illusory correlation. This distinction accounts for many inconsistencies observed in the social perception literature. For example, McConnell et al. (1994b) found that judgments of individual targets are typically formed on-line, whereas judgments of group targets are usually memory-based. This finding accounts for previous research that showed better recall of information about individuals than about groups (e.g., Srull, 1981), recall of impression-consistent information for groups but not for individuals (e.g., Srull et al., 1985), and the formation of illusory correlations for groups but not for individuals (e.g., Sanbonmatsu et al., 1987).

In another study examining the on-line versus memory-based distinction, McConnell et al. (1997) found that perceivers form on-line judgments about targets expected to demonstrate behavioral consistency (e.g., people who are predictable) but form memory-based judgments about targets expected to demonstrate little behavioral consistency (e.g., people who are moody). In the former case, perceivers showed relatively good recall, primacy effects in recall, no memory–judgment correlations, and no illusory correlations. In the latter case, perceivers showed relatively poor recall, relatively better recall for more recent information, memory–judgment correlations, and the presence of illusory correlations. These differences were observed because social perceivers expected different amounts of behavioral consistency in the targets they encountered. Given these expectations, different social information processing mechanisms were invoked (on-line vs memory-based judgments), and as a result, different recall and evaluative outcomes were observed. It is interesting to note that these outcomes occurred based on qualities ascribed to the social targets that perceivers encountered. An interesting, and yet unaddressed, question is: Are there systematic differences within the perceiver that may determine whether social judgments will be on-line or memory-based? We now turn to research on implicit theories to propose one individual difference that might moderate social information processing.

Implicit Theories

Dweck and her colleagues (e.g., Dweck, 2000; Dweck & Leggett, 1988; Dweck et al., 1993) have proposed that individuals hold systematic beliefs about the nature of people's personalities. These implicit theories have been shown to influence many social phenomena. At the heart of implicit theory is a distinction between those who believe that people's personalities are comprised of static, fixed traits (entity theorists) and those who believe that people's personalities are dynamic and malleable (incremental theorists). Unlike research that focuses on how particular personality traits are intercorrelated (e.g., Schneider, 1973), implicit theories explore people's beliefs about the malleability and fixedness of personality traits.

An array of research has shown that implicit theories influence how people see others, themselves, and social groups. In typical experiments, participants' implicit theories are measured by a questionnaire or are manipulated via instruction set. Studies have shown, for example, that entity theorists (compared to incremental theorists) draw stronger inferences from behavior (e.g., Chiu, Hong, & Dweck, 1997; Hong, Chiu, Dweck, & Sacks, 1997), blame themselves more following failure (e.g., Erdley, Cain, Loomis, Dumas-Hines, & Dweck, 1997), and form and endorse more extreme group stereotypes (e.g., Levy, Stroessner, & Dweck, 1998). Findings such as these have been obtained for men and women, children and adults, and members of independent and interdependent cultures. A consistent theme is that entity theorists are more ready to see others' behaviors as stable, consistent, and diagnostic of their underlying attributes than incremental theorists.

Although several studies have explored the implications of implicit theories for judgments of others, relatively little is known about the underlying processes that may be influenced by the implicit theory that one holds. Although there has been some speculation about the implications of implicit theories for how social judgments are produced (e.g., Dweck et al., 1993; Levy et al., 1998), only one study has attempted to explore some impression formation mechanisms (Hong et al., 1997). Those authors argued that entity theorists, relative to incremental theorists, engage in more evaluative processing of information about target individuals.

In their study, participants were presented with positive and negative test scores about a fictitious airplane pilot trainee (e.g., "Donn B.'s score: 8.8"), each of which preceded the presentation of target adjectives that were desirable or undesirable in valence (e.g., "likable" and "painful"). Participants made connotative judgments about each target adjective, with test scores serving as primes on some trials. Hong et al. found that entity theorists, but not incremental theorists, showed prime-consistent facilitation. That is, when the test score prime was favorable (i.e., scores greater than 5.0), entity theorists' judgments of desirable target adjectives were made more quickly than judgments of undesirable target adjectives. Similarly, unfavorable test score primes (i.e., scores less than 5.0) facilitated judgments of negative target adjectives relative to positive target adjectives, but again this pattern was only observed for entity theorists. These data suggest that entity theorists, but not incremental theorists, spontaneously extracted the evaluative connotation of the pilot's scores, which in turn facilitated valence-congruent target judgments.

Given this demonstration of an initial difference in spontaneous trait extraction as a function of implicit theory, it becomes important to consider what subsequent impression formation processes might unfold differently for entity and incremental theorists. Thus, the current work proposes that entity theorists will be more likely to form on-line evaluative judgments of target individuals and incremental theorists will be more likely to form memory-based evaluative judgments of target individuals. Because entity theorists are especially likely to assume that observed behaviors are reflective of an underlying disposition and, hence, are more likely to try to discern an individual's qualities as information is received, they should be more inclined to form on-line impressions of social targets than incremental theorists. Conversely, incremental theorists will be more likely to base their judgments on recall of target-relevant behaviors at the time of judgment because they are less likely to extract trait information from behaviors in an on-going fashion. Thus, the current hypotheses are consistent with the conclusions of Hong et al. (1997), but they explore how social information is used differently in target judgments. Also, they examine several consequences that result from these processes. Experiment 1 tested these predictions by assessing perceivers' implicit theories and then presenting them with information about two target individuals in an illusory correlation paradigm. Experiment 2 used the same paradigm, but established the causal relation between implicit theory and social information processing by manipulating participants' implicit theories.

EXPERIMENT 1: IMPLICIT THEORIES AND SOCIAL JUDGMENTS OF INDIVIDUALS

The first experiment examined whether individual differences in implicit theories would reveal systematic relations with social information processing and illusory correlation formation. It was expected that entity theorists would be more likely to form on-line judgments about the target individuals. This process outcome would be revealed by better overall recall of information about the targets, better recall of early information relative to late information about the targets, no evidence of illusory correlations, and no

correlation between target memory and target judgment. On the other hand, incremental theorists should be more likely to form memory-based judgments about the targets. This would be revealed by relatively poor recall for the targets' behaviors, relatively better recall for more recently encountered information about the targets, evidence of illusory correlations in their judgments, and memory–judgment correlations.

Method

Participants

At Michigan State University, 50 undergraduates enrolled in introductory psychology courses participated in exchange for extra credit.

Implicit Theory Questionnaire

Participants completed a 14-item questionnaire described as assessing social opinions. Five critical questions were embedded in the questionnaire to assess participants' implicit theories: "People can do different things, but the important parts of who they are can't really be changed"; "The kind of person someone is is something very basic about them and it can't be changed very much"; "Everyone is a certain kind of person and there is not much that can be done to really change that"; "Everyone, no matter who they are, can significantly change their basic characteristics"; and "All people can change even their most basic qualities)."[1] The nine remaining items were fillers (e.g., "People are better off if their romantic partner isn't their best friend too"). Participants indicated their responses using a scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*).

A relative entity person theory score was computed by calculating the sum of the responses to the five critical items (reverse scoring those worded in an incremental theory direction), with larger scores reflecting a relatively strong entity theory ($M = 21.9$, $SD = 5.58$, range = 12–33). A median split was used to classify participants as being incremental theorists (those whose scores were 22 or less, $n = 26$) or entity theorists (those whose scores were greater than 22, $n = 24$).

[1] Research has shown that implicit theory questionnaires possess good psychometric qualities, including good test–retest reliabilities, interitem agreement, and unique predictive power above other personality measures (for extensive details, see Dweck, Hong, & Chiu, 1995; Hong et al., 1997; Levy & Dweck, 1997; and Levy et al., 1998). In the current experiment, the five questions revealed only very modest reliability ($\alpha = .52$). The reason that questionnaire reliability in the current study was not as robust as in previous work is not clear.

Target Behaviors

A series of 36 behavior statements used by McConnell et al. (1994b) was employed in this study. Of these behaviors, 24 were associated with a target person named Jim and 12 were associated with a target person named Bob. For each target, two-thirds of the behaviors (16 for Jim and 8 for Bob) were desirable in nature (e.g., saves cans and bottles for recycling) and one-third of the behaviors (8 for Jim and 4 for Bob) were undesirable in nature (e.g., cheated on a take-home exam from the university). In addition to maintaining the same ratio of desirable-to-undesirable behaviors for both Jim and Bob, pilot testing ensured that the overall evaluation of both desirable and of undesirable behaviors ascribed to each individual was equivalent. In the current study, Jim was always the more frequently encountered target individual. Previous work has shown that manipulations of which target person (Jim or Bob) is the more frequently encountered target do not affect memory or judgment outcomes (McConnell et al., 1997).

Procedure

Participants were run in one session in a large auditorium. They were told that the current experiment was exploring how people process and retain information and that they would be taking part in several unrelated studies. After completing consent forms, they were given a booklet for recording their responses. The first page of the booklet asked them to complete a survey assessing various social opinions (the implicit theory questionnaire). Once all participants had completed it, they were asked to pay attention to the overhead projection screen and to read the information presented to them. Overhead transparencies with a large, laser-printed typeface (24-point Times) were used to present the information. Participants were told that the next task was designed to acquaint them with the procedure of reading information presented on the screen at a controlled pace. They were asked to read the names of 12 different cities of moderate notoriety (e.g., Austin, Texas) with each city being presented for 8 s. Only one city was visible at a time, and no additional instructions or processing goals were provided to the participants.

Behavior statement presentation. After the presentation of the cities, participants were told that they would next read a series of behaviors performed by two real individuals named Jim and Bob. Following McConnell et al. (1994b), they were told that their goal was to read each statement carefully and that later they would be asked questions about the information. These memory-set instructions are typically used in illusory correlation studies (e.g., Hamilton & Gifford, 1976; Stroessner et al., 1992), and they were selected for the current study because previous research (e.g., McConnell et al., 1994b, 1997) has shown that such non-

directive instructions allow perceivers to reveal the greatest range of social information processing. Because the current work was designed to examine social information processing differences, nondirective instructions should increase the likelihood that individual differences in social information processing can be detected.

After being provided with these instructions, the 36 behavior statements were presented individually, each for 8 s. The order of the statements was randomly determined beforehand with the restriction that no more than 3 items from the same target–valence category (e.g., Jim–desirable behaviors) could be consecutively repeated. After the behavior statements were presented, the participants completed a 4-min filler task to eliminate short-term memory effects. The filler task asked them to recall the cities that they had previously seen and to record them in the booklet.

Target free recall. After completing the city recall task, participants were directed to recall as many of the statements as they could about Jim and Bob and to write the statements in their booklet. They were told that their recall did not have to be verbatim, but that they should list as much of the statement as they could remember. They were given 8 min to recall the behaviors.

Frequency estimates. Following the free recall task, participants were told that they had read 24 statements about Jim and were asked to estimate how many of them were undesirable in nature. Next, they were told that they had read 12 statements about Bob and were asked to estimate how many of them were undesirable in nature. They recorded each estimate in the booklet.

Likability estimates. Next, participants evaluated how desirable Jim and Bob were on 9-point scales, ranging from 1 (*extremely undesirable*) to 9 (*extremely desirable*). That is, participants rated how desirable they found each individual to be based on the behaviors they read. They recorded each evaluation in the booklet.

Debriefing. Finally, participants were asked to indicate whether they thought that anything suspicious had occurred during the experiment and whether they saw a relation between the social attitudes survey (the implicit theory questionnaire) and the remainder of the experiment. Although some participants responded to the former question (e.g., "I wondered whether Jim and Bob were MSU students"), none of them reported that they saw any link between the survey and the person perception task.

Results

Free Recall Analyses

To examine evidence of the formation of on-line and memory-based judgments, the participants' free recall for behaviors performed by Jim and Bob was assessed.[2] Free recall was assessed by three trained judges who were unaware of the experimental hypotheses. They used a "gist" criterion in assessing whether each recorded statement was accurately recalled. Statements were categorized based on which target actually performed the behavior. Two judges served as primary judges and demonstrated very good interjudge reliability (95% agreement). In cases of disagreement, the third judge broke the tie.

TABLE 1
Free Recall and Target Evaluations as a Function of Implicit Theory in Experiment 1

Measure	Implicit theory	
	Incremental	Entity
Amount of recall	10.19	12.13
Serial presentation of recall		
First 12 items	3.81	5.08
Last 12 items	3.39	3.04
Likability ratings		
Jim	6.31	5.83
Bob	5.65	6.17
Frequency estimates		
Jim	0.30	0.27
Bob	0.37	0.27

Amount of free recall. An analysis of covariance was conducted on the number of statements recalled about the targets using implicit theory (incremental vs entity) as the independent variable and recall for the 12 cities (the filler task) as the covariate. If entity theorists are more likely to form on-line judgments, they should reveal better recall for the target-relevant information than incremental theorists should. As Table 1 shows, the effect of implicit theory was significant, $F(1, 46) = 4.25$, $p < .05$, revealing that entity theorists recalled more behaviors about Jim and Bob than did incremental theorists.

Serial position of free recall. Following McConnell et al. (1994b, 1997), serial position of free recall was assessed by comparing participants' memory for the first 12 behaviors presented to them to their memory for the last 12 behaviors presented to them. It was expected that entity

[2] Because participants assigned themselves to conditions based on their responses to the implicit theory questionnaire, it is possible that uncontrolled factors could account for differences in amount of recall about Jim and Bob. One possibility is that entity theorists, relative to incremental theorists, may possess better memory in general. To assess this possibility, a *t* test was conducted on the number of cities that participants correctly recalled during the filler task. This analysis revealed no difference in recall between entity and incremental theorists ($M = 6.17$ vs $M = 6.35$, respectively), $t(48) = 0.92$, *ns.* Thus, any differences observed in recall for target behaviors would not seem to represent global differences in memory ability between entity and incremental theorists, but instead would suggest differences in social information processing specifically.

theorists, when compared to incremental theorists, would be more likely to recall early information because of the formation of on-line impressions. A 2 (person theory: incremental vs entity) × 2 (presentation position: first 12 vs last 12, a repeated measure) mixed-design analysis of variance (ANOVA) was conducted on the number of behaviors recalled. Two significant effects were observed. First, a main effect of presentation position was found, revealing that participants recalled more information from the first 12 items ($M = 4.42$) than from the last 12 items ($M = 3.22$), $F(1, 48) = 11.84$, $p < .01$. But as predicted, this main effect was qualified by person theory, $F(1, 48) = 5.11$, $p < .03$. As Table 1 reports, entity theorists showed strong primacy effects in recall, $t(23) = 4.40$, $p < .01$, whereas incremental theorists did not, $t(25) = 0.78$, *ns*. Thus as expected, recall serial position effects varied as a function of implicit theory, with entity theorists showing greater evidence of on-line judgments than did incremental theorists.

Illusory Correlation Analyses

In addition to examining free recall, the formation of on-line and memory-based judgments can be revealed by biased target evaluations. When participants form memory-based judgments, they report preferring more frequently encountered targets in illusory correlation paradigms. Thus, it was expected that incremental theorists, relative to entity theorists, would reveal evidence of illusory correlations by showing an evaluative preference for Jim over Bob.

Likability ratings. Participants' liking judgments of Jim and Bob were examined in a 2 (person theory: incremental vs entity) × 2 (target: Jim vs Bob, a repeated measure) mixed-design ANOVA. The critical prediction is for an interaction, revealing stronger evidence of illusory correlations (i.e., preferring Jim to Bob) for incremental theorists than for entity theorists. As predicted, the interaction obtained, $F(1, 48) = 7.02$, $p < .02$. No other effects were significant. As Table 1 reveals, participants who held an incremental person theory did indeed show a preference for Jim over Bob, $t(25) = 2.36$, $p < .03$, whereas those who held an entity person theory did not show a preference between the targets, $t(23) = -1.36$, $p > .18$. Thus, only incremental theorists showed an illusory correlation bias consistent with memory-based judgments.

Frequency estimates. The proportion of undesirable behaviors ascribed to Jim and Bob were analyzed in a 2 (person theory: incremental vs entity) × 2 (target: Jim vs Bob, a repeated measure) mixed-design ANOVA. Again, an interaction was predicted to reveal stronger evidence of illusory correlations (i.e., estimating that Bob performed proportionally more undesirable behaviors than Jim) for incremental theorists than for entity theorists. The ANOVA revealed three effects. A main effect of implicit theory was found, $F(1, 48) = 5.58$, $p < .03$, indicating that incremental theorists estimated that the targets performed relatively more undesirable behaviors ($M = 0.33$) than the entity theorists ($M = 0.27$). Also, a marginal main effect of target was also observed, $F(1, 48) = 3.01$, $p < .09$, suggesting that participants ascribed proportionately more undesirable behaviors to Bob ($M = 0.32$) than Jim ($M = 0.29$). Last, the predicted interaction was marginally significant, $F(1, 48) = 3.67$, $p < .07$, suggesting that incremental theorists showed greater evidence of illusory correlations. Indeed, *t* tests indicated that only incremental theorists showed a significant illusory correlation, $t(25) = 2.98$, $p < .01$. These data are consistent with the evaluative judgment data, which showed that only incremental theorists showed an illusory correlation bias consistent with memory-based judgments.[3]

Memory–Judgment Correlations

If judgments are memory-based, target evaluations should reflect the content of target memory. That is, if perceivers show evidence of illusory correlations (i.e., prefer Jim to Bob), the content of their free recall should reflect the evaluative bias as well (i.e., show relatively better recall for Jim's desirable behaviors and Bob's undesirable behaviors). Positive correlations should exist for incremental theorists but not for entity theorists.

To assess this relationship, the bias in the content of free recall was correlated with the strength of participants' illusory correlation liking bias. Based on the work of McConnell et al., all of the behaviors recalled by each participant were used to create an index based on pretest desirability norms for each behavior sentence. Separate indices were computed for recall of behaviors that were associated with Jim and with Bob during the original stimulus presentation. Each index was computed by summing the pretest ratings for the items that each participant recalled about the target person and dividing by the number of total statements recalled for that target person. Thus, these recall-based indexes represent the mean evaluative content of the information recalled about the target person. In order to conduct

[3] Although more recent research has focused on presenting the proportion of undesirable behaviors ascribed to each social target (e.g., Fiedler, 1991; McConnell et al., 1994b, 1997), previous research (e.g., Hamilton & Gifford, 1976; Hamilton et al., 1985) calculated a phi coefficient for each participant's frequency estimates. In the current context, positive phi coefficients would reflect either proportionately greater estimates of undesirable Bob behaviors or proportionately greater estimates of desirable Jim behaviors. It is this ambiguity in interpretation that makes phi coefficients a less than ideal indicator of illusory correlation strength. However, frequency estimate analyses using phi coefficients (following a Fisher *r*-to-*z* transformation) found a marginally significant difference between the implicit theory groups, $t(48) = 1.93$, $p < .06$. Incremental theorists showed significant positive phi coefficients [$\phi = 0.09$, $t(25) = 3.21$, $p < .01$], whereas entity theorists did not [$\phi = 0.01$, $t(23) = 0.34$, *ns*]. Thus, these findings are consistent with the analyses that examined the proportion of undesirable behaviors ascribed to each person.

the correlational analysis, two difference scores were computed. The first difference score was produced by subtracting the recall-based index for Bob from the recall-based index for Jim. Thus, this recall-based difference score reflects the relative evaluative preference for Jim over Bob based on the content of free recall. And similarly, the likability rating for Bob was subtracted from the likability rating for Jim. Thus, this evaluation-based difference score reflects the relative evaluative preference for Jim over Bob based on the 9-point scale ratings.

These recall-based and evaluation-based differences scores were then correlated separately for entity and incremental theorists. For the entity theorists, as expected because of the on-line nature of their judgments, participants did not show a significant memory–judgment correlation ($r = -0.21$, *ns*). For incremental theorists, the anticipated memory–judgment correlation did not emerge ($r = 0.09$, *ns*).

Discussion

It was proposed that people who hold a relatively strong entity implicit theory would be more likely to form on-line judgments than people who hold a relatively strong incremental implicit theory. The results of Experiment 1 provided good support for this hypothesis. Entity theorists showed stronger primacy effects in recall and recalled more information about social targets than incremental theorists. These data suggest that entity theorists, relative to incremental theorists, processed social information in a more extensive fashion, which is consistent with forming on-line judgments. Further, this experiment revealed that the on-line versus memory-based distinction had important implications for perceivers' evaluations of social targets. Specifically, only incremental theorists showed evidence of forming illusory correlations, an outcome that results from memory-based judgments. That is, incremental theorists showed an evaluative bias between two objectively equivalent targets, whereas entity theorists did not.

Taken together, there is good evidence that perceivers' implicit theories may affect the social information processing mechanism invoked when forming impressions of individuals. Two memory measures and two illusory correlation measures provided a consistent pattern of results in support of this distinction. Just as McConnell et al. (1997) showed that expectations of behavior consistency *in social targets* can influence whether on-line or memory-based judgments result, Experiment 1 provided evidence that perceivers may *naturally exhibit meaningful individual differences* that influence how they form impressions of others.

Although Experiment 1 suggests that implicit theories may affect how perceivers form impressions of others, a few limitations should be noted. First, although two different memory measures and two different illusory correlation measures provided support for the predicted differences in the social information processing between entity theorists and incremental theorists, memory–judgment correlations did not achieve significance for incremental theorists. The difficulty in obtaining strong memory–judgment correlations has been discussed in previous work (e.g., Hamilton, Dugan, & Trolier, 1985; Hastie & Park, 1986; McConnell et al., 1994b, 1997). As a result, researchers have relied on multiple process measures to document whether extensive social information processing takes place.[4] Indeed, incremental theorists in the current experiment did reveal strong evidence of memory-based judgments using other measures: relatively poor recall, the absence of primacy effects in recall, and the formation of illusory correlations. Significant memory–judgment correlations are most likely to occur when integration and elaboration of social information is especially poor. The current experiment relied on participants' preexisting differences in implicit theories, and perhaps it would take a sample of people who hold even stronger incremental theories to obtain significant memory–judgment correlations.[5]

Another limitation of Experiment 1 is that it was correlational in nature, and thus, no strong causal claims can be made that holding entity or incremental implicit theories *causes* perceivers to form on-line or memory-based judgments. Clearly, Experiment 1 showed that natural differences in implicit theories were related to differences in how perceivers form impressions of others. In order to make a strong causal claim, Experiment 2 used a procedure similar

[4] To assess the robustness of the pattern of results across the two memory measures, a one-way multivariate analysis of variance (MANOVA) was conducted using the number of behaviors recalled and an index of primacy in recall (a difference score based on subtracting recall for the last 12 items from recall for the first 12 items) as the dependent measures. As expected, the MANOVA revealed a strong effect of implicit theory, (Wilks's $\lambda = 0.84$), $F(2, 47) = 4.44$, $p < .02$.

[5] Additional analyses are consistent with this possibility. Zero-order correlations between participants' relative entity person theory score (used for the median split) and measures of memory performance and illusory correlation suggest a linear relation between implicit theory and the outcome measures. For these analyses, all repeated measures were converted to difference scores: primacy bias in recall (recall of first 12 items minus recall of last 12 items), liking bias (liking for Jim minus liking for Bob), and frequency estimate bias (proportion of undesirable behaviors performed by Bob minus proportion of undesirable behaviors performed by Jim). Across all participants, those who held stronger entity theories recalled more target behaviors ($r = 0.35$, $p < .02$), showed a greater primacy bias in recall ($r = 0.31$, $p < .04$), and revealed weaker liking biases ($r = -0.29$, $p < .05$). Only the frequency estimate bias was uncorrelated to the implicit theory score ($r = -0.09$, *ns*). These correlational results, along with the above-mentioned t test, ANOVA, and MANOVA findings provide consistent and converging evidence that entity theorists were more likely to form on-line evaluative judgments and incremental theorists were more likely to form memory-based evaluative judgments and illusory correlations (a memory-based product).

to one employed by Chiu et al. (1997) to manipulate perceivers' implicit theories. In addition to providing an experimental test of this study's hypotheses, it might also be the case that a strong experimental manipulation would increase the likelihood of observing significant memory–judgment correlations in situations where memory-based judgments were anticipated.

EXPERIMENT 2: CAUSAL RELATION BETWEEN IMPLICIT THEORIES AND SOCIAL JUDGMENTS

Experiment 2 tested whether holding an entity or incremental implicit theory causes the formation of on-line or memory-based judgments, respectively. In addition to manipulating individuals' implicit theories, this experiment provided a replication of Experiment 1 under more controlled conditions. Again, an illusory correlation paradigm was used both to assess the nature of social information processing and to examine its evaluative consequences. It was expected that those who were manipulated to adopt an entity implicit theory, relative to an incremental implicit theory, would show greater evidence of on-line judgments.

Method

Participants and Design

At Michigan State University, 44 undergraduates enrolled in introductory psychology courses participated in exchange for extra credit. They were randomly assigned (22 participants per condition) to instruction conditions designed to manipulate their implicit theory.

Implicit Theory Manipulation

A procedure based on Chiu et al. (1997) was used to manipulate participants' implicit theories. At the beginning of the experiment, participants were told that the current study was focusing on how people come to understand others. Next, they read a detailed summary describing what research on understanding people's basic underlying attributes has shown.

Participants in the entity theory condition read that "people's basic underlying attributes do not change much." The narrative then explained that expert Dr. Edward Jones argued that "in most of us, by the age of ten, our character has set like plaster and will never soften again." The passage continued by noting that Jones's experiments, and those of numerous other researchers, have consistently found that "the kind of person someone is cannot be changed much across one's lifetime and that people's basic personality traits and characteristics are very stable."

Participants in the incremental theory condition read that "people's basic underlying attributes can change a great deal." The narrative then stated that expert Dr. Edward Jones argued that "no one's character is hard like a rock that cannot be changed. Only for a small number is great effort and determination needed to effect changes." The passage continued by noting that Jones's experiments, and those of numerous other researchers, have consistently found that "the kind of person someone is can be changed a great deal across one's lifetime and that people's basic personality traits and characteristics are quite flexible and malleable."

Target Behaviors

After reading the introductory passage, all participants were told, "Although this current experiment does not attempt to address this [Jones's] finding directly, we are interested in learning about how we come to understand others." They were then told that they would be reading a series of behaviors that were performed by two real people named Jim and Bob. They were told to simply read each statement as it appeared and that later they would be asked some questions about the information they read. The statements were the same items used in Experiment 1.

Procedure

After completing consent forms, participants were taken to individual computer workstations. The computer provided the appropriate instructions, presented stimulus materials, and collected participant responses. After providing instructions, it presented the 36 behavior statements on the monitor, each for 8 s. The presentation order of the statements was randomly determined by the computer with the restriction that no more than 3 items from the same target–valence category could be consecutively repeated. After the statements were presented, they completed a 4-min filler task (solve a series of math problems) to eliminate short-term memory effects (McConnell et al., 1994b, 1997).

Following the filler task, participants provided free recall, frequency estimates, and likability ratings just as in Experiment 1.[6] The only difference between the experiments was that all responses (except for free recall, which was recorded on a sheet of paper) were recorded using the computer's keyboard. At the end of the experiment, participants were asked, "how rigid or flexible do *you think* people's personalities are" as a manipulation check. They responded using a 1 (*very flexible*) to 9 (*very rigid*) scale. Finally, they were debriefed and thanked for participating.

[6] The order of task completion was not varied because past research (Hamilton et al., 1985) found task order (e.g., recall before evaluations vs evaluations before recall) does not affect responses.

Results

Manipulation Check

It was important to demonstrate that the implicit theory manipulation affected participants' own beliefs. As expected, those in the entity theory condition reported holding more rigid beliefs about people's personalities ($M = 6.23$) than did participants in the incremental theory condition ($M = 4.14$), $t(42) = 4.89$, $p < .001$. Thus, the instruction sets appear to have manipulated participants' implicit theories as intended.

Free Recall Analyses

As in Experiment 1, free recall was examined for evidence of on-line and memory-based judgments. It was expected that those in the entity theory condition would recall more information and recall more early information than those in the incremental theory condition. Free recall was assessed by three trained judges who were unaware of the experimental hypotheses using a "gist" criterion. The primary judges demonstrated good interjudge reliability (93% agreement).

Amount of free recall. A *t* test comparing those in the entity and incremental conditions was conducted on the number of statements recalled by participants. As Table 2 reveals, the predicted effect obtained, $t(42) = 2.62$, $p < .02$, revealing that those in the entity theory condition recalled more behaviors than those in the incremental theory condition. This result replicates Experiment 1.

Serial position of free recall. As in Experiment 1, free recall serial position was examined by comparing participants' memory for the first 12 behaviors presented to them to their memory for the last 12 behaviors presented to them. It was expected that those in the entity theory condition, when compared to those in the incremental theory condition, would be more likely to recall early information because of the formation of on-line impressions. Thus, a 2 (person theory condition: incremental vs entity) × 2 (presentation position: first 12 vs last 12, a repeated measure) mixed-design ANOVA was conducted on the number of behaviors recalled. Analyses revealed the same two effects observed in Experiment 1. First, a main effect of presentation position indicated that participants recalled more information from the first 12 items ($M = 4.25$) than from the last 12 items ($M = 3.50$), $F(1, 42) = 5.70$, $p < .03$. But more important, this effect was qualified by person theory condition, $F(1, 42) = 6.41$, $p < .02$. As Table 2 illustrates, those in the entity theory condition showed significant primacy effects in recall, $t(21) = 3.88$, $p < .01$, whereas those in the incremental theory condition did not, $t(21) = -0.09$, *ns*. As predicted, and replicating Experiment 1, entity theorists showed greater evidence of on-line judgments in free recall than did incremental theorists.

TABLE 2
Free Recall and Target Evaluations as a Function of Implicit Theory Manipulation in Experiment 2

Measure	Implicit Theory condition	
	Incremental	Entity
Amount of recall	9.60	12.23
Serial presentation of recall		
First 12 items	3.59	4.91
Last 12 items	3.64	3.36
Likability ratings		
Jim	6.27	5.68
Bob	5.41	6.31
Frequency estimates		
Jim	0.32	0.34
Bob	0.49	0.35

Illusory Correlation Analyses

As in Experiment 1, likability ratings and frequency estimates were examined for illusory correlation formation. It was predicted that those in the incremental theory condition would be more likely to reveal illusory correlations because they should form memory-based judgments.

Likability ratings. Evaluations of Jim and Bob were examined in a 2 (person theory condition: incremental vs entity) × 2 (target person: Jim vs Bob, a repeated measure) mixed-design ANOVA. As found in Experiment 1, only the interaction was significant, $F(1, 42) = 12.38$, $p < .01$. As Table 1 shows, the nature of illusory correlation formation depended on the person theory condition. Replicating Experiment 1, those in the incremental theory condition formed a significant distinctiveness-based illusory correlation, $t(21) = 2.78$, $p < .02$, preferring Jim to Bob. However, those in the entity theory condition showed a significant illusory correlation in the opposite direction, $t(21) = -2.19$, $p < .05$. That is, they preferred Bob (the infrequently encountered target) to Jim (for a similar finding, see Sanbonmatsu et al., 1987).

Frequency estimates. The proportion of undesirable behaviors ascribed to Jim and to Bob were analyzed in a 2 (person theory condition: incremental vs entity) × 2 (target person: Jim vs Bob, a repeated measure) mixed-design ANOVA. Again, an interaction was predicted to reveal stronger evidence of illusory correlations for those in the incremental theory condition than for those in the entity theory condition. The ANOVA revealed two effects. First, a main effect of target was found, $F(1, 42) = 10.97$, $p < .01$, indicating that participants ascribed proportionately more undesirable behaviors to Bob ($M = 0.42$) than Jim ($M = 0.33$). But more important, this effect was qualified by person theory condition, $F(1, 42) = 8.01$, $p < .01$. As Table 2 shows, participants in the incremental theory condition showed a significant illusory correlation, $t(21) = -4.25$,

$p < .01$, indicating they thought that Bob performed relatively more undesirable behaviors than Jim. Thus as Experiment 1 found, only incremental theorists formed illusory correlations consistent with forming memory-based judgments.[7]

Memory–Judgment Correlations

It was predicted that only participants in the incremental theory condition would show a positive correlation between the biased content of their free recall and the strength of their illusory correlation bias. As in Experiment 1, recall-based difference scores (where positive values reflect recalling relatively positive information about Jim and relatively negative information about Bob) and evaluation-based difference scores (where positive values reflect an evaluative preference for Jim over Bob) were calculated and correlated separately for those in the entity and incremental conditions.

As expected and replicating Experiment 1, those in the entity theory condition did not show a significant memory–judgment correlation ($r = -0.29$, *ns*). However, and consistent with predictions, those in the incremental theory condition did reveal a significant, positive memory–judgment correlation ($r = 0.44$, $p < .05$). Indeed, the magnitude of the correlations was significantly different between the two conditions, $z = 3.36$, $p < .001$ (Cohen & Cohen, 1983). Thus, those expected to form memory-based judgments (i.e., those in the incremental theory condition) showed evidence that their illusory correlation biases were based on the content of their memory for the targets' behaviors.

Discussion

Experiment 2 conducted a causal test of the hypothesis that incremental theorists form memory-based judgments and entity theorists form on-line judgments. Experiment 2 provided very strong support for this position. This experiment revealed that those induced to hold an incremental implicit theory (when compared to those induced to hold an entity implicit theory) recalled less information, recalled less early information, formed illusory correlations, and revealed positive memory–judgment correlations. These converging memory and judgment measures indicate that incremental theorists formed memory-based judgments, whereas entity theorists formed judgments on-line.

These findings not only replicate Experiment 1, but also permit strong claims about the causal role of implicit theories in determining the information processing mechanism invoked in social judgments. In addition, positive memory–judgment correlations were found for incremental theorists. As noted previously, the difficulty in obtaining significant memory–judgment correlations has compelled researchers to use multiple and converging measures of information processing. Thus, Experiment 2 provided extremely strong evidence (i.e., significant effects across five different process measures) that implicit theories do affect how evaluative judgments are rendered.

GENERAL DISCUSSION

The on-line versus memory-based judgment distinction has provided a useful process-oriented account that integrates and reconciles several conflicting social perception literatures (Hamilton & Sherman, 1996). This approach furnishes a unifying theme for understanding how people judge and remember social entities. To date, this distinction has shown how perceivers' expectations of target consistency affect social information processing goals, which in turn affect whether judgments are formed on-line or are memory-based (McConnell et al., 1994b, 1997). This line of work has shown that social information processing can be determined by the qualities one perceives *in the target.* The current study, in contrast, suggests that perceivers themselves vary systematically in their readiness to form on-line and memory-based judgments. That is, their implicit theories affect whether their impressions will result from on-line or memory-based judgments. This is not to suggest that incremental theorists will only form memory-based evaluations or that entity theorists will only form impressions on-line. Instead, the current work proposes that perceivers naturally vary in how they come to understand individuals and that their implicit theories serve as guides in determining social information processing defaults. And as the current study reveals, these defaults can have important implications, ranging from how much perceivers recall about targets to biases in their evaluations of objectively equivalent targets.

The current work illustrates that the evaluative judgments that perceivers render will tend to be on-line for entity theorists but will tend to be memory-based for incremental theorists. Indeed, evidence consistent with this conclusion was found in differences in recall (both its amount and primacy), differences in illusory correlation (both likability judgments and frequency estimates), and memory–judgment correlations (Experiment 2). These differences suggest that entity theorists are expending more cognitive effort in forming evaluative impressions of the social targets they encounter than are incremental theorists. However, does this mean that incremental theorists are not actively processing social information at all? An interesting possibility for fu-

[7] Frequency estimate analyses using phi coefficients, following a Fisher *r*-to-*z* transformation, supported these findings. A significant difference between the person theory groups was found, $t(42) = 3.06$, $p < .01$. Incremental theorists showed significant positive phi coefficients [$\phi = 0.18$, $t(21) = 4.34$, $p < .001$], whereas entity theorists did not [$\phi = 0.02$, $t(21) = 0.52$, *ns*].

ture research to consider is that incremental theorists may be actively processing information, but not in the service of forming strong evaluative impressions. Instead, they may be focusing on situational information (e.g., the situational demands or social roles) or transient target features (e.g., the target person's goals and mental state) rather than attending strongly to dispositional, impression-focused factors (Levy, Plaks, & Dweck, 1999). Thus, incremental theorists may show effortful social information processing for situational details rather than for target-relevant details required to draw a strong impression. The current study focused on impression formation and thus does not permit an examination of this intriguing possibility. However, future research should examine the extent to which incremental theorists expend their cognitive resources on understanding situational factors instead of evaluative data, and such work may allow for an interesting examination of how the processes by which incremental theorists render attributions about others differ from those used by entity theorists (see also Chiu et al., 1997; Hong et al., 1997).

In addition to identifying an important individual difference moderator for the on-line versus memory-based distinction, the current work also extends previous theory about the role of implicit theory in social perception. First, the current findings are consistent with Hong et al.'s (1997) conclusion that entity theorists are more likely than incremental theorists to engage in elaborative processing of social information. On-line judgments, found for entity theorists, do indeed reveal evidence consistent with extensive information processing. Thus, the evidence of greater spontaneous trait extraction observed for entity theorists by Hong et al. (1997) is quite consistent with the formation of on-line judgments by entity theorists in the current study, who should work especially hard to form a strong impression based on the early behaviors they encounter. The current work suggests that such differences may result from the formation of on-line and memory-based judgments, which is different than the mechanism proposed by Hong et al. (1997), who suggested that social information would be segregated for entity theorists but integrated for incremental theorists.

At first glance, the current findings might seem inconsistent with the Hong et al. explanation. That is, strong impression formation goals have been shown in numerous person memory studies to produce an integration of behavioral inconsistencies rather than their segregation (e.g., Srull, 1981; Srull et al., 1985; for a review, Srull & Wyer, 1989; see also, Asch, 1946; Asch & Zukier, 1984). And when impression-set goals are given in an illusory correlation paradigm, stronger on-line judgments and the elimination of illusory correlations result (e.g., McConnell et al., 1994b; Pryor, 1986). Thus, it might be deduced that on-line judgments should produce more integration rather than more segregation, which appears to run contrary to the Hong et al. (1997) account.

However, a few differences between the current study and Hong et al. (1997) should be noted. First, the current work utilized an illusory correlation paradigm, whereas Hong et al.'s participants were provided with test scores that later served as primes in a target adjective connotation task similar to one developed by Fazio, Sanbonmatsu, Powell, and Kardes (1986). Thus, direct comparisons between recall and evaluations derived from behavioral statements (used in the studies by Srull and by McConnell et al.) and priming facilitation (Hong et al.) are difficult to make. Further, the illusory correlation paradigm, by design, does not provide any target-relevant expectancies or processing goals because it studies the development and formation of target impressions, whereas the Hong et al. study provided participants with a framing manipulation that asked participants to consider the likelihood that the target would succeed or fail based on the test scores provided. As a result, it is difficult to compare the findings of the current study with Hong et al. in terms of how well the proposed mechanisms speak to each other's work. Indeed, multiple mechanisms for impression formation exist (e.g., Brewer, 1988; Fiske, Lin, & Neuberg, 1999; Fiske & Neuberg, 1990; Hamilton & Sherman, 1996). Although through different processes, the current study and Hong et al. arrive at the same conclusion: Entity theorists seem to process social information in a more evaluative manner than do incremental theorists.

Along with forming impressions of individuals, implicit theories may affect attitude formation as well. Although Hong et al. (1997) provided evidence that implicit theories play a moderating role in *attitude activation*, the current work raises the possibility that implicit theories may play a role in *attitude formation* as well. For example, McConnell, Leibold, and Sherman (1997) found that memory-based judgments resulted in the formation of context-dependent attitudes about social targets. In their study, perceivers who formed memory-based judgments held different attitudes about a social target in different contexts (e.g., Bob at work vs Bob at home) when perceivers learned more about the target in one context than in the other even though the desirability of the target's behavior did not vary across contexts. Such effects appear to be examples of attitude–behavior inconsistency (Wicker, 1969) unless one considers that attitude objects are multiply categorizable (Fazio, 1998; Smith, Fazio, & Cejka, 1996). Therefore, incremental, but not entity, theorists may produce context-dependent attitudes about individuals they encounter in multiple contexts because their implicit theory will lead them to form memory-based judgments.

In sum, the current study shows that a consideration of implicit theory illustrates how perceiver differences have important implications for social information processing

that occurs when forming impressions of others. We have shown that an individual difference variable can directly affect how social judgments are rendered. Also, this work shows that implicit theory can benefit from considering how the on-line versus memory-based judgment distinction can provide a process account for how entity theorists engage in greater evaluative processing than incremental theorists. Thus, a social cognition model advances from the consideration of a personality trait variable, and a theory of individual differences is furthered from the consideration of a process model of social judgments. In addition to expanding the theories of both camps, this work demonstrates new consequences that result from people holding different implicit theories. Given the role of implicit theories in influencing a broad range of social behavior and the generality of the on-line versus memory-based model of social judgments, a marriage of these two lines of work may yield interesting and important insights for future research and theory development.

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