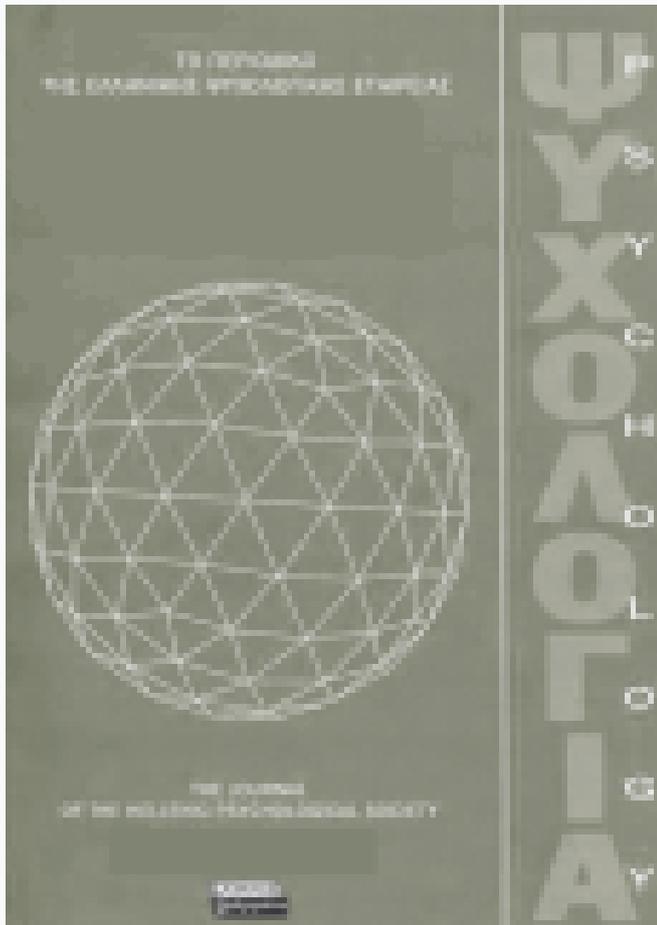


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# Effects of self-focused attention on recognizing previously presented self-relevant and irrelevant stimuli

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## ABSTRACT

Self-focused attention elevates individuals' awareness of the self as an object and directs attentional resources toward it. It facilitates the performance of well-learned tasks or the recall of information pertaining to the self, but undermines performance of difficult tasks especially among evaluatively anxious individuals. This study examines the effects of self-focused attention and evaluation on recognition memory of words varying in self-relevance, among normal individuals. Based on previous findings, it was hypothesized that the presence of self-focus and evaluation would affect performance, in a positive direction since participants were normal and the task easy. An alternative hypothesis predicts that self-focus would enhance processing of self-relevant information only. Self-focus and evaluation led to greater recognition of distractor words, i.e. to more false alarms, indicating that both manipulations may induce performance pressure and may affect the strategy participants employ to achieve positive evaluation, rather than influencing information processing itself.

*Key words:* Self-focused attention, Recognition memory, Priming.

## 1. Introduction

Increased attention to the self as an object influences performance on a variety of tasks, although the mechanism behind this effect remains obscure. Duval and Wicklund's self-awareness theory (1972) suggests that self-focus directs attention to the self, which is automatically compared to socially accepted standards of

performance (Carver & Scheier, 1978, 1981. Duval & Silvia, 2002. Duval & Lalwani, 1999). This process is believed to absorb attention to the processing of information about the self, therefore leaving few resources available for task processing and impairing performance on certain tasks. It may alternatively cause narrowing of attention so that only a few cues can be processed. This leads to facilitation of simple tasks, that only require

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processing of a few central cues, and impairment on complex tasks where processing of multiple cues is required (Huguet et al., 1999). Thus, self-awareness theory implicates two potential mechanisms in the performance effects of self-focus, without clarifying which one is the cause of performance deterioration or improvement. The first mechanism (comparison to standards) is a self-evaluation process, which entails a change in strategy following this assessment. The second mechanism is purely cognitive, i.e. fewer attention resources available due to processing of self-relevant information.

Carver's (1979) cybernetic model adds explicitly a motivational component to this view: the self-evaluation associated with self-focus leads to persistence on easy tasks, if predictions regarding performance are favorable, and to withdrawal from the task if predictions are unfavorable (Krohne et al., 2002), e.g. when the task is difficult. Blascovich, Mendes, Hunter and Salomon (1999) describe these approaches to tasks as the motivational states of challenge (approach) or threat (avoidance). Whether someone will predict success or failure on a task depends on the person (Hormuth, 1986), situation (Hope, Heimberg & Klein, 1990), and task (Schmitt et al., 1986). In sum, the cybernetic model assumes that it is a change of strategy that affects performance, rather than self-focus affecting attention or other cognitive processes directly.

Self-evaluation and self-focused attention are essentially intertwined. People become focused on thoughts about the self when they are in real or perceived evaluative situations. For instance, socially anxious individuals, who constantly worry that they will be negatively evaluated (e.g., Woody & Rodriguez, 2000. Wells & Papageorgiou, 1999), show increased levels of self-focused attention during social situations, which may be a source of the poor social performance they sometimes demonstrate. Hope, Gansler and Heimberg (1989) concurred that social performance impairment due to self-focus only occurs among participants who are anxious about being evaluated. Even among normal individuals, self-focus may impair

performance when evaluation apprehension is experimentally induced, particularly when the task is difficult. Liebling and Shaver (1973) found that mirror presence deterred performance on a text-copying task but only under evaluation conditions. Panayiotou and Vrana (1998) found that self-focus only had a negative effect on memory for digits if subjects were also being evaluated. This evidence adds further support to the idea that it is the self-evaluative component of self-focused attention that brings about performance deficits under certain circumstances, probably by increasing expectations of failure and leading the person to withdraw from the task.

However, evidence exists from a separate set of studies that lends support to the alternative notion that the performance effects of self-focus are due to direct impact on cognitive processes, in this case on memory. Hull and Levy (1979) suggest that self-focus acts as a "prime" leading to increased activation of self-relevant material. They have found that high self-conscious subjects (a trait form of self-focus) recalled more words that were previously rated as self-relevant compared to low self-conscious subjects and compared to non-self-relevant words. Similarly, Turner (1980) found that self-conscious subjects recalled more trait terms in an unexpected recall task, presumably because relevance to the self is spontaneously used as a powerful encoding strategy by chronically self-conscious individuals. Geller and Shaver (1976) found slowed color naming for self-relevant words on a Stroop task under self-focus conditions, which they interpreted as indicating increased activation of such words, i.e. "priming". Silvia and Eichstaedt (2003) based on the reasoning that self-focus increases recognition of self-relevant material (words), have actually recommended this task as a measure of self-focus. These interpretations stress the effects of self-focus on memory and attention and de-emphasize the impact of self-evaluation. A limitation of this literature, however, is that at least the first two studies mentioned had examined the effect with self-conscious subjects,

who may react to self-focus differently than normal individuals.

In sum, research this far has proposed two separate mechanisms through which self-focus exerts effects on performance: (a) through self-evaluation processes and consequent adjustments to the strategic approach to the task, and (b) through a direct impact on cognitive processes, such as through priming some types of information in memory or taking up limited attention resources. In order to decipher which of the two mechanisms is actually responsible for the effects, or whether the two effects co-exist, it is necessary to study the variables examined in previous studies, i.e. self-focus, evaluation and stimulus self-relevancy within a single experimental design. Since many previous studies examined self-conscious or otherwise evaluatively anxious individuals, who may have a tendency toward self-focus, it is also important that these effects are studied among normal individuals in order to avoid confounding with individual difference variables. The present study examines the effect of self-focus and evaluation apprehension, manipulated independently, on a recognition memory task where the stimuli to be remembered varied in self-relevance.

If it is the case that self-focus exerts its effects through a process of self-evaluation and a consequent change in strategy, it was hypothesized that (A) performance on this task would be influenced by self-focus especially in conjunction with evaluation, i.e. the greatest impact on performance would be observed in the cells that manipulate both self-focus and evaluation. Specifically, performance improvement rather than deterioration was predicted in the self-focus/evaluation condition, because the task is not particularly complex. The second prediction is based on the view that self-focus impacts cognitive processes directly: (B) Performance would be better for self-relevant than neutral stimuli especially in the self-focused conditions, if self-focus indeed primes self-referential material in memory.

## 2. Method

### *Participants*

Ninety-nine Introduction to Psychology students from a USA university (50 male, 49 female) participated in the study in return for course credit. All participants provided informed consent.

### *Procedure*

Results reported here were collected in the context of a larger study that examined the effects of self-focus on cognitive performance (see Panayiotou & Vrana, 2004). In order to manipulate self-focused attention in the manner proposed by Duval and Wicklund (1972) and in accord with several other authors (e.g. Buss, 1980), participants were randomly assigned to one of three conditions: a no self-focus condition ( $n=30$ ), a video-camera present and focused on the participant ( $n=27$ ), or a mirror present so that the participant could see one's reflection ( $n=27$ ). The latter two conditions are well-known to induce self-focused attention. Two alternative methods were used because, according to some writers, they induce somewhat different processes: The mirror leads to increased *private* self-focus, while the camera to increased *public* self-focus (Buss, 1980). Although explication of this distinction is beyond the scope of this paper, it has been suggested that private self-focus leads to thoughts about internal processes, feelings and sensations, while public self-focus leads to thoughts about how the self is seen by others. Both manipulations were tried in order to ensure that the resulting effects were due to self-focus in general and not to one of these specific sub-processes.

Participants were further assigned to one of two evaluation conditions: One condition involved instructions that performance would be evaluated and compared to that of others (evaluation condition), while the 2<sup>nd</sup> condition contained instructions indicating that the experiment was focused on physiological measurement and performance was not going to be evaluated (no

evaluation condition). Specifically, participants in the evaluation condition were instructed as follows: "... we will be evaluating your performance and at the end of the experiment we will tell you how you did compared to other participants in this experiment." Participants in the no-evaluation condition were told: "During this experiment try to perform as well as you can. However, what we are interested in is your body's physiological response to the task so we will not be evaluating how well you did."

All participants were fitted with physiological monitors (miniature electrodes) and instructions were read (see Panayiotou & Vrana, 2004 for the specifics of this phase of the study and psychophysiological apparatus, which are not relevant to the present study). The researcher then left, leaving the participant alone in the presence of the self-focus manipulation, so that self-focus could be induced. Participants were next instructed to complete a questionnaire, the Linguistic Implications Form (LIF – Wegner and Guiliano, 1983), a projective measure of self-focused attention as a manipulation check for the induction of self-focus. To answer it respondents complete sentences with first, second or third person pronouns. Increased ratios of first person completions indicate greater self-focus.

Following questionnaire completion the main task was initiated. Participants saw, on a computer monitor, words and non-words. Words were equal numbers of person-descriptive adjectives (e.g. tall, young) or neutral adjectives (e.g. vacant, boiled) that were matched for length and frequency in the English language based on the norms by Kucera and Francis (1967). This manipulation of self-relevancy was used (i.e. operationalizing self-relevant stimuli to be trait adjectives), as it is the same procedure used in the previous studies by Turner and Geller and Shaver. Non-words were nonsense strings of letters matched for length with the real words.

Seventy-two words and seventy-two non-words were presented for 500 ms each at inter-trial intervals ranging from 5-12 seconds. The interval was varied in order to decrease predictability of

stimulus presentation, which could influence orienting and attention, and consequently the physiological measurements. The seventy-two target words were drawn from a total set of 96 items. The other 24 items served as distractors for the particular participant. These 96 items were rotated as target words or distractors and varied across subjects in a counter-balanced design.

Participants first performed a lexical decision reaction time task during which they decided if a stimulus was a word or non-word and quickly pressed a button accordingly (these and physiological results are discussed in Panayiotou and Vrana, 2004). This was followed by a surprise recognition test, the main focus of this study, during which participants responded to a questionnaire which listed all the target words used during the RT task, plus the 24 distractors (12 person-descriptive, 12 neutral). The recognition test asked participants to give a confidence rating on a 0 to 5 scale regarding whether they had seen each word during the experiment (0=sure not seen before, 5=sure seen before). A smaller number of distractors than target words were used because of the difficulty in finding words that fit our criteria of word length, frequency and person descriptiveness.

Following the recognition task, and in a different room, participants completed a questionnaire which included all target words used in the experiment and asked participants to identify the adjectives that were descriptive of him/herself using a seven-point scale (1=not at all like me, 7=just like me). This questionnaire was used to identify *self*-descriptive adjectives (words rated 5, 6, or 7 on the scale) and non-descriptive adjectives (words rated 1, 2, or 3 on the scale) as opposed to generally *people*-descriptive adjectives (e.g., Geller & Shaver, 1976). It was hoped that having this information would permit a more stringent examination of the effect of stimulus self-relevancy compared to the use of the trait (people-descriptive) adjectives alone. The questionnaire was given at the end of the study to avoid priming any words prior to the RT and recognition tasks.

### Data Analysis

First, an analysis of variance (ANOVA) was conducted to verify that participants were able to distinguish between neutral and person descriptive adjectives, and to test whether their ratings of self-descriptiveness varied as a function of word status (person descriptive, neutral) or self-focus and evaluation manipulations. Self-descriptiveness ratings to the presented words were the dependent variable in a word status (person-descriptive, neutral) x Self-focus x Evaluation ANOVA. Next, an ANOVA was conducted to test the main hypotheses of interest: The effects of self-focus (no self-focus, self-focus) and evaluation (evaluation or no-evaluation conditions) as between-subject variables, and word status (person descriptive, neutral) along with word presentation status (presented, distractor) as within-subjects variables on recognition. A third ANOVA using self-descriptiveness category (i.e. all words receiving ratings above 5 and all words receiving ratings of 4 or below) instead of word descriptiveness as a within participants variable, and self-focus and evaluation condition as between participant variables examined recognition differences between words rated as self-descriptive and non-descriptive. Self-descriptiveness ratings were available only for presented words, so presentation status (presented/distractor) was not a variable in this analysis. A fourth ANOVA with the same between subjects' variables was conducted on the LIF scores to check the effectiveness of the self-focus manipulation. A modified Bonferroni procedure was used to correct for multiple comparisons where significant interactions were obtained (Simes, 1986).

### 3. Results

Fifteen cases were dropped from analyses due to missing data. Because initial analyses did not indicate any significantly different effects of camera and mirror presence on recognition, RT, or other measures, participants in the two self-focus conditions were combined.

### Neutral vs. person-descriptive manipulation

The effectiveness of the manipulation of neutral versus person-descriptive adjectives was shown to have been effective. As expected, person-descriptive adjectives were rated as more self-descriptive (mean=3.7, SD=0.56) than neutral adjectives (mean=1.4, SD=0.6),  $F(1, 78)=1269, p<0.05$ . The neutral adjectives were rated at nearly the minimum on self-descriptiveness. The person-descriptive words were rated, on average, at about the midpoint of the 1-7 self-descriptive scale, indicating that many of these words were self-descriptive and others were not. Self-focus and evaluation had no effect on self-descriptiveness ratings, indicating that there were no confounds in this manipulation from the previous task.

### Effects on recognition

As expected, participants reported significantly greater recognition of presented words ( $M=3.76$ ,  $SD=0.63$ ) than distractors ( $M=1.57$ ,  $SD=0.91$ ),  $F(1, 80)=354.71, p<0.05$ . Participants also reported greater recognition of person-descriptive ( $M=2.73$ ,  $SD=0.59$ ) than neutral ( $M=2.60$ ,  $SD=0.59$ ) words,  $F(1, 80)=12.84, p<0.05$ . The presence of evaluation also resulted in higher recognition ratings,  $F(1, 80)=4.12, p<0.05$ , but only for distractors and not for presented words, as indicated by a Presentation status x Evaluation interaction,  $F(1, 80)=8.58, p<0.05$ .

Partial support was provided for hypothesis A of the study (i.e. that self-focus would affect recognition performance only in the evaluation condition): A Presentation status x Evaluation x Self-focus interaction showed that for presented words in the evaluation condition only, participants had higher recognition in the self-focus condition than in the no self-focus condition,  $F(1, 80)=5.51, p<0.05$ . These differences were not found for distractors, and were not found in the no evaluation condition (see Figure 1).

With regards to hypothesis B (i.e. that self-focus exerts its effects through priming of self-relevant material in memory), there was no

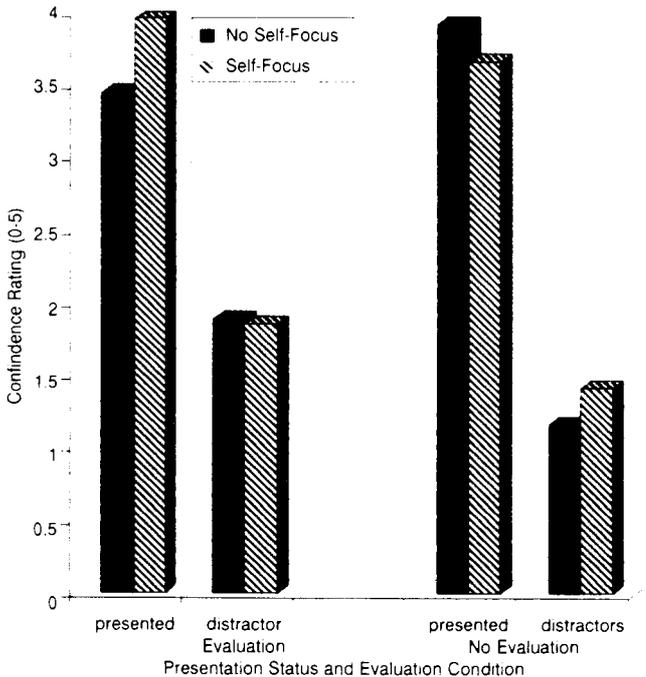


Figure 1

Effects of self-focus and evaluation on the recognition of presented words and distractors

evidence that more person-descriptive than non-descriptive presented words were recognized in the self-focus conditions (person-descriptive  $M=2.77$ ,  $SD=0.78$ ; neutral  $M=2.66$ ,  $SD=0.73$ ). Instead, there was evidence that evaluation changed participants' strategy regarding their report of recognizing words that had not been presented before. A Presentation status  $\times$  Descriptiveness  $\times$  Evaluation interaction,  $F(1, 80)=4.33$ ,  $p<0.05$ , was decomposed by analyzing presented and distractor words separately. For the presented words, there were higher recognition ratings for person-descriptive than neutral words, as expected. For distractor words, in addition to a similar main effect of word descriptiveness, there was an Evaluation  $\times$  Descriptiveness interaction: Whereas for the no evaluation group, ratings were higher

for person-descriptive than neutral words, for subjects in the evaluation group recognition ratings were equally high for person-descriptive and neutral words (see Table 1).

The ANOVA examining recognition for presented words rated by participants as self-descriptive and non-self-descriptive indicated no significant differences in recognition between the two, and no significant interaction with self-focus or evaluation ( $p>0.1$  for both effects).

Manipulation Check

Scores on the LIF showed that women scored higher on the LIF in the mirror condition compared to men although the interaction fell short of statistical significance,  $F(2, 85)=2.56$ ,  $p=0.08$ . This does not offer adequate support for

**Table 1**  
**Mean recognition ratings for presented and distractor words depending on person-descriptiveness and evaluation condition**

|               | Presented Words    |         | Distractors        |         |
|---------------|--------------------|---------|--------------------|---------|
|               | Person-Descriptive | Neutral | Person-Descriptive | Neutral |
| Evaluation    | 3.78               | 3.61    | 1.90               | 1.85    |
| No-Evaluation | 3.81               | 3.74    | 1.42               | 1.19    |

the notion that the manipulation of self-focus was successful. However, this is not a novel issue and has been encountered consistently in our research and that of others (Kimble, Hurt & Arnold, 1984. Innes & Gordon, 1984). As discussed by Panayiotou and Vrana (1998), it appears that self-focus measures such as the LIF are only sensitive to the self-focus manipulation when completing the questionnaire is the only task presented to the participants, but not when participants are faced with another demanding task that may occupy their attention. This issue raises the need for better measures of increased self-focus in situations where the self is not the only salient object of attention.

### 3. Discussion

This study examined the effects of self-focus, induced through a mirror or a camera, and evaluation on the recognition of stimuli that varied in self-relevance. The purpose was to examine the two alternative hypotheses that self-focus exerts effects on performance through increasing self-evaluation and altering the strategic approach to a task, or that it directly affects cognitive processes, in this case by priming self-relevant information in memory. Results from this task, in a similar way to Panayiotou and Vrana (2004) who examined effects on reaction time to self-relevant and irrelevant words, showed no support for the prediction, that self-focus primes self-relevant information in memory. Recognition data showed

that person-descriptive adjectives received higher recognition ratings, but there was no interaction with self-focus. Improved recognition of person-descriptive adjectives is most likely a replication of the frequently observed advantage in remembering self-referential information (e.g. Symons & Johnson, 1997). For the hypothesis that self-focus improves recognition of self-relevant material to be supported, the recognition scores of person-descriptive words (and self-descriptive words) should have been significantly larger for the self-focus condition than for the no self-focus condition. The means were in fact in this direction (i.e. in the Self-focus condition person descriptive  $M=2.77$ , neutral  $M=2.66$ ) however, they were not significantly different, and the non-person-descriptive (i.e., neutral) words showed the same pattern of results as the person descriptive words. Furthermore, specifically self-descriptive words (based on participants' own ratings) were not recognized better than non-descriptive words, and there was no interaction between self-descriptiveness and self-focus. It may be that the improved memory for person-descriptive words found elsewhere occurs because person descriptive material, by its nature, provokes more active processing through superior elaboration and organization that it evokes (e.g. Klein & Kihlstrom, 1986. Klein & Loftus, 1988). A similar argument regarding the self-reference effect in memory was made by Symons and Johnson (1997). In the same vein, Green and McKenna (1996) have suggested that it is not the self-reference of material that attracts

attention, but its significance to the self, so that negatively valent (threat) items are the ones that are actually processed more attentively. In sum, there is no indication that the self-focus manipulations engaged in here (i.e. state self-focus, which may in fact be different than trait self-focus that was examined in Hull & Levy's study) prime self-referential material and thus have a direct impact on memory.

Findings instead support the first hypothesis, i.e. the notion that the presence of self-focus in combination with evaluation affects the strategy used by participants when approaching tasks, hence supporting Duval and Wicklund's (1972) theory, which states that self-focused people are motivated to meet socially appropriate behavioral standards (see also Aiello & Douthitt, 2001). There was greater recognition of all presented words (descriptive and neutral) in the self-focus than no self-focus condition when evaluation was also present (see Figure 1), indicating that these two conditions in combination probably increased performance pressure, in this case leading to increased confidence ratings that presented words were actually seen before. On the other hand, while evaluation improved somewhat performance on target words, it also had a negative side-effect by increasing recognition ratings even for words that should not be remembered (distractors). It appears that when participants expected to be evaluated they used a more liberal criterion and risked committing errors of falsely recognizing a stimulus that was new, rather than missing a stimulus that was old. Increased "recognition" of distractors words may have been influenced by the instructions that were to identify words seen before, rather than to avoid inaccurate recognition. The evaluation instructions may have led participants to "please" the experimenter (i.e. meet the perceived behavioral standard of the instructions) by focusing on the production of as many "hits" as possible, without avoiding "false alarms". A similar effect was observed by Ferris and Rowland (1983), who found a speed-accuracy

trade-off on a reaction time task during observation.

The present results are in accord with the view that self-focus interacts with evaluation to affect performance, and that it is probably the self-evaluation associated with self-focus that affects task performance. They suggest that performance may be influenced by changes in the strategic approach of the task by the participant, who wants to comply with the demands of the experiment in order to avoid negative evaluation. Thus, the self-evaluation mechanism behind self-focus effects appears to hold true not only for anxious individuals as found in previous studies, but also for normal individuals who are placed under evaluative conditions, as was done here.

The hypothesis that self-relevant material is remembered better under self-focus conditions (Hull & Levy, 1979) was not supported. Improved memory for self-relevant material may not be as easily obtained among normal subjects (who are able to appropriately direct their attention toward task relevant stimuli) as it is among socially anxious or privately/publically self-conscious individuals who habitually allocate attention toward self-relevant thoughts. Self-conscious individuals may react to self-focus in entirely different ways than the general population. According to Turner (1980), only such individuals would be prone to spontaneously rely on a strategy of using the self as an encoding tool without prompting. Future studies should attempt to examine directly the cognitions of participants who are approaching a task under self-focus or evaluation conditions in order to elucidate the strategy-planning process induced by these manipulations. It remains to be seen if the priming effect is real and under which circumstances it may appear. What the present results do is to add further support to the notion that the evaluative processes associated with self-focus affect performance by changing the strategy used by individuals, so that they can achieve a good match to performance standards and obtain positive evaluations.

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## Η επίδραση της εστιαζόμενης στον εαυτό προσοχής στην αναγνώριση ερεθισμάτων σχετικών ή άσχετων με τον εαυτό

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### ΠΕΡΙΛΗΨΗ

Η εστιαζόμενη στον εαυτό προσοχή αυξάνει την αντίληψη του εαυτού ως αντικείμενου και απορροφά αντιληπτικούς πόρους. Η κατάσταση αυτή διευκολύνει την επίδοση σε καλά μαθημένα έργα και την ανάκληση πληροφοριών σχετικών με τον εαυτό, αλλά δυσχεραίνει την επίδοση σε δύσκολα έργα, ιδιαίτερα σε άτομα με αυξημένο άγχος αξιολόγησης. Η παρούσα έρευνα μελετά την επίδραση της εστιαζόμενης στον εαυτό προσοχής και της επίγνωσης αξιολόγησης σε ένα γνωστικό έργο που περιλαμβάνει την αναγνώριση λέξεων οι οποίες είχαν παρουσιαστεί προηγουμένως, σε δείγμα του γενικού πληθυσμού. Οι λέξεις διέφεραν ως προς τη σχετικότητα τους με έννοιες του εαυτού. Με βάση προηγούμενα ευρήματα, αναμενόταν ότι η εστιαζόμενη στον εαυτό προσοχή και η επίγνωση αξιολόγησης θα διευκόλυναν την επίδοση, αφού το έργο ήταν εύκολο και οι συμμετέχοντες δεν είχαν αυξημένο άγχος αξιολόγησης. Η εναλλακτική υπόθεση ήταν ότι οι μεταβλητές αυτές θα βελτίωναν την επίδοση μόνο για τις λέξεις που σχετίζονταν με τον εαυτό. Τα αποτελέσματα έδειξαν ότι η εστιαζόμενη στον εαυτό προσοχή μαζί με την επίγνωση αξιολόγησης αύξησαν την τάση των συμμετεχόντων να δηλώνουν ότι αναγνώρισαν λέξεις απόσπασης (λανθασμένη αναγνώριση). Φαίνεται ότι οι μεταβλητές αυτές αυξάνουν την πίστη για καλή επίδοση και επιδρούν στη στρατηγική με την οποία τα άτομα προσεγγίζουν το έργο, ώστε να αποσπάσουν θετικότερη αξιολόγηση, αλλά όχι στην ίδια τη μνήμη. Στην προκειμένη περίπτωση, οι συμμετέχοντες δήλωσαν ότι αναγνώρισαν περισσότερες λέξεις, έστω και εάν αυτές ήταν λανθασμένες.

Λέξεις κλειδιά: Προσοχή εστιαζόμενη στον εαυτό, Αναγνώριση, Μνήμη.

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