The concept of the self has played an important role in the study of human memory. In a landmark study, Rogers, Kuiper, and Kirker (1977) uncovered a phenomenon now known as the self-reference effect. The self-reference effect is defined as the process of encoding information related to the self that causes better recall of that information compared to information processed in other ways. To our knowledge, researchers have not examined this effect using a set of trait adjectives based on the dimensions of the Big Five Personality Inventory (BFI). We aimed to (a) demonstrate a self-reference effect for trait adjectives, (b) indicate whether recall is enhanced for endorsed words (“yes–no” effect), and (c) determine if recall is better for words associated with one’s personality profile (trait effect). Results supported previous findings indicating that self-referential encoding promotes better recall than semantic encoding. However, the presence of a “yes–no” effect depended on the type of judgment being made (i.e., semantic versus self-referent), and we observed only a marginal trait effect.

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Self-Referential Memory for the Big-Five Personality Traits
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ABSTRACT. A classic finding in the study of episodic memory, known as the self-reference effect, suggests that people who relate information to themselves typically show greater recall for that information compared to information processed in other ways. To our knowledge, researchers have not examined this effect using a set of trait adjectives based on the dimensions of the Big Five Personality Inventory (BFI). We aimed to (a) demonstrate a self-reference effect for trait adjectives, (b) indicate whether recall is enhanced for endorsed words (“yes–no” effect), and (c) determine if recall is better for words associated with one’s personality profile (trait effect). Results supported previous findings indicating that self-referential encoding promotes better recall than semantic encoding. However, the presence of a “yes–no” effect depended on the type of judgment being made (i.e., semantic versus self-referent), and we observed only a marginal trait effect.
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factors that influence the self-reference effect, one concept not examined in detail is the role of personality in one’s tendency to remember particular items. Some research closest to this aim involved studying the self-reference effect in participants who were clinically diagnosed with depression (Davis, 1979; Derry & Kuiper, 1981; Hull et al., 1988). For example, Davis (1979) asked both clinically depressed participants and nondepressed participants to make judgments about whether a list of “normal,” nondepression-related adjectives described themselves. Davis found that the nondepressed participants’ recall was enhanced due to the self-reference effect, but that the depressed individuals’ recall was not. Other research has demonstrated the presence of the self-reference effect among depressed participants, but only for depression-related words (Derry & Kuiper, 1981).

Another way to study this concept in a general population is by relating self-referent processing to one’s personality profile. We examined whether memory would be better for items related to pronounced personality traits as measured by the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008). The BFI is a shorter version of the NEO-PI-R (Revised Neuroticism-Extraversion-Openness Personality Inventory; Costa & McCrae, 1992) created to measure personality across five main factors: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Based on Rogers et al.’s (1977) original findings and a robust body of literature demonstrating the self-reference effect across a variety of contexts (Symons & Johnson, 1997), we expected that self-referent encoding would be superior to a semantic encoding condition, where each condition involved thinking about a set of common trait adjectives related to the BFI. However, based on Rogers et al.’s (1977) tentative finding regarding a “yes–no” effect related to item endorsement during self-referent encoding and a small body of evidence suggesting that factors such as depression can influence self-referential processing, we also hypothesized that participants would be better at recalling both endorsed trait words and trait words associated with one’s BFI profile.

Therefore, we designed this experiment to (a) demonstrate that self-referent encoding enhances recall for trait adjectives compared to a semantic encoding task, (b) determine whether recall is enhanced for trait items that are endorsed with “yes” when asked if they describe the participant (yes–no condition), and (c) determine if trait words that are associated with a participant’s BFI profile are recalled better than unassociated trait words. We hypothesized that self-referent encoding would produce greater recall than semantic encoding, that a “yes–no” endorsement effect would emerge during self-referent encoding, and that participants would demonstrate greater recall for trait words associated with one’s most pronounced personality traits as measured by the five dimensions of the BFI.

Method

Participants
A total of 98 college undergraduate students between the ages of 18 and 23 ($M = 18.90$, $SD = 1.00$) participated in this experiment, including 76 women and 22 men. Students participated in exchange for extra credit in one of their psychology classes. Participation was voluntary, and all participants completed an informed consent statement before beginning the experiment. The protocol was approved by the Human Research Review Board.

Materials
Each condition involved presenting participants with a list of 40 trait adjectives. Factor loadings on each of the five traits that comprise the BFI contributed to our choice of experimental words (John & Srivastava, 1999). All the words chosen for this experiment had a factor loading of at least 0.59 on one of the Big Five traits (i.e., openness, extraversion, agreeableness, conscientiousness, and neuroticism). Eight adjectives were included for each of the five traits. We used Thesaurus.com to choose an additional 40 words as synonyms or antonyms for the semantic encoding condition. The order of the words used in the experiment was randomized using an online random number generator (Random.org).

This experiment also used the 44-item BFI (John et al., 1991; John et al., 2008; John & Srivastava, 1999). The BFI contains five subscales, one for each main factor: openness (10 items), conscientiousness (9 items), extraversion (8 items), agreeableness (9 items), and neuroticism (8 items; Worrell & Cross, 2004). For each statement, participants rate their opinion from 1 (disagree strongly) to 5 (agree strongly). This brief personality inventory has both high reliability and validity (Gosling, Rentfrow, & Swann, 2003). John and Srivastava (1999) reported alpha reliabilities from .75 to .80 for subscales of the BFI and 3-month test–retest reliabilities from .80 to .90.
Procedure
The experiment took approximately 30 min to complete. In all conditions, participants first completed an informed consent document followed by the 44-item BFI questionnaire. We randomly assigned participants to one of three conditions: an incidental semantic encoding condition, an incidental self-referential encoding condition, and an intentional encoding condition. All participants viewed the 40 trait words, one at a time on PowerPoint slides, for 10 s each. After participants viewed all words, they recalled as many of the target words as possible during a 5 min free recall period.

In the incidental semantic encoding condition, we showed participants trait words paired with 40 antonym/synonym words. Each slide had the phrase “Does this word mean the same thing as _____?” The blank contained the synonym/antonym, and the target word appeared underneath in large, bold font. In the incidental self-referential encoding condition, the phrase “Does this word describe you?” appeared above the target word on each slide. In both conditions, we instructed participants to check “yes” or “no” on an answer sheet in response to each slide. Participants were not aware that a free recall test would follow. Contrary to the other conditions, participants in the intentional encoding condition were told to memorize the words in preparation for a memory test. However, we did not instruct participants to use any specific encoding strategy.

Results
To test the hypothesis that there was a significant difference between recall for self-referentially encoded words and semantically encoded words, a one-way ANOVA was performed, with number of words recalled as the dependent variable and the experimental group as the independent variable. The overall ANOVA was significant, $F(2, 95) = 43.73, p < .0001, \eta^2 = .48$. A Tukey HSD test was done to examine differences between groups. Both the incidental self-referential encoding score, $M = 14.76, SD = 4.24, p < .0001$, and the intentional recall score, $M = 13.20, SD = 3.71, p < .0001$, were significantly higher than the incidental semantic encoding score, $M = 7.06, SD = 2.61$. However, there was no significant difference between the incidental self-referential encoding condition and the intentional encoding condition ($p = .19$), suggesting that self-referential encoding was just as effective as intentional encoding.

Before testing the hypothesis that there was a significant difference between recall of endorsed words compared to unendorsed words (“yes–no” effect), an independent-samples t test was first performed to test for differences in the number of words endorsed by each group (self-reference versus semantic encoding). The self-reference encoding group ($M = 28.62, SD = 4.08$) endorsed significantly more words than the semantic encoding group ($M = 16.32, SD = 4.33$), $t(66) = 12.05, p < .0001, r^2 = .69$. Therefore, because the total number of endorsed words differed across conditions, we examined the proportion of endorsed versus unendorsed words recalled in each condition.

A 2 (endorsement) × 2 (encoding group) mixed factorial ANOVA was conducted to determine whether a “yes–no” effect emerged in either the semantic encoding or self-reference condition. There was an interaction between encoding condition and endorsement, $F(1, 66) = 4.95, p = .03, \eta^2 = .07$, such that participants performing self-referential encoding recalled a higher proportion of endorsed versus unendorsed words, although the opposite pattern emerged for the semantic encoding group, such that they recalled more unendorsed versus endorsed words (see Figure 1). The main effect of group was also significant, $F(1, 66) = 63.45, p < .0001, \eta^2 = .49$, indicating that the self-reference group ($M = 0.36, SD = 0.10$) recalled a significantly higher proportion of words than the semantic group ($M = 0.17, SD = 0.10$). However, the main effect of endorsement was not significant, $F(1, 66) = .003, p = .960, \eta^2 = .00$, indicating that the proportion of endorsed words recalled ($M = 0.27, SD = 0.08$) was not different than the proportion of unendorsed words recalled ($M = 0.27, SD = 0.09$).

To test the hypothesis that trait words associated with a participant’s BFI profile were more likely to be recalled than trait words not related to their profile, we examined scores across each trait to determine each participant’s “highest” and “lowest” traits. We examined the proportion of words recalled related to each participant’s highest and lowest traits, rather than the raw scores, because some participants scored equally high or low on two of the five subscales from the BFI. A 2 (high vs. low trait) × 3 (encoding group) mixed factorial ANOVA was conducted to examine the proportion of words recalled that corresponded with each participant’s highest and lowest traits. The main effect of trait was marginal, but not significant at the accepted alpha level, $F(1, 95) = 3.13, p = .08, \eta^2 = .03$. This
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finding reflected a slightly higher proportion of “high” trait words recalled \( (M = 0.33, SD = 0.08) \) compared to the proportion of “low” trait words recalled \( (M = 0.27, SD = 0.08) \). The main effect of group, however, was significant, \( F(1, 95) = 32.48, p < .0001, \eta^2_p = .41 \), indicating that the self-reference group \( (M = 0.36, SD = 0.10, p < .0001) \) and the intentional encoding group \( (M = 0.33, SD = 0.10, p < .0001) \) recalled a significantly higher proportion of trait words than the semantic group \( (M = 0.17, SD = 0.10) \). There was no difference between the self-reference encoding group and the intentional encoding group \( (p = .24) \), and there was no interaction between encoding group and the type of trait word being recalled (high vs. low), \( F(1, 95) = 0.25, p = .78, \eta^2_p = .01 \).

Discussion

As hypothesized, the findings of this study support previous findings indicating that self-referential encoding promotes better recall than semantic encoding when given a surprise memory test (e.g., Davis, 1979; Derry & Kuiper, 1981; Einstein & Hunt, 1980; Hull et al., 1988; Klein & Kihlstrom, 1986; Klein & Loftus, 1988; Nieznański, 2009; Symons & Johnson, 1997). These data extend Rogers et al.’s (1977) classic finding by also showing that, in some cases, incidental self-referential encoding can be equally effective as deliberate encoding when no particular strategy guidance is provided. Furthermore, results indicated that the presence of a “yes–no” effect may depend on the type of judgment being made (i.e., semantic vs. self-referent), with a positive endorsement effect being more likely during self-referential encoding. Lastly, these effects were demonstrated using a set of trait adjectives specifically associated with the BFI, which to our knowledge has not been previously examined in this context. We defined a trait effect as when trait words associated with a participant’s highest trait(s), as measured by the 44-item BFI, were recalled more easily than trait words associated with a participant’s lowest trait(s). We found only a marginal trait effect in the present study.

There are several ways that the self-reference effect can be explained (see Symons & Johnson, 1997 for a review and meta-analysis). Rogers et al. (1977) explained the effect as the result of one’s ability to access a personal schema that is structured in a hierarchy. This hierarchy allows for individuals to rate traits within themselves as important, and having to think about whether a trait adjective describes oneself makes the trait more salient. Rogers and colleagues argued that this process accounts for the benefit of self-referential encoding, even over semantic encoding, where one still needs to access the meaning of the word. Semantic encoding does not bring up this “self” schema and therefore may not trigger as rich a set of cues for recalling the information later.

The results involving the yes–no effect may be driven by two separate processes. Participants in the self-reference condition recalled a greater proportion of endorsed words, although participants in the semantic encoding condition recalled a greater proportion of unendorsed words. We expected the greater proportion of endorsed words recalled in the self-reference condition because these words were explicitly endorsed as being more self-referent during encoding. However, one reason why more unendorsed words may have been recalled in the semantic encoding condition is that the unendorsed words caused participants to spend more time thinking about the target word in order to decide that it was not a synonym of its comparison word. This idea may be reflected by the difficulty of making the semantic judgments, and, in fact, participants were less likely than expected to indicate that words were synonyms (50% of the target words were paired with synonyms, but only approximately 40% were endorsed as synonyms by participants). This finding suggests that participants may have
had to think more carefully about the unendorsed words, which may have promoted deeper encoding.

The role of personality in people’s natural tendency to remember self-referent information is still unclear, as we found only a marginal trait effect. This result suggests that if such a tendency to recall information related to people’s most pronounced traits does emerge in this context, it may be of rather small practical significance. One challenge to detecting such effects may lie in the fact that even information related to one’s least pronounced personality trait(s) may still be highly self-referent and personally meaningful. For example, scoring low on extraversion may be just as important to an individual’s “self” schema as scoring high on neuroticism, and words related to the concept of extraversion may remain highly salient for that individual.

Therefore, the hypothesis that trait-based remembering should be more pronounced for “high” personality traits should be tested in other contexts using different stimuli and procedures as well as other personality measures. In particular, future studies examining measures of reaction time during item encoding (e.g., speed of “yes–no” responses) or during tests of recognition memory may provide additional, more sensitive measures of self-referential processing than free recall alone. Nieznanski (2009) found that recognition tasks did not show the self-reference effect; however, other recognition tasks have demonstrated a self-reference effect (see Symons & Johnson, 1997). Recognition tasks could be more sensitive for detecting a trait effect because more stimuli can be used, and reaction times can be measured during testing.

Further elucidating the relationship between memory and personality may have important implications in people’s daily lives. Determining whether memory performance in real-world contexts is likely to be biased by personal characteristics, such as one’s most pronounced personality traits, may affect the way in which both students and educators approach the learning process. In particular, this study showed that, among three groups of college students, incidental self-referent encoding was just as effective as intentional encoding that was not guided by any particular mnemonic strategy; however, both of these methods were more effective than incidental semantic encoding. This finding suggests that reflecting on the personal relevance of new information may lead students to learn this information more quickly and reliably compared to focusing purely on the meaning of new information. Future research should examine whether the benefits of self-referent encoding can be enhanced in intentional encoding contexts where this approach is combined with other encoding strategies based on techniques such as imagery or organization. Furthermore, if further research demonstrates clear links between personality characteristics and memory performance, it opens up a variety of alternative means for assessing personality, both in research settings (e.g., measuring implicit attitudes) and in real-world contexts (e.g., screening job candidates).

In summary, the self-reference effect was pronounced in this experiment and the yes–no effect was present during self-referent encoding, although a trait effect was only marginally evident. The self-reference effect is obviously an important encoding device, and, in this experiment, was just as effective as intentional encoding among participants without any specific strategy training. Future research on this topic should examine the relation between one’s BFI profile and “naturally occurring” propensities for better encoding and recall of words that are associated with the personal characteristics assessed by this measure.

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