

SELF EFFECTS IN MEMORY FOR PERSON INFORMATION

TRACEY L. KAHAN
Santa Clara University
MARCIA K. JOHNSON
Princeton University

Subjects' memory for trait adjectives generated under relatively naturalistic conditions was investigated. Forty-eight female pairs (comprised of a subject and a confederate) participated in a study of the accuracy of first impressions. The women first reported their opinions on several current issues, and then each generated descriptors of herself and the other person. Participants then alternated in sharing and rating these descriptors in a simulated conversation. Two days later, subjects returned to the lab individually and were given one of three surprise memory tests: Free Recall, Referent Identification, or Source Identification. The results illustrate the importance of considering source and referent information, as well as memory for content, in trying to understand the representation of concepts about self and others in memory. Subjects recalled more of what the confederate said about them than what the confederate said about herself, and tended to think that they had been the referent of descriptors the confederate had given for herself. In contrast, subject recall of what they themselves had said did not show an advantage for self-referential items, and subjects were quite good at identifying the source of the descriptors. This pattern is discussed in terms of the types of information and processes involved in recall and in the identification of referent and source (e.g., Johnson, 1990, 1991a; Johnson & Raye, 1981; Klein & Kihlstrom, 1986).

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Requests for reprints should be sent to Tracey L. Kahan, Department of Psychology, Santa Clara University, Santa Clara, CA 95053.

Most recent theorizing concerning the mental representation of self draws extensively from empirical demonstrations of the "Self-Reference Effect" (see especially Higgins & Bargh, 1987; Kihlstrom et al., 1988; Klein & Loftus, 1990; Wyer & Srull, 1989). In studies of the Self Reference Effect (SRE), subjects are typically presented with trait words (e.g., tolerant, shy) and asked to judge each word in one of several ways (e.g., "Does this word rhyme with 'revere'?" "Does this word mean the same as 'skillful'?" "Does this word describe you?" "Does this word describe your mother?"). Subjects' recognition or recall for the items is later assessed. Rogers, Kuiper, and Kirker (1977) initially defined the SRE when they found that subjects' recall was better for items judged with reference to the self than for items judged with reference to their semantic or structural features. Subsequent research indicated that information judged with reference to the self was also better recalled than information judged with reference to another person (e.g., Bellezza, 1984; Ferguson, Rule, & Carlson, 1983; Flannagan & Blick, 1989; Ganelen & Carver, 1985; Kuiper & Rogers, 1979). A similar advantage for information judged with reference to the self has been found for recognition memory measures (e.g., Bower & Gilligan, 1979; Perdue & Gurtman, 1988; Rogers, 1977).

Although information judged with reference to the self is not inevitably remembered better than information judged with reference to a well-known other or to specific semantic properties of the items (e.g., Bower & Gilligan, 1979; Keenan & Baillet, 1980; Klein & Kihlstrom, 1986; Klein & Loftus, 1988; McDaniel, Lapsley, & Milstead, 1987), there are by now numerous demonstrations of the SRE (for reviews see Greenwald & Pratkanis, 1984; Higgins & Bargh, 1987). The SRE is thought to arise because the self is a highly elaborated cognitive structure with organizational properties (e.g., Markus, 1980; Markus & Wurf, 1987) and/or because self-reference tasks are likely to evoke elaborative and relational processing (e.g., Klein & Loftus, 1988, 1990; Klein, Loftus, & Burton, 1989). That is, the advantage of self-referential information is presumably produced by the sorts of cognitive mechanisms that augment recall and recognition of any information. Perhaps because such cognitive factors are so clearly important, studies in this area have left potentially interesting social aspects of self-reference largely unexplored.

Most studies of the SRE resemble typical "levels of processing" paradigms (e.g., Craik & Tulving, 1975) that vary cognitive orienting task in a nonsocial situation. That is, an experimenter presents a list of apparently randomly selected traits and the subject judges the relevance of each to some specified category such as the self, and the

memory test occurs shortly thereafter. Although such studies can tell us something about the role and representation of the self in memory (and person information in general), for the most part they do not model the social situations in which information about people is typically encountered. Important among these, we think, are the kinds of interactive situations in which people are offering information and impressions about themselves and each other. In this more saliently social context, and after retention intervals measured in days instead of minutes, is self-referential information remembered better than other-referential information? And does the relative memorability of self and other referential information depend on who is the source of the information?

Previous research in nonsocial memory shows that the source of information can influence memory. People's recall and recognition of stimuli such as words, sentences, or simple pictures is often better when the information is self-generated than when the information originates with another person or source (e.g., Gardiner & Arthur, 1982; Jacoby, 1978; Johnson, 1985; Johnson, Raye, Foley & Foley, 1981; Kolers, 1975; Rabinowitz & Craik, 1986; Slamecka & Fevreiski, 1983; Slamecka & Graf, 1978). Although some of these studies used paradigms in which individuals exchanged information (e.g., Raye & Johnson, 1980; Ross & Sicoly, 1979), individuals typically are not asked to exchange personally relevant information. However, one might expect a memory advantage for self-generated information in situations in which self- and other-relevant information is being exchanged. But does the magnitude or direction of the advantage depend on who the information is about?

In addition to exploring the joint effects of referent and source on memory of the content of what was said, we also explore two important questions that, although perhaps obvious, have not been addressed in previous studies of self/memory effects. Do individuals in a social judgment situation in fact code information according to referent and source? For example, having judged how well trait words describe the self or another person, can subjects identify the specific target (self or other) that the items were judged with reference to? This ability to say who a trait refers to is critical for demonstrating that person concepts are being formed or used, as opposed to isolated pieces of information. Further, do individuals also code person information in terms of its source? Would subjects be able to identify the source (self or other) of trait adjectives and would their source judgments be influenced by the referent of this information? Asking subjects to identify the source or referent of trait adjectives should provide valuable insight into how information about the self/others is

coded in memory. As will be argued in the Discussion, comparing relative levels and patterns of performance on referent and source identification tasks provides interesting clues about the roles of schemas (e.g., Alba & Hasher, 1983; Bartlett, 1932; Markus & Sentis, 1982) and specific information about how the original information was acquired (e.g., Alba & Hasher, 1983; Johnson, 1983; Johnson & Raye, 1961) in memory for socially exchanged information.

METHOD

PARTICIPANTS

Participants were 48 female undergraduates at the State University of New York at Stony Brook.¹ Participants were selected from among 275 undergraduate males and females who voluntarily completed a Self-Description Inventory and indicated a willingness to participate in a paid follow-up study. Participants' ages ranged from 19 to 30, with a mean age of 22. Each person was paid \$10.00.

DESIGN AND PROCEDURE

Three factors were initially varied in a within-subjects design: source of descriptive adjectives (self or other), referent of descriptive adjectives (self or other), and judged accuracy of descriptive adjectives (accurate or inaccurate). Three memory measures were observed in independent groups of subjects: free recall, referent identification (subjects' judgments of who the words purportedly described), and source identification (subjects' judgments of who generated the words).

The study was conducted in two phases. The purpose of Phase 1 was to unobtrusively obtain subject self-descriptions, which were needed to generate materials for the experimental phase (Phase 2). Two weeks separated Phase 1 and Phase 2, and the relationship between the two phases was not disclosed beforehand.

Phase 1: Self-Description. Summer school students were invited to complete a confidential Self-Description Inventory (SDI) as part of a

1. The decision to include only women subjects and confederates in this study was based primarily on design considerations. There is some evidence that men and women describe themselves differently (see Markus, 1977; McCuire et al., 1976). To control for possible sex differences, it would have been necessary to include sex as a factor, resulting in an unwieldy increase in the number of conditions. Also, women confederates were more available than males at the time of the study.

survey of how college students in the 1980s see themselves. The SDI was administered during class time by an assistant not otherwise involved in the study. The SDI included 200 adjectives selected from Anderson's (1968) list of trait adjectives. This subset included adjectives from the entire likableness range that were also highly meaningful. Participants indicated how well each of the adjectives generally described them. Responses were made using a 7-point Likert-type scale. A separate sign-up sheet was included inviting students to participate in a follow-up project that paid \$10.00 for two 45-minute sessions. Students interested in the follow-up project were told the experimenter would contact them with more detailed information.

Phase 2: Accuracy of First Impressions. For the first session (Acquisition), subjects came to the lab individually, where they were greeted by an experimenter and introduced to another female subject, who was a confederate. The subject and the confederate were seated across from each other at a table and behind a short partition that allowed the pair to view each other, but prevented them from seeing the other's materials.

Subjects were told that the overall purpose of the study was to determine what kinds of impressions people form of each other when they meet and talk only briefly and how well people evaluate the accuracy of these impressions. The experimenter then asked several "orientation" questions regarding personal opinions on different issues (e.g., "What is your opinion on raising the drinking age to 21?"). Subjects were told that the purpose of this orientation was to obtain enough information about the other person to form a clear impression of that person. Both subjects and confederates responded to the orientation questions.

Following this orientation, subjects were engaged in a task that bears some resemblance to the "spontaneous self-concept measure" developed by McGuire (e.g., McGuire & Padawer-Singer, 1976) and the "spontaneous trait generation task" employed by Deutsch, Kroll, Weible, Letourneau, & Gross (1988). The subject and the confederate were given two sheets of paper: one labeled "About Me" and the other labeled "About Other Person." Subjects were asked to generate 20 descriptive adjectives: 10 about the self and 10 about the other person. Within each set of 10 descriptors, subjects were to include 5 adjectives they believed were true of the referent person (self or other) and 5 adjectives they believed were not true of the referent person (self or other). Subjects were instructed to include both positive and negative descriptors in both sets. Subjects were then randomly assigned to one of four generation orders representing the counterbalancing of target

(self, other) and descriptive accuracy (accurate, inaccurate). After generating and writing these 20 adjectives, the subject and the confederate were given 2 evaluation sheets: one labeled "Conversation About Me" and the other labeled "Conversation About Other Person." Evaluation sheets were numbered 1 through 10 along the side and labeled with "Accurate" and "Inaccurate" across the top, along with a confidence scale.

The subject and confederate then alternated reporting and evaluating the descriptors they had generated. Subjects did not know in advance that they would be asked to report their descriptions to the confederate. For example, a subject asked to begin the "conversation" by reporting descriptions of the other person would first consult the list of adjectives she had generated about the confederate and then say one of these words aloud. The confederate then circled either "Accurate" or "Inaccurate" on the evaluation sheet, depending on whether she felt the adjective did or did not describe her. While the confederate's data were not included in the eventual analyses, the confederate did participate in the evaluation task for purposes of face validity. The subject checked off the first adjective reported, selected another from the same list ("About Other") and then reported this descriptor to the confederate. Subjects were asked to "mix up" the words they reported and not simply report the words in the order they were generated. The confederate again judged whether the adjective accurately or inaccurately described her. The subject continued reporting these other-referent descriptors until she had reported 10 adjectives (5 supposed accurate and 5 supposed inaccurate descriptors of the other person). The confederate then reported 10 adjectives about herself following the same procedure. For each word now reported by the confederate, the subject evaluated how well she felt the word described the confederate, using her evaluation sheet titled "Conversation About Other Person." Following the exchange of information about the confederate, the procedure was repeated, this time with the subject as the referent. In our example, the subject now reported the 10 descriptors she had generated about herself to the confederate. The confederate evaluated each descriptor for how well she felt the words described the subject, using the rating sheet titled "Conversation About Other Person." Lastly, the confederate reported the 10 descriptors she had listed as words describing the subject. The subject evaluated these words according to how well she felt the words described her using the rating sheet titled "Conversation About Me." In this way, 40 different adjectives were reported and evaluated over the course of the session. Four conversation orders were used to counterbalance who began the conversation (subject or confederate) and who the

first conversation was about (subject or confederate). All words reported during this "conversation" were recorded by the experimenter. Unknown to the subject, the words reported by the confederate were pre-selected from the Self-Description Inventories completed during Phase 1. The words reported by the confederate about the subject were selected from the subject's own SDI. Five words the subject had previously rated 6 or 7 ("Very Descriptive of Me") were randomly selected, along with five words the subject had previously rated 1 or 2 ("Not At All Descriptive of Me"). In this way, items that were accurate or inaccurate descriptors of the subject, as previously rated by the subject, were included on the confederate's adjective list. In addition, words reported by the confederate about herself were selected from a different subject's SDI, using the same procedure. Across subjects, then, a given set of self-referent descriptors originated both with a subject and with a confederate. (This quasi-yoking procedure has been employed in previous studies to control for variability in memory performance due to differences in item memorability [e.g., Higgins, King, & Marvin, 1983; Raye & Johnson, 1980]). The confederate's lists also included several extra accurate and inaccurate descriptors; in the event the subject generated a word during Session 2 that was also on one of the confederate's lists, an appropriate word could be substituted. Overlap in words across subjects' and confederates' lists was thereby minimized. On average, there were only .56 (out of a possible 20) overlapping words per subject/confederate pair. Overlapping words were not included as test items so analyses of memory performance were based on nonoverlapping items. No more than two items were dropped for any given subject. Subjects were explicitly instructed to generate different words to describe themselves and the other person and all subjects complied.

For Session 2, subjects returned to the lab two days after the first session and were given one of three surprise memory tests: (1) Free Recall, (2) Source Identification (Source ID), or (3) Referent Identification (Referent ID). Sixteen subjects were randomly assigned to each of the test conditions. The block of 16 subjects in a particular test condition thus represented the complete counterbalancing of the 4-word generation orders and the 4 conversation orders. For the Free Recall test, subjects were given 5 minutes to remember and write down all of the descriptors reported during the first session, in any order. For the Source ID test, subjects were asked to decide whether each word presented was one they had said, one the other person had said, or a new word. For the Referent ID test, subjects were asked to decide whether each word was one that had been said about them, one that had been said about the other person, or a new word.

Individual test lists were constructed for each subject for the Source ID and the Referent ID tests. Each test list included 60 items: the 40 words from Session 1 plus 20 distractor descriptors. Half of the distractors were selected from the subject's SDI, and the other half were selected from the SDI of the subject whose descriptors were used for the confederate's "Describes Self" list. For the distractor items, five words that had not been reported in Session 1 were selected from those words the subject rated "Very Descriptive," and another five words were selected from words the "yoked" subject had rated "Very Descriptive." Similarly, five words that had not been reported in Session 1 were selected from words rated by the subject as "Not at All Descriptive" and another five words were selected from those the "yoked" subject rated "Not at All Descriptive." Test lists were individually randomized in blocks of 12 items. Each block included 4 descriptors of the subject (2 reported by the subject and 2 reported by the confederate); 4 descriptors of the confederate (2 reported by the subject and 2 reported by the confederate); and 4 distractor descriptors. For both the Source ID and Referent ID tests, all test items were delivered verbally by the experimenter and an electronic response timer was manually activated as each word was presented and stopped when the subject pressed one of the response buttons. Subjects' responses and response latencies were recorded by the experimenter. The response times were too variable to yield interesting results and are not considered further here. Following the test phase, subjects were fully debriefed, thanked, and paid for their participation.

RESULTS

ANALYSIS OF ITEM CHARACTERISTICS

Subjects spontaneously generated a wide variety of words to describe themselves and the other person. Of the 960 words generated by subjects, 735 (76%) were unique words. It is of interest to note that only 124 (13%) occurred on Anderson's (1968) list of 555 trait adjectives, from which trait words in many SRE studies are drawn. Sixty-six (7%) of the words were generated by more than five subjects and only 5 (1/2%) (idealistic, intelligent, inconsistent, possessive, and shy) were generated by more than ten subjects. The primary concern in this study was with the effects of source and referent on memory for trait information, independent of the content of this information. Therefore, two preliminary analyses were performed to determine whether the

evaluative content and/or the normative word frequency of the items varied with our acquisition variables or across test conditions.

Number of Positive Trait Words. All words produced (by subjects and confederates) ($n = 1920$) during the acquisition phase were independently scored as positive, negative, or neutral by two assistants not otherwise involved with the study, and discrepancies in scoring were resolved by a third independent rater. A comparison of the 124 words that also appear in Anderson's (1968) list indicated that our rating of "positive" was given to words from the first third of his list ("high likable") and our rating of "negative" to words from the last third of his list ("low likable"). The number of positive trait words was first entered into a 2 (Source) \times 2 (Referent) \times 2 (Accuracy) \times 3 (Test) mixed MANOVA with Test (Free Recall, Referent ID, Source ID) the one between subjects factor. There were several significant effects, and an examination of the means suggested that most of the variability among means was contributed by conditions involving inaccurate descriptors. Therefore, a second 2 (Source) \times 2 (Referent) \times 3 (Test) mixed MANOVA was used to analyze the mean number of positive trait words for accurate descriptors alone. Again, Test was the between subjects factor. The overall mean number of positive descriptors was 2.83. There were no main effects of Test [$F(2, 45) = .08$, $Mse = .90$, $\eta^2 = .003$, $p < .05$], Source [$F(1, 45) = 1.89$, $Mse = 1.10$, $\eta^2 = .04$, $p < .05$], or Referent [$F(1, 45) = .82$, $Mse = .82$, $\eta^2 = .02$, $p < .05$], nor any interactions.

Normative Word Frequency. For each subject, we determined the mean word frequency (Kucera & Francis, 1970) for the five words occurring in each experimental condition involving Accurate descriptors. Since norms were available for only 82% of the target words, an individual subject's mean for a given condition may be based on fewer than five items. Mean word frequencies were analyzed using a 2 (Source) \times 2 (Referent) \times 3 (Test) mixed MANOVA, with Test the between subjects factor. The only significant result was a main effect of Source: $F(1, 45) = 22.73$, $Mse = 361.96$, $\eta^2 = .34$, $p > .001$. Words reported by subjects had a higher mean word frequency ($M = 32.66$) than words reported by confederates ($M = 19.57$). When test conditions were considered individually, there were source differences in mean word frequency for items in the Referent ID [$F(1, 15) = 13.42$, $Mse = .06$, $p > .01$] and Source ID [$F(1, 15) = 10.08$, $Mse = .06$, $p > .01$], but not in the Recall [$F(1, 15) = 2.89$, $Mse = .06$, $p < .05$] test. Differences in word frequency between self- and other-generated words were most probably the result of replacing items on the "yoked" list (confederate's items) that were reported by the subject first; replacement items were likely of lower word frequency than the original items.

The small advantage in word frequency of the subject-generated items in the referent and source identification conditions cannot alone explain the pattern of results to be reported below; for example, the interaction of source and referent in the recall and referent identification tests and the absence of a main effect of source in the source identification test. Given, then, that the accurate descriptors were reasonably equivalent across conditions in how positive they were and varied minimally in word frequency (and in a manner uncorrelated with the main findings), we included only accurate descriptors in the analyses reported below. It should be noted, however, that the major conclusions also hold when all descriptors were included in the analyses.

FREE RECALL

Consistent with previous research demonstrating a Self-Reference Effect, self-referent descriptors should be better recalled than other-referent descriptors. Consistent with previous studies of the generation effect, self-generated descriptors should be better recalled than other-generated descriptors. A recall measure was computed for each subject for each level of Source and Referent. The number of words the subject correctly recalled was divided by the number of non-overlapping words reported during session 1. The resultant proportions were analyzed using a 2 (Source) \times 2 (Referent) repeated measures ANOVA.

Figure 1 presents the overall mean proportion descriptors correctly recalled. A main effect of Source was observed. More self-generated descriptors were recalled ($M = .62$) than were other-generated descriptors: ($M = .20$), $F(1, 15) = 53.36$, $Mse = .06$, $\eta^2 = .78$, $p > .001$. More important, there was a significant Source \times Referent interaction: $F(1, 15) = 9.24$, $Mse = .05$, $\eta^2 = .38$, $p > .01$. Words reported by the confederate about the subject were better recalled ($M = .29$) than words the confederate reported about herself ($M = .10$), $t(1, 15) = 3.30$, $Mse = .06$, $p > .01$. In contrast, for words generated by the subject, there was a small but insignificant advantage of other-referent ($M = .69$) over self-referent ($M = .56$) items: $t(1, 15) = -1.65$, $Mse = .08$, $p < .05$. Thus, in recall, the effect of self-reference depended upon the source of the adjectives. A SRE was observed only for other-generated descriptors.²

2. Although the overall level of recall was lower for inaccurate than accurate descriptors, the pattern was the same.

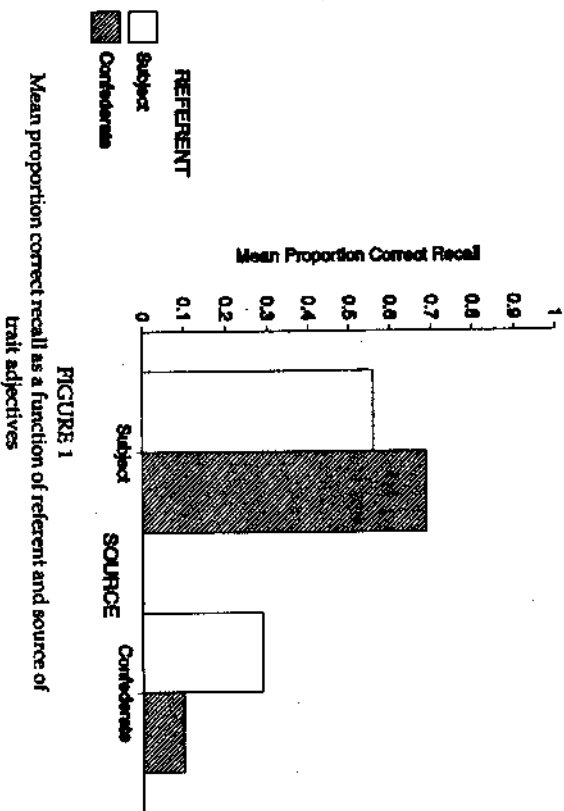


FIGURE 1
Mean proportion correct recall as a function of referent and source of trait adjectives

JUDGING THE REFERENT AND SOURCE OF PERSON INFORMATION

Recognition. First, a measure of overall Old/New Recognition was computed for each subject in the Referent ID and the Source ID test groups. For each subject, the number of items correctly identified as having occurred in the experiment, irrespective of whether referent (source) had been correctly identified was added to the number of items correctly identified as new. This sum was divided by the total number of items ($n = 40$). The resultant proportions were analyzed using an independent groups *t*-test. The overall mean proportion correct Old/New Recognition did not differ for subjects in the Referent ID ($M = .84$) and Source ID ($M = .81$) test groups: $t(1, 30) = 1.11, p < .05$. In addition, an independent groups *t*-test revealed no reliable difference in overall mean proportion new items misidentified as Old (false positives) for the Referent ID ($M = .23$) and Source ID ($M = .25$) tests: $t(1, 30) = -.43, p < .05$.

For both the Referent ID and Source ID test conditions, correct recognition of Old items was also computed for each subject for all levels of Source and Referent. The number of items the subject correctly

identified as having occurred in the experiment, irrespective of whether referent (source) had been correctly identified, was divided by the number of Old test items in each condition ($n = 5$). Proportions were analyzed using a 2 (Source) \times 2 (Referent) repeated measures ANOVA.

Analysis of subjects' Old/New recognition in the context of the Referent ID test revealed only a main effect of Source: $F(1, 15) = 29.16, Mse = .02, \eta^2 = .66, p > .001$. Recognition was better for self-generated descriptors ($M = .99$) than for other-generated descriptors ($M = .83$). False positives were also evaluated. A dependent groups *t*-test performed on the mean proportion of new items a subject misidentified as self or other-referent revealed no bias to respond "self" ($M = .09$) or "other" ($M = .14$), $t(1, 15) = -1.81, Mse = .03, p < .05$.

In the context of the Source ID test, recognition was again better for self-generated descriptors ($M = 0.98$) than for other-generated descriptors ($M = .75$), $F(1, 15) = 23.77, Mse = .04, \eta^2 = .61, p > .001$. A dependent groups *t*-test performed on the mean proportion of new items a subject misidentified as self or other-referent revealed a bias to respond "other" ($M = .21$) more often than "self" ($M = .04$), $t(1, 15) = -4.15, Mse = 0.04, p > .05$.

Referent ID. A Referent Identification (Referent ID) score was computed for each subject for each level of Source and Referent. The number of words attributed to the correct referent (self or other) was divided by the number of words correctly recognized as "Old." These proportions were analyzed using a 2 (Source) \times 2 (Referent) repeated measures ANOVA.

In general, subjects correctly identified the referent more often for self-generated words ($M = .85$) than for other-generated words ($M = .66$): $F(1, 15) = 13.07, Mse = .05, \eta^2 = .46, p > .01$ (see Figure 2). Also, subjects' Referent ID was better overall for self-referent ($M = .85$) than for other-referent items ($M = .66$): $F(1, 15) = 11.44, Mse = .05, \eta^2 = .43, p > .01$. However, as in the Free Recall test, the Source \times Referent interaction revealed that the effect of referent depended upon the source of trait adjectives: $F(1, 15) = 6.88, Mse = .08, \eta^2 = .31, p > .05$. Subjects correctly identified the referent more often for words the confederate reported about the subject ($M = .85$) than for words the confederate reported about herself ($M = .47$): $t(1, 15) = 3.74, Mse = .06, p > .01$, while the referent was correctly identified equally often for words the subject reported about the confederate ($M = .85$) and words the subject reported about herself ($M = .86$): $t(1, 15) = .12, Mse = .05, p < .05$. This pattern is comparable to that observed in free recall.

Source ID. A Source Identification (Source ID) score was computed for each subject using the same procedure outlined for computing

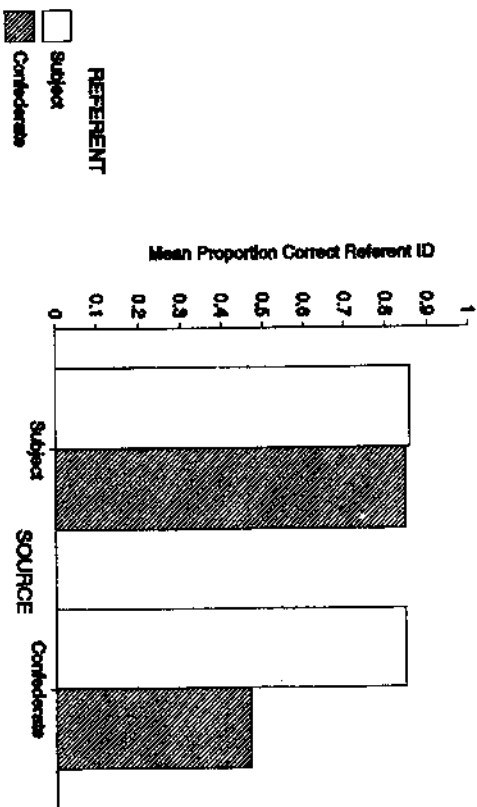


FIGURE 2
Mean proportion correct referent identification as a function of referent and source of trait adjectives.

Referent ID scores. In this case, the number of words attributed to the correct source (self, other) was divided by the number of words correctly recognized as "Old." Figure 3 presents the mean proportion correct Source ID as a function of Source and Referent.

Subjects were highly accurate in identifying the source of trait adjectives, indicating that person memory includes information regarding the conditions under which the memories were acquired (see also Johnson, 1991b). No main effect of Source was observed; words generated by the subject were correctly identified for source as often ($M = .94$) as words generated by the confederate ($M = .94$): $F(1, 15) = .05$, $Mse = .01$, $\eta^2 = .003$, $p < .05$. However, subjects correctly identified the source of self-referent descriptors ($M = .96$) more often than other-referent descriptors ($M = .91$): $F(1, 15) = 3.88$, $Mse = .01$, $\eta^2 = .20$, $p = .06$.

Overall, subjects were able to identify who said the word 94% of the time; whereas they were able to identify who the word described only 76% of the time, $t(1, 30) = 4.68$, $Mse = .02$, $p > .001$. This difference cannot be accounted for by differences in overall memory in the two groups because Old/New Recognition computed for each of these groups was comparable.

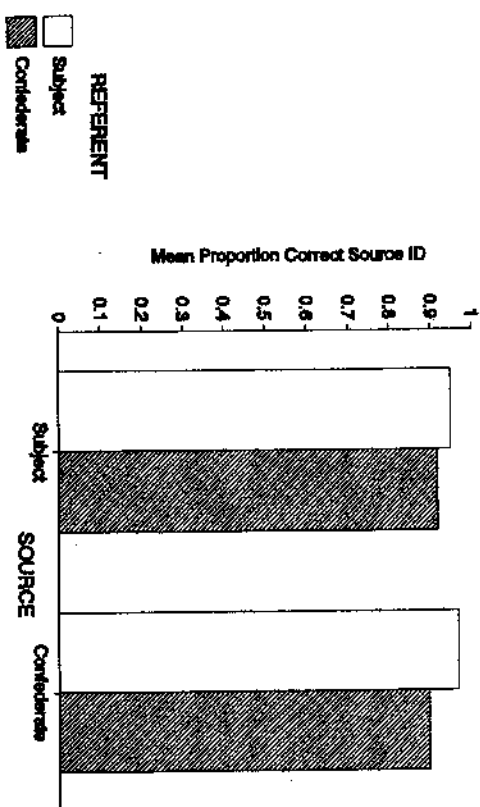


FIGURE 3
Mean proportion correct source identification as a function of referent and source of trait adjectives.

DISCUSSION

In this study, pairs of people (a subject and a confederate) exchanged trait adjectives that described themselves and each other. Two days later, we asked subjects either to recall as many of the items as they could, to identify the referent (self or other) of each item, or to identify the source (self or other) of each item. The overall pattern of results clearly indicated that the effects of referent depended on the source of the information and the way that memory was tested.

When descriptors originated with an external source (another person), we found a "typical" SRE for all three tests: performance was better for self-referent than for other-referent trait words. In contrast, when the descriptors were self-generated, the relative performance on self- and other-referent items depended on the test. In the Source ID test, subjects correctly identified the source of items more often for self-referent than for other-referent items. On the other hand, Free Recall and Referent ID was comparable for self- and other-referent words.

We also found an advantage for self-generated over other-generated items in recall and Referent ID. The fact that both referent and source

contribute to memory suggests that in several previous studies, the effects of self-reference may have been confounded with the effects of source. Some memory effects previously attributed to the self may have more to do with the processes involved in generation than with the self-relevance of the information (see especially Deutsch, Kroll, Weible, Letourneau, & Cross, 1988; Greenwald & Banaji, 1989).

A particularly interesting finding from the present study is that subjects were much better at identifying the source of descriptors (94%) than at identifying their referent (76%). In fact, source identification was remarkably good, considering the two-day retention interval. This overall difference in performance in the two tasks, as well as differences in the particular patterns of scores in the two test conditions as a function of source and referent conditions, suggests that the two tasks require somewhat different information or judgment processes.

Johnson and colleagues have attempted to specify the types of information and processes involved in identifying the sources of memories (e.g., Johnson, 1985, 1991a; Johnson & Raye, 1981; Johnson, Hashtroudi, & Lindsay, in preparation). They propose that memories consist of records of prior perceptual and reflective processing. In addition, they propose that there are two major classes of judgment processes, associated, respectively, with the two reflective memory subsystems (R-1 and R-2) in the "Multiple-Entry, Modular Memory System" (MEM) framework (see Johnson, 1991a, 1991b; Johnson & Hirst, 1991; Johnson et al., in preparation). R-1 processes make relatively quick attributions about the origin of information based on appraising available qualitative characteristics of memories such as perceptual, contextual, emotional, and semantic detail and information about cognitive operations involved in establishing the memory. R-2 processes engage in more deliberate retrieval and evaluation of additional information and consider such things as plausibility or appropriateness in light of antecedents, consequences, and general world knowledge. Such R-1 and R-2 processes underlie all judgments or attributions, not only source monitoring (Johnson et al., in preparation). Thus, we should be able to compare performance on referent identification with performance on source identification in the present study using this framework.

For source identification, R-1 judgment processes can exploit differences between self- and other-generated memories in type or amount of perceptual, contextual, emotional, or semantic detail or cognitive operations information. For example, self and other sat in different locations, spoke in different voices, and different cognitive operations were involved in generating and listening. In contrast, for referent identification, perceptual, contextual, and cognitive operations cues

provide little useful discriminative information in the present situation. For example, remembering a word in the confederate's voice does not give any information about who she might have been talking about. Thus for referent identification, R-1 judgment processes may largely depend on semantic matches between information and categories or schemas ("Does this trait fit my schema for me?"). The fact that subjects often claimed that they were the referent for descriptors that the confederate gave for herself (reflected in low performance on Other-referent/Other-source items in Figure 2), is consistent with the idea that subjects were influenced in making decisions about referent by whether traits matched their self-schema (after Markus, 1977). It also should be emphasized that subjects did not show a similar tendency to claim that falsely recognized new items referred to themselves. Subjects were not simply responding on the test on the basis of whether items fit their pre-experimental self-schema. This pattern suggests subjects were also specifically influenced by records of their prior processing of what the confederate said about herself in terms of their own self-schemas.

Both source and referent identification may profit from R-2 processes as well as R-1 processes. For example, imagine this hypothetical recollection of earlier reflective products: "I almost didn't write 'impatient' because I thought she might be offended; I remember she smiled when I later said 'impatient' during the word exchange so I figured I had hit the mark." Retrieval of such related antecedent and consequent information would help specify source and referent for the item *impatient*. As in R-1 processes, it is possible that information available for R-2 processes might differentially favor source as opposed to referent judgments. For example, suppose in listening to what the confederates said about themselves, the subjects were likely to compare themselves to the confederate (e.g., the confederate says "loyal" and the subject thinks, "Oh, yes, I'm loyal too") (e.g., Markus & Sentis, 1982; Markus, Smith, & Moreland, 1985; Wyer & Gordon, 1984). Later, the subject's memory for the source of the item may be good based on perceptual and contextual cues and memory for her own general reaction, but the referent may not be so clearly specified because the subject has thought about the self-relevance not only of what the confederate says about the subject but what the confederate has said about herself.

Suppose we had only the outcome of the Referent ID condition for other-generated information. We might conclude that, after two days, subjects have only a moderate amount of specific memory for the original experience and thus largely make schema-based decisions (e.g., Bartlett, 1932; Higgins et al., 1983). However, subjects could

discriminate traits from the prior conversation from new traits, suggesting that they were not simply responding on the basis of whether items fit their self-schema or their schema for the confederate. Arnd, perhaps more persuasive, the high level of source monitoring performance indicates that much more specific information was available in memory than what appears from the referent identification task or the recall task. However, as we argue above, some of this specific information can be used to differentiate source but not referent.

Recall, like referent identification, especially depends on reactivating prior reflective processing (e.g., Johnson, 1990). That is, recall draws on records of inter-item, organizational processing that occurred during encoding (see, especially, Klein & Kihlstrom, 1986). The overall pattern of recall results suggests that more inter-item, organizational processing occurred for what the subject generated than for what the confederate said, especially for what the confederate said about herself. Presumably, subjects relate both self-generated and incoming self-referential information to well developed self schemata and perhaps consider the relations among individual items of information (e.g., "She said I'm indecisive and that's true, but previously she said I was open-minded, so she probably doesn't think I'm weak, but just compulsive.")

When the subject herself generates the items about the confederate, inter-item processing is likely evoked, for example, as the subject tries to find a compromise between what she thinks and what she says (e.g., "She probably won't be too offended if I say she is stubborn because I'll also say she is thoughtful"). However, because the subject would not have a well-developed person-schema for the confederate, descriptors given by the confederate about herself would receive significantly less inter-item or relational processing (e.g., Hunt & Einstein, 1981; Klein & Kihlstrom, 1986). Here, again, is an area where the source of person information may be especially important. If the "other" person were an important and/or well-known individual, then what the other said about herself might be more likely to receive extensive relational processing. A follow-up question, then, is whether the seeming "egocentric bias" (e.g., Greenwald, 1981) we found would disappear if subjects exchanged information with another person who is important or well known to them (cf. Bower & Gilligan, 1979; Keenan & Baillet, 1980).

In the introduction we suggested that it is important to show that subjects remember the referent of information in order to demonstrate that cohesive concepts of persons are being acquired rather than isolated items of information that received special attention because they were described to the subject as potentially self-referential. We

think it is equally important to explore the extent to which people can identify the sources of the information they have about people, including themselves (e.g., Johnson & Sherman, 1990). One example of an important consequence of source information for the development and maintenance of the self concept is that it allows one to attempt to control the impact of information on beliefs about oneself (our self-schemas) depending on its source. The fact that we sometimes ruminate on negative self-referential information originating from sources we do not respect suggests that we may not be entirely successful in discounting information based on source. Arnd, of course, our ability to discount source may fall off markedly as a function of time (cf. sleeper effect; Greenwald, Pratkanis, Leippe, & Baumgardner, 1986). Similarly, we may begin to confuse our own speculations about the characteristics of others with externally derived information about them. Thus, we may mistakenly hold or even pass on an opinion that originated with us as if it came from someone else. The present results suggest there are at least some circumstances in which we are quite good at later differentiating what we generated from what we heard in a social exchange of self-relevant information. Also, we appear to be much better at recalling information and identifying its referent for what we ourselves concluded about someone else than what they told us about themselves. The overall pattern in the present data suggests that others, in telling us about themselves, may have to work hard to overcome our self-absorption and/or tendency to think about the potential applicability to us of what they say about themselves, and, especially, to overcome our better memory for the characteristics we attribute to them than for the ones they attribute to themselves.

In summary, our findings extend previous research on the SRE to more naturalistic, social acquisition conditions, to trait descriptors that arise from subjects' own concepts of themselves and impressions of others, and to reasonably long retention intervals. We found, under these conditions, a robust self-referent effect for information that was externally derived, but not for information that was self-generated. Furthermore, we found that subjects were better at identifying the source of descriptive items than at identifying their referent. We interpreted the findings within the general MEM framework proposed by Johnson (1983, 1991a, 1991b; Johnson & Hirst, 1991; Johnson et al., in preparation). We suggested that perceptual and contextual cues and records of cognitive operations can help discriminate source, but not referent, in this situation. Referent identification will thus be more dependent on matches between remembered information and semantic schemas, and on explicit recollection of related antecedent and consequent thoughts and events that help specify referent. Finally, we

suggested that whether representations of the self and others include source information may have important consequences for our self-concept and conceptions of others.

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