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PERSONALITY AND
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The associations between Self-Criticism and Dependency and incidental learning of interpersonal and achievement words

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Abstract

Personality trait-congruent implicit content processing was studied experimentally. In Experiment-1 ($N = 132$), individual differences in Self-Criticism were most strongly associated with incidental learning of negative achievement words, whereas individual differences in Dependency were most strongly associated with incidental learning of negative interpersonal words. In Experiment-2 ($N = 172$), individual differences interacted with processing tendencies in predicting negative affect. Highly dependent and highly self-critical individuals experienced higher negative affect if they were low in incidental learning of positive interpersonal words. Overall, these findings indicate that Self-Criticism and Dependency have significantly differential impacts on implicit cognitive processes.

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Keywords: Self-Criticism; Dependency; Automatic thoughts; Negative affect; Memory

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1. Introduction

Studies of personality in the context of information processing suggest two competing hypotheses. First, that processing tendencies are correlated with individual differences (e.g., Eisenberger, Lieberman, & Satpute, 2005). Second, that processing tendencies are independent of individual differences but interact with them to predict affective outcomes (e.g., Robinson, Ode, Wilkowski, & Amodio, 2007). The experiments presented in this paper were designed to test these hypotheses by examining associations between Dependency and Self-Criticism and the unintentional learning of positive and negative interpersonal and achievement stimuli words.

Blatt (1991) characterized personality development as the integration of a person's capabilities for self-definition (Self-Criticism) and for interpersonal relatedness (Dependency). The self-definition process relates to "the development of a realistic, essentially positive and increasingly integrated self-definition and self-identity" (Blatt, 1991, p. 453). The interpersonal relatedness process is defined as "the development of the capacity to establish increasingly mature, reciprocal and satisfying interpersonal relationships" (Blatt, 1991, p. 453). Excessive emphasis on either the relatedness or the self-definition dimension has been considered a vulnerability factor to depression (e.g., Beck, 1987; Besser, 2004; Besser & Priel, 2003, 2005). Individuals high in Dependency are hypothesized to be at risk for developing negative affectivity when they perceive disruptions in their relationships with others, interpersonal loss, or social rejection. Individuals high in Self-Criticism are hypothesized to be at risk for developing negative affectivity when they perceive that they are not meeting such standards.

In 1992, Blatt and Zuroff proposed that dependent and self-critical individuals have marked differences in the way they perceive and interpret the social world (for reviews, see Blatt, 2004; Corveleyn, Luyten, & Blatt, 2005). This selective processing would also explain, in part, why dependent individuals are more at risk for distress following negative interpersonal events, whereas self-critical individuals would be more at risk for distress following negative events of failure and loss of self-esteem (the so-called *congruency-hypothesis*). However, results from research on the congruency hypothesis are mixed (see e.g., Blatt, 2004; Corveleyn et al., 2005), probably because dependent and self-critical individuals may show marked differences in the way they interpret life experiences: a negative life event can be interpreted by one individual as threatening self-worth (a negative achievement event) and by another as a threat to interpersonal relationships (a negative interpersonal event). Existing experimental studies used situational stressors defined *a priori* as related to achievement or interpersonal issues, and therefore did not control for the subjectivity of participants' interpretations of failure versus rejection (e.g., Mazure, Bruce, Maciejewski, & Jacobs, 2000).

To further investigate the role of selective information processing related to Dependency and Self-Criticism we compared participants' self-reports with their unintentional cognitive processing of stimuli words expressing threats to achievement goals or to interpersonal relatedness. We used a Stroop-like color identification task followed by an unanticipated recognition test. This paradigm allowed us to examine the *recognition of relevant words without intentional learning* or encoding-intentional retrieval task (see Perlman & Tzelgov, 2006) that involved the presentation of a word list, without asking participants to read, memorize, or otherwise process the presented words. We investigated cognitive biases in the processing of four contents: two negative contents – negative interpersonal (rejection) and negative achievement (failure) words; and two positive contents – positive interpersonal (relatedness) and positive achievement (success) words (available upon request from first author). After the Stroop-like color identification task, participants were presented with

an unanticipated recognition test. Higher incidental learning in the color-naming stage (especially of negative words) was expected to result in better memory performance (intentional retrieval).

Previous studies of memory facilitation reported memory biases for personally meaningful content (see e.g., Williams, Mathews, & MacLeod, 1996). Studies on sociotropy/autonomy vulnerabilities to depression (Beck, 1987), provided some evidence for a biased processing in the study of memory (Moore & Blackburn, 1993), and not in a Stroop task *attention* study (Nunn, Mathews, & Trower, 1997) among depressed patients.

Accordingly, we assumed that individual stresses on self-critical and dependent personality schemas would facilitate memory performance for items congruent with the individual's personality organization as compared with items of lower personal relevance. It was expected that self-critical and dependent individuals would present better memory for negative achievement and interpersonal contents, respectively.

Recent studies have suggested the presence of mood-regulatory processes in which people retrieve positive memories to moderate negative moods (e.g., Joormann & Siemer, 2004). This mechanism might also be related to the protective role of retrievals of positive interpersonal relationships, which has been found to mitigate both dependent and self-critical individuals' depressive feelings (e.g., Priel & Besser, 2000). We therefore also tested whether cognitive readiness to process positive interpersonal stimuli might play a buffering role in the Dependency/negative mood association, and that cognitive readiness to process positive achievement stimuli might play a buffering role in the Self-Criticism/negative mood association.

Our main assumption was that participants performing the color-naming task would process word contents unintentionally (automatically), and that this unintentional processing would produce differential levels of incidental learning (memory). In addition, in order to take into account individual differences, also reaction times (RT) were monitored and recorded. However, it is important to notice that emotional Stroop RT effects tend to be less robust in normal populations compared to clinical ones, and interference effects in normal subjects have been rarely reported in studies using the emotional Stroop task (e.g., Sharma & McKenna, 2001). Significant differences in RT were therefore not expected, and the mean RT was expected to fall within the typical range for this task.

2. Experiment-1

The main aims of the first experiment were (a) to investigate the efficacy of the incidental learning manipulation and (b) to explore the incidental learning of personality congruent words.

Hypothesis 1. Within each word content category (achievement or interpersonal), the memory performance (incidental learning) for the negative word contents was expected to be significantly higher than for the positive word contents. This hypothesis follows the consensual finding in the implicit learning literature that there is a general, automatic processing advantage for negative words (e.g., Matthews, Pitcaithly, & Mann, 1995) as well as psychophysiological findings that negative contents greatly accelerate recognition memory compared to positive and neutral contents (e.g., Midori, Michio, & Hideki, 2005).

Hypothesis 2. Self-Criticism and Dependency scores will be significantly and positively associated with incidental learning for the congruent negative achievement and negative interpersonal content words, respectively.

2.1. Method

2.1.1. Participants

A sample of 132 undergraduate students (62 men, 70 women) took part in Experiment-1 for course credit. Participants were native speakers without color blindness or learning disabilities. The mean age of the participants was 23.92 years ($SD = 2.30$).

2.1.2. Measures and procedure

The experiment was conducted in two sessions. In the first session, participants completed the Depressive Experiences Questionnaire (DEQ) only. In the second session, conducted by a research assistant blind to participants' vulnerability scores, each participant was given instructions for the color naming/Stroop-like task that was used as an unintended learning manipulation. Participants were introduced to the task as a "color perception task" in which they would be presented a word in one of four colors at the center of the screen. Their task was to ignore the words and respond to the colors as quickly and as accurately as possible by pressing one of four computer keys. The Stroop-like task was used to present and prime the critical words (incidental encoding stage). Later, after completing an interpolation task, participants were asked to recognize the words that had been used among an equal number of analogous distractor words (by pressing a "yes/no" button) in an unanticipated explicit recognition test (retrieval stage).

2.1.3. Personality measure

The DEQ (Blatt, D'Afflitti, & Quinlan, 1976) is a 66-item scale that yields orthogonal factors for Dependency and Self-Criticism. The Dependency factor reflects a preoccupation with abandonment and separation, feelings of being unloved, and fear of loss. Self-Criticism reflects concerns about failure and guilt, self-criticism, and being unable to meet high standards set by the self and by others. Internal consistency and test–retest reliability are adequate (see Blatt, 2004). Items were converted to z scores and multiplied by the factor weight coefficient according to national norms (Priel, Besser, & Shahar, 1998). In the present sample, we obtained an internal consistency reliability coefficient of $\alpha = .90$.

2.1.4. Experimental stimuli

Stimuli for the experimental tasks included five lists of 20 words. The lists consisted of positive and negative achievement and interpersonal words, as well as neutral words.¹ All partici-

¹ The lists of primed positive and negative achievement and interpersonal words were created as follows: Ten undergraduate psychology students listed (in Hebrew) as many positive and negative interpersonal and achievement words as possible. For the neutral words, we used office equipment words taken from lists of categories of Hebrew norms (Henik, Rubinstein, & Anaki, 2005). Four independent judges (experts), blind to the aims of the study, classified all words obtained. The judges were given a list of 200 randomly listed words and were asked to classify each word into one of five possible groups (positive interpersonal, positive achievement, negative interpersonal, negative achievement, neutral). The criterion for including a word in the experiment was 100% agreement on classification among the judges. The final list included 100 words, 20 in each of the five content categories. We counterbalanced the words in terms of written frequency.

pants were exposed to all five types of words. Each list was randomly divided in half. Ten words were presented in the color naming/Stroop-like task and also used as target words in the recognition test. The other 10 words were used as distractors for the recognition test. In both tasks, order of presentation and target-distractor lists were counterbalanced between subjects.

2.1.5. *Incidental learning phase for valence words using a Stroop-like task*

The task was performed using the following word contents: positive achievement, negative achievement, positive interpersonal interaction, negative interpersonal interaction, and neutral. All the neutral words were all from the same category (office equipment) to avoid possible interim priming effects (Williams et al., 1996).

Participants sat approximately 60 cm from the computer's screen. The stimuli were 1.5 cm high and 4 cm wide. The presentation timing was controlled by the computer, which stored the responses of all participants (RT in milliseconds). Each stimulus was presented at the center of a black screen and remained until a response was made. Following the participant's response, a fixation point appeared on the screen for 300 ms, a blank screen was presented for another 300 ms, and then the next stimulus was presented. Responses were made by pressing one of four colored buttons on a keypad: red, blue, yellow, or green.

Each of the 50 target words (10 in each category) appeared four times, in a different color each time. The presentation of the 200 words was random, with the constraint that no word or color appeared twice in succession.

2.1.6. *Test phase: memory recognition test*

In order to eliminate the recency effects on recall (Glanzer & Cunitz, 1966), after the color-naming task, participants completed an interpolation activity for 40 s. Participants had to count backward by sevens from a randomly generated three-digit number that appeared on the screen. Then, they were given an unanticipated recognition test for the words that they had been instructed to ignore during color identification. They were instructed to decide whether each test stimulus had been in the color-naming task they had just completed, and to press a "yes" or "no" button in response. The test stimulus (in white/natural color) remained on the screen until the participant responded, or for up to 2.5 s, after which a black screen remained until a response was made. Only then did the next stimulus appear. The recognition test included 50 target words that had been presented in the color-naming/Stroop-like task phase (10 from each category) and 50 distractors (10 from each category).

The proportion of hits minus false alarms which was computed for each condition (word category) is a standard measure of accuracy of recognition without intentional learning. Higher scores indicate greater incidental learning of semantic contents at the simple color-naming stage. This equated all the conditions in the recognition tests with respect to the scale used, from chance performance at 0.0 (0%) to the highest score of 1.0 (100%). Finally, when participants completed the recognition test, they were asked to report whether they anticipated having this recognition test while performing the color-naming task. All participants reported that the recognition test was unexpected.

2.2. Results and discussion

2.2.1. Color identification

Mean color identification times were analyzed using repeated measures ANOVA, with word type as a within subjects factor and RT as the dependent variable.² The results were as follows: positive achievement, $M = 642.0$, $SD = 85.3$; negative achievement, $M = 640.2$, $SD = 80.7$; positive interpersonal, $M = 635.4$, $SD = 77.8$; negative interpersonal, $M = 643.2$, $SD = 81.8$; and neutral, $M = 641.6$, $SD = 85.9$. Analysis revealed no differences among the RTs for the different word types ($F_{[4,524]} = 1.42$, $p = .23$), and the overall mean RT was typical for this task in nonclinical samples (see, e.g., MacLeod, 2000; MacLeod & Dodd, 2001). Results demonstrate that participants did not differentially slow down to read or memorize the different semantic category words intentionally.

2.2.2. Recognition

The mean percentages of recognition without intentional learning on the incidental learning manipulation (incidental learning level, abbreviated as ILL) were analyzed using repeated measures ANOVA, with word type (positive interpersonal, negative interpersonal, positive achievement, negative achievement, neutral) as a within subjects factor and the mean percentages of recognition without intentional learning on the incidental learning manipulation as the dependent variable. This procedure showed a main effect of word type, $F_{[4,524]} = 7.99$, $p < .0001$ (see Fig. 1). *Post hoc* tests showed that participants displayed higher ILL for negative achievement words than for positive achievement words ($F_{[1,131]} = 13.76$, $p < .0003$), and higher ILLs for negative interpersonal words than for positive interpersonal words ($F_{[1,131]} = 7.90$, $p < .0057$). Overall, *post hoc* contrasts indicated that participants displayed higher ILLs for negative than for positive words ($F_{[1,131]} = 22.98$, $p < .0001$); the ILLs for neutral words fell in between.

These findings suggest that the unintentional processing of the words in the list affects the recognition of personality-related content congruent semantic domains. The affective charge of a stimulus word seems to affect retention even when a subject's attention has not focused on it during encoding, confirming the assumption that contents in awareness are a subset of a greater set of contents that affect behavior and may explain pathology (Bowers, 1984).

The second objective of the study was to explore whether assessments of individuals' explicit Self-Criticism and Dependency vulnerabilities were associated with the recognition of incidentally learned achievement and interpersonal word contents. We first correlated color-naming RT by personality types and obtained no associations between Self-Criticism or Dependency and the word types RTs ($r_{s[132]}$ ranged from .00 to $|.15|$, ns).

2.2.2.1. Zero order correlations. Table 1 presents the zero order correlations between personality vulnerabilities (Self-Criticism and Dependency) and recognition without intentional learning (incidental learning) for the word valence and content categories. Dependency and Self-Criticism

² Ulrich and Miller (1994) recommended that extreme RTs should not be removed because this may introduce considerable bias. Therefore, RTs were analyzed for all correct responses. Both mean and median RTs (which are likely to be more stable) were analyzed, but because these analyses produced the same pattern of results, only mean RTs are reported.

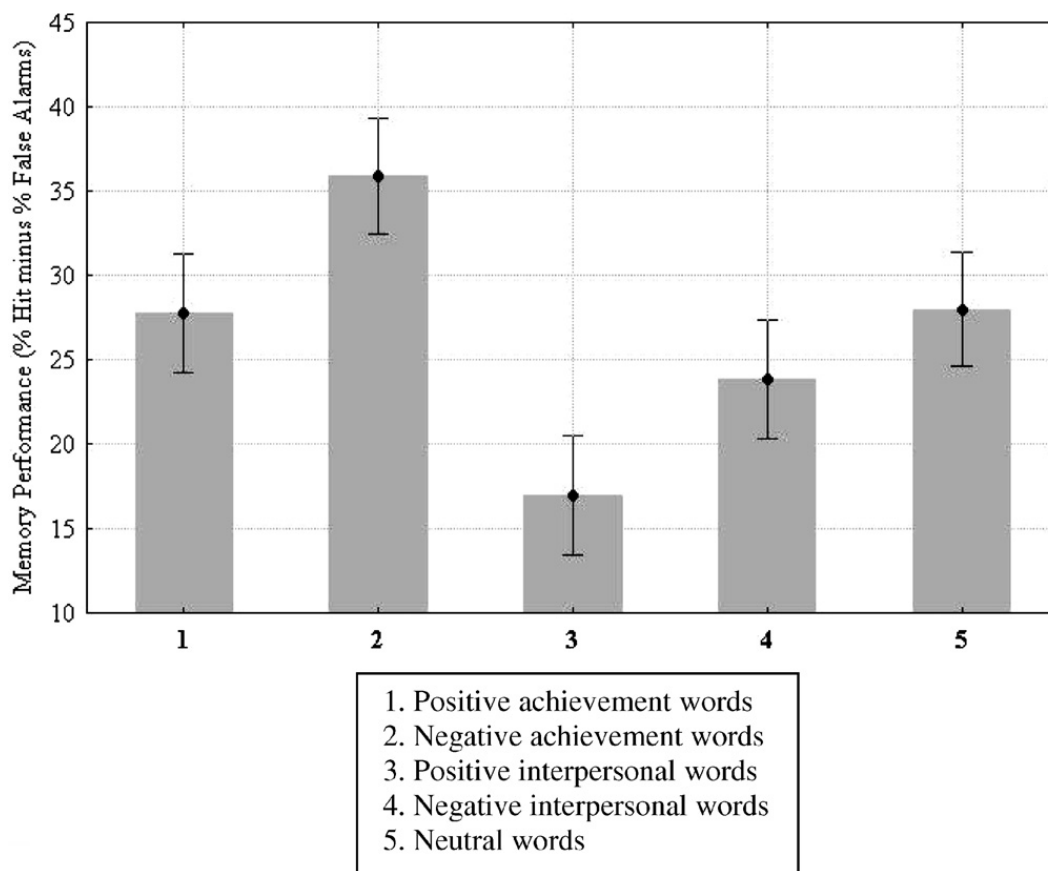


Fig. 1. Means (\pm SD) for IL (memory performance; % hits minus % false alarms) for the word types in Experiment-1 ($N = 132$). *Note.* The mean of the proportion of hits minus false alarms, separately for each of the five semantic categories, were computed for each participant. The results were as follows: positive achievement, $M = 23.49$, $SD = 24.56$; negative achievement, $M = 32.58$, $SD = 25.07$; positive interpersonal, $M = 19.02$, $SD = 20.11$; negative interpersonal, $M = 25.68$, $SD = 23.77$; and neutral, $M = 27.73$, $SD = 21.95$. Means for memory performance were each tested against zero as a reference constant and found to be significantly different than zero: $t[131] = 10.99$, $p < .0001$, $t[131] = 14.93$, $p < .0001$, $t[131] = 10.86$, $p < .0001$, $t[131] = 12.41$, $p < .0001$ and $t[131] = 14.51$, $p < .0001$ for mean memory performance of primed positive achievement, negative achievement, positive interpersonal, negative interpersonal, and neutral words, respectively.

were not correlated ($r_{[132]} = .08$, ns). Correlations between Dependency and ILL for negative interpersonal words ($r_{[132]} = .28$, $p < .001$) and for Self-Criticism and ILL for negative achievement words ($r_{[132]} = .37$, $p < .0001$) were significant.

2.2.2.2. Regression analyses. To determine the unique and stronger association between Self-Criticism or Dependency and ILL for word type, while taking into account individual differences in ILLs for the words types, we regressed all five scores of memory performance for the words types, once on Dependency and once on Self-Criticism. Results indicated that the only correlative for Dependency was ILL for negative interpersonal words ($\beta = .21$, $t_{[126]} = 2.34$, $p < .002$; $F_{[5,126]} = 4.117$, $p < .0017$; $R = .37$, $R^2 = .14$, Adjusted $R^2 = .11$), and the only correlative for Self-Criticism was ILL for negative achievement words ($\beta = .32$, $t_{[126]} = 3.55$, $p < .0006$;

Table 1

Zero order correlations among Self-Criticism, Dependency, and IL of word valence and content domain categories: for Experiment-1 ($N = 132$)

Domain	Word valence and content category				
	Achievement		Interpersonal		
	Positive	Negative	Positive	Negative	Neutral
Dependency	.21, $p < .02$.14, ns	.25, $p < .01$.28, $p < .001$.19, $p < .03$
Self-criticism	.19, $p < .03$.37, $p < .0001$.20, $p < .02$.18, $p < .04$.07, ns

Note. To insure that the overall chance of making a Type I error was still less than .05, a full Bonferroni correction was applied; bolded estimates are still significant after this correction ($p < .001$; two-tailed tests).

$F_{[5,126]} = 4.602$, $p < .0007$; $R = .39$, $R^2 = .15$, Adjusted $R^2 = .12$). These results replicate the zero order correlations.

Both the regression analyses conducted on ILLs of words in the Negative or Positive valence category (regardless of their content domain), and those on ILLs of words in the primed Achievement or Interpersonal domains (regardless of their valence) revealed that Dependency was associated with higher ILLs for the relationship words ($\beta = .30$, $t_{[129]} = 3.33$, $p < .0011$), but not with higher ILLs for the achievement words ($\beta = .09$, $t_{[129]} = 0.10$, $p > .34$), and with higher ILLs for the negative words ($\beta = .20$, $t_{[129]} = 2.09$, $p < .04$), but less so for the positive words ($\beta = .17$, $t_{[129]} = 1.83$, $p < .06$).

Self-Criticism was associated with higher ILLs for the achievement words ($\beta = .29$, $t_{[129]} = 3.16$, $p < .0019$) but not with higher ILLs for the relationship words ($\beta = .13$, $t_{[129]} = 1.39$, $p > .17$), and was associated with higher ILLs for the negative words ($\beta = .32$, $t_{[129]} = 3.40$, $p < .0009$), but not for the positive words ($\beta = .09$, $t_{[129]} = .92$, $p > .36$).

The results of Experiment-1 indicated that Self-Criticism associates with high incidental learning of negative achievement words, whereas Dependency associates with high incidental learning of negative interpersonal words. Both Self-Criticism and Dependency were associated with high incidental learning of negative words in both content domains. Furthermore, Self-Criticism was associated with higher levels of incidental learning of words in the Achievement domain whereas Dependency was related to higher levels of incidental learning of words in the Interpersonal domain. These results also may shed light on the congruency hypothesis: if dependent and self-critical individuals attend to different experiences, then it can be expected that they are vulnerable to different events.

Our results indicated that although there are no significant differences in RTs for the different word types, and personality variables were not significantly associated with the different RTs, they were however significantly associated with the incidental learning of congruent words. These findings are in line with conclusions from studies proposing the automaticity of reading (e.g., Tzelgov, 1997), as well as in line with conclusions that cognitive biases in *memory* process are more commonly related to vulnerability to depression as compared to biased *attentional* process (Williams, Watts, MacLeod, & Mathews, 1997).

3. Experiment-2

The aims of Experiment-2 were the replication of Experiment-1 and the investigation of the following hypotheses:

Hypothesis 1. Self-Criticism and Dependency will be significantly associated with participants' negative affect.

Hypothesis 2. High incidental learning levels for domain-congruent positive content and low incidental learning levels for domain-congruent negative content words will moderate the Self-Criticism or Dependency associations with negative affect.

3.1. Method

3.1.1. Participants

A sample of 172 undergraduate students (81 men and 91 women) took part in the experiment for course credit. Eligible participants were native speakers without color blindness or learning disabilities. The mean age of the participants was 23.20 years ($SD = 1.80$).

3.1.2. Procedure

The personality measure, experimental stimuli, and study and test phase procedures were identical to those in Experiment-1, with a single modification: Immediately after completing the recognition test, participants were instructed to complete the Visual Analogue Scale (VAS). This measure was administered as the final task to avoid the plausible priming effect of the VAS mood words on the participants' performance in the personality measure, the color-naming task, or recognition performances.

3.1.3. State mood measure

Current state mood was assessed using the VAS (Albersnagel, 1988), composed of 18 mood adjectives. Participants were asked to indicate how they were feeling "at the moment" by placing a vertical mark on each 80 mm line anchored at 0% and 100% with opposing labels for each adjective (e.g., *not at all sad* to *extremely sad*). The four affective states assessed were: dysphoria, (depressed, sad, blue, lost), hostility (hostile, irritable, annoyed, disagreeable), anxiety (anxious, nervous, uneasy, tense), and positive affect (happy, glad, pleased, cheerful). The α coefficients were .83 for dysphoria, .79 for hostility, .86 for anxiety, and .82 for positive affect.

3.2. Results and discussion

3.2.1. Preliminary analyses

Analysis of Rts showed no significant differences ($F_{[4,684]} = .062, p = .99$) among the RTs for the different word types (positive achievement, $M = 634.8, SD = 84.2$; negative achievement, $M = 634.4, SD = 95.7$; positive interpersonal, $M = 635.6, SD = 87.7$; negative interpersonal, $M = 635.8, SD = 82.7$; and neutral, $M = 635.1, SD = 85.1$). Analysis of the effectiveness of the experimental manipulation (i.e., recognition) showed a main effect of word type, $F_{[4,684]} = 20.57, p < .0001$ (see Fig. 2) and replicated Experiment-1 results. The associations of participants' explicit Dependency and Self-Criticism scores with their recognition of incidentally learned achievement and interpersonal word contents also replicated Experiment-1 results (see Table 2). Overall preliminary analyses replicated the findings of Experiment-1 (detailed analyses are available upon request).

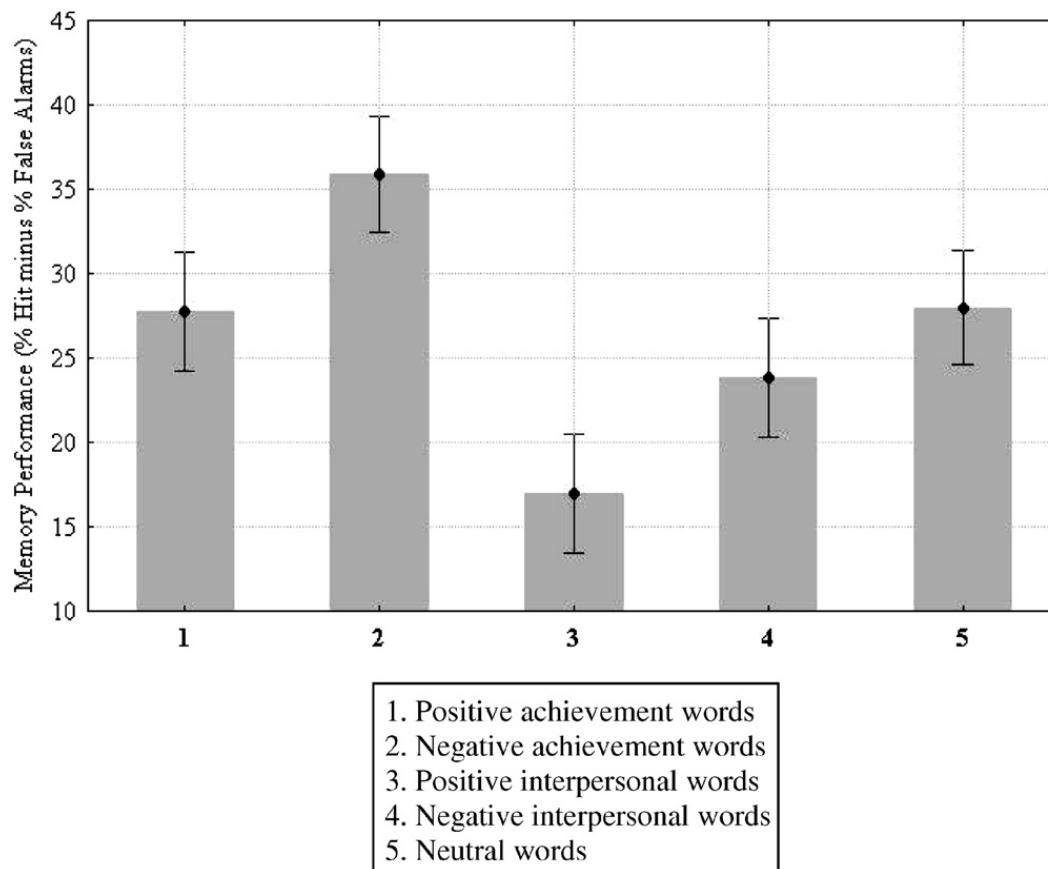


Fig. 2. Means (\pm SD) for IL (memory performance; % hits minus % false alarms) for the word types in Experiment-2 ($N = 172$). *Note.* The mean of the proportion of hits minus false alarms, separately for each of the five semantic categories, were computed for each participant. The results were as follows: positive achievement, $M = 27.74$, $SD = 23.50$; negative achievement, $M = 35.87$, $SD = 22.89$; positive interpersonal, $M = 16.98$, $SD = 23.40$; negative interpersonal, $M = 23.84$, $SD = 23.63$; and neutral, $M = 27.97$, $SD = 22.50$. Means for memory performances were each tested against zero as a reference constant and found to be significantly different than zero: $t[171] = 15.48$, $p < .0001$, $t[171] = 20.56$, $p < .0001$, $t[171] = 9.52$, $p < .0001$, $t[171] = 13.23$, $p < .0001$ and $t[171] = 16.30$, $p < .0001$ for mean memory performance of primed positive achievement, negative achievement, positive interpersonal, negative interpersonal, and neutral words, respectively.

3.2.2. The role of unintentional learned words in the Self-Criticism/Dependency and negative mood associations

The main objective of this study was to explore whether the associations between individuals' self-reported personality vulnerabilities and levels of Composite Negative Affect Score would be moderated by the achievement and interpersonal schemas revealed by the incidental learning of the positive and negative interpersonal and achievement word contents.

Scores for dysphoria, anxiety, and hostility were highly correlated ($r_s > .60$, $p_s < .0001$). Factor analysis of these three scales revealed that all three loaded substantially (greater than .85) on a common factor with an eigenvalue of 3.1, accounting for 74.13% of the total variance. Standardized scores of the obtained factor were computed. We will refer to this standardized score as the Composite Negative Affect Score (CNAS). Correlational analyses revealed correlations between

Table 2

Zero order correlations among Self-Criticism, Dependency, and IL of word valence and content domain categories: for Experiment-2 ($N = 172$)

Domain	Word valence and content category				
	Achievement		Interpersonal		
	Positive	Negative	Positive	Negative	Neutral
Dependency	.16, $p < .04$	-.01, ns	.10, ns	.26, $p < .001$.08, ns
Self-Criticism	.06, ns	.32, $p < .0001$	-.00, ns	.17, $p < .03$	-.00, ns

Note. To insure that the overall chance of making a Type I error was still less than .05, a full Bonferroni correction was applied; bolded estimates are still significant after this correction ($p < .001$; two-tailed tests).

self-reported personality vulnerabilities and levels of CNAS ($r_{[172]} = .17, p < .02$ and $r_{[172]} = .25, p < .001$ for Dependency and Self-Criticism, respectively). Correlational analyses revealed, however, no associations between ILLs for any of the word types and state mood levels or CNAS ($r_{s[172]}$ ranged from .00 to $|.14|$, ns), thus eliminate possible mediational effect for ILLs in the personality/mood associations.

To explore the role of the incidental learning of positive and negative interpersonal and achievement contents in moderating the associations between self-reported Self-Criticism and Dependency with CNAS, a hierarchical multiple regression was performed with interactions represented by product terms (Aiken & West, 1991). This analysis tested the effects of the interactions between ILLs for word type and Self-Criticism and Dependency on the CNAS. In Step 1, we entered the ILLs for word types, including the ILLs for neutral word type, and the personality variables (Self-Criticism and Dependency scores). In Step 2, we added the two-way interactions.

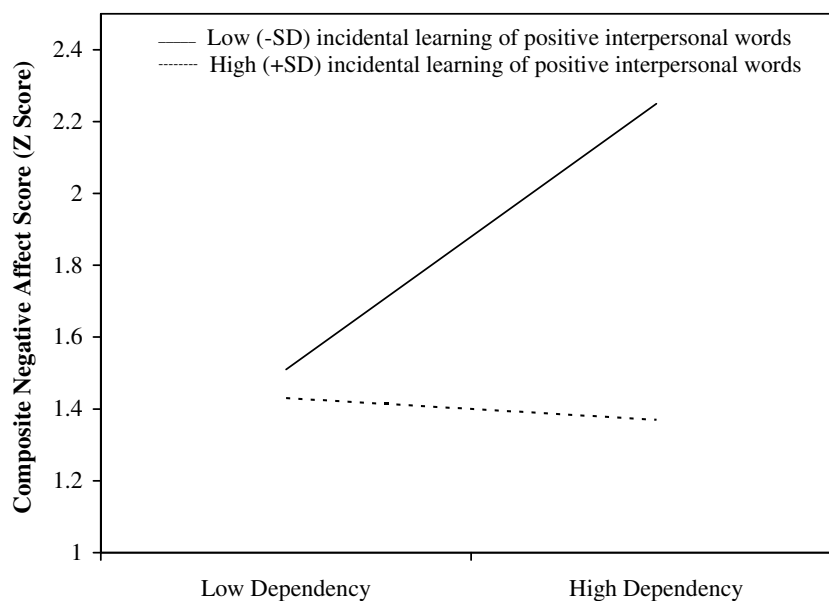


Fig. 3. The association between high (+SD) and low (-SD) Dependency and CNAS for high (+SD) and low (-SD) IL of positive interpersonal words.

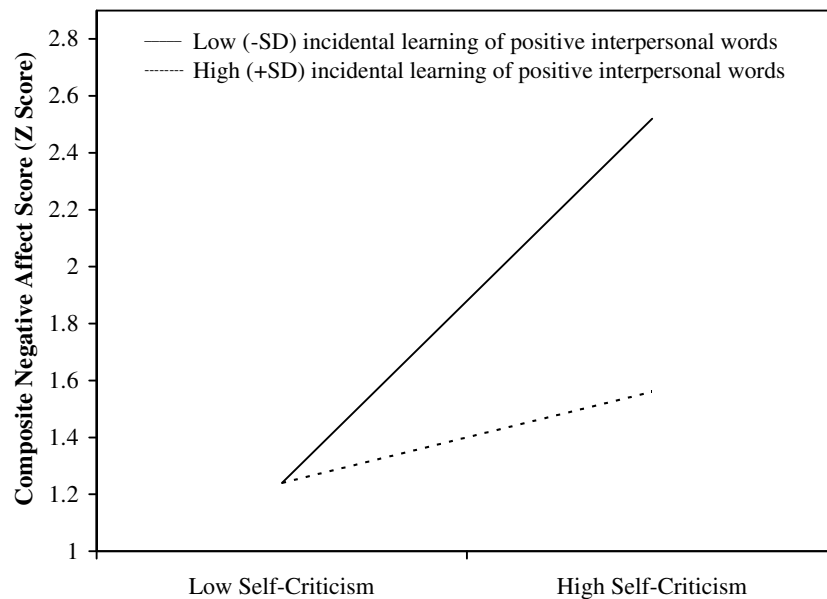


Fig. 4. The association between high (+SD) and low (–SD) Self-Criticism and CNAS for high (+SD) and low (–SD) IL of positive interpersonal words.

Variables were centered prior to the computation of the product terms. We used the procedures suggested by Aiken and West to plot the interaction effects (see Figs. 3 and 4). The regression yielded two significant two-way interactions: (a) for Dependency \times ILLs for primed positive interpersonal words ($\beta = -.21$, $t_{[154]} = -2.11$, $p < .05$), and (b) for Self-Criticism \times ILLs for the primed positive interpersonal word type ($\beta = -.23$, $t_{[154]} = -2.78$, $p < .04$). These interactions added a significant 10% to the explained variance in CNAS ($F_{\text{change}} = 2.10$, $p < .05$). The overall model explained 18% of the variance in CNAS ($F_{[17,154]} = 2.39$, $p < .005$; $R = .43$, $R^2 = .18$, Adjusted $R^2 = .11$).

As can be seen in Figs. 3 and 4, higher levels of incidental learning for positive interpersonal words moderate the associations between Self-Criticism or Dependency and CNAS; both Self-Criticism and Dependency were associated with significantly lower CNAS among participants with higher ILL for the positive interpersonal words than among participants with lower ILL for the positive interpersonal word type.

4. General discussion

Results confirmed the assumed unintended selective processing of supraliminal presented negative words: We found higher incidental learning of negative than of positive words, independently of their content, as well as within each content category. Moreover, the results confirmed the existence of congruent selective processing among dependent and self-critical individuals. Selective information processing, may hence lead to differential activation of latent schemes, which may be involved in explaining the congruency hypothesis. A plausible explanation might be that Levels of Self-Criticism and Dependency are associated with the unintentional acti-

vation of negative cognitive structures or schemas that are relevant in their content to the participants' vulnerability.

Although Self-Criticism and Dependency were associated with negative mood, the unintentional processing of emotional stimuli was not. These findings indicate that the affective significance of congruent stimuli among self-critical and dependent individuals might operate automatically and depend on implicit cognitive processing. Apparently, mood congruent and concern-related material does not mediate self-critical and dependent constellations' associations with negative mood, but rather, these personality tendencies activate both the relevant cognitive schemas as well as negative affectivity. As this part of our study is correlative, it is plausible that both negative mood and memory recognition performance result from individual differences in personality vulnerabilities. It seems possible that the activation of a specific negative implicit cognition that associates with mood might require the presence of a specific congruent negative stress, and not just the exposure to specific word contents. Further studies are needed that manipulate interpersonal and achievement stress situations (separation, loss, failure) while assessing the automatic processing of vulnerability-congruent contents. Moreover since in our study a measure of state negative mood was used, further studies are needed that focus on clinical depression.

With this limitation in mind, a noteworthy result of the current investigations involved the buffering role of positive interpersonal words. Consistent with our expectations, the unintentional processing of positive interpersonal stimuli moderated the association between Dependency and negative affectivity. However, unexpectedly, interpersonal stimuli also moderated this association among high self-critics, while positive achievement stimuli did not. Thus, although people high in vulnerabilities to depression focus on negative images and words, the ability to also automatically process positive interpersonal stimuli seems to associate with better outcomes. The color-naming/Stroop-like paradigm might provide an appropriate means of assessing vulnerabilities as well as resilience factors as revealed in their automatic processing. The current results confirm the assumption that unconscious mental structures (e.g., latent schemata) can be studied as they are activated in an unintentional, subliminal manner.

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