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Tuijl, L.A. van; Bennik, E.C.; Penninx, B.W.J.H.; Spinhoven, P.; Jong, P.J. de

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# Predictive Value of Implicit and Explicit Self-Esteem for the Recurrence of Depression and Anxiety Disorders: A 3-Year Follow-Up Study

Lonneke A. van Tuijl  
University Medical Center Groningen

Elise C. Bennik  
University of Groningen

Brenda W. J. H. Penninx  
Amsterdam University Medical Center

Philip Spinhoven  
Leiden University and Leiden University Medical Centre

Peter J. de Jong  
University of Groningen

Anxiety and depressive disorders are characterized by high rates of recurrence, substantially contributing to the high burden associated with these disorders. It is therefore crucial to identify factors related to recurrence, as they may provide viable targets for preventative intervention. Previous studies have observed a link between low self-esteem and subsequent symptoms of depression and anxiety, and low levels of self-esteem in those recovered from a depression or an anxiety disorder. Research also suggests that it is crucial to differentiate more explicit self-esteem (ESE) from more implicit self-esteem (ISE). The current study is the first to test whether ISE and ESE predict recurrence of depression and recurrence of anxiety during a 3-year follow-up as determined with clinical interviews. The sample included those with a history of a depressive disorder ( $n = 559$ ) and/or a history of an anxiety disorder ( $n = 458$ ) who had been depression- and anxiety-free for at least six months at baseline. During the 3-year follow-up, 119 (21%) and 104 (23%) had a depression and anxiety recurrence, respectively. ISE predicted recurrence of both depression and anxiety, even when statistically controlling for residual symptoms and neuroticism at baseline. ESE also showed predictive value, although this was not over and above residual symptoms. Explorative analyses suggest that ESE and ISE improved little, or not at all, from currently having a depression or anxiety disorder to recovery. These results therefore suggest that ISE may be an important target for interventions to prevent the recurrence of both depression and anxiety disorders.

## General Scientific Summary

Implicit self-esteem refers to automatic and potentially subconscious levels of self-esteem, whereas explicit self-esteem tends to be the result of more purposeful and conscious consideration of one's ability and worth. In the present study, specifically implicit self-esteem predicted the recurrence of depression and anxiety in a sample of individuals who had recovered from a previous depression and/or anxiety.

**Keywords:** depression, anxiety, recurrence, self-esteem, implicit

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 Lonneke A. van Tuijl, Department of Health Psychology, University Medical Center Groningen, University of Groningen; Elise C. Bennik, Department of Clinical Psychology and Experimental Psychopathology, University of Groningen; Brenda W. J. H. Penninx, Department of Psychiatry, Amsterdam University Medical Center, Vrije Universiteit; Philip Spinhoven, Institute of Psychology, Section of Clinical Psychology, Leiden University, and Department of Psychiatry, Leiden University Medical Centre;  Peter J. de Jong, Department of Clinical Psychology and Experimental Psychopathology, University of Groningen.

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Correspondence concerning this article should be addressed to Lonneke A. van Tuijl, Department of Health Psychology, University Medical Center Groningen, University of Groningen, HPC FA12, Hanzplein 1, Postbus 30 001, 970 RB Groningen, the Netherlands. E-mail: [l.a.van.tuijl@rug.nl](mailto:l.a.van.tuijl@rug.nl)

Despite several effective treatments, recurrence is a common characteristic of both depression and anxiety disorders (Bruce et al., 2005; Hardeveld, Spijker, De Graaf, Nolen, & Beekman, 2013). Indeed, taking into account also diagnostically unstable recurrence (i.e., recurrence in the form of another anxiety or depression disorder different from the previous disorder), recurrence rates as high as 66.3% have been reported (Scholten et al., 2016). It is clearly crucial to understand who will experience a recurrence and why to optimize currently available recurrence prevention interventions (e.g., Bockting et al., 2018).

In causal models of depression and anxiety, a negative concept of oneself is theorized to play a key causal role not only in the onset of these conditions, but also in their maintenance, relapse, and recurrence (e.g., Beck, 2002; Ingram, 1990). Consistent with these models, a meta-analysis of longitudinal studies observed that (self-reported) low self-esteem is prospectively related to symptoms of depression (weighted mean effect size =  $-.16$ ) and anxiety (weighted mean effect size =  $-.10$ ; Sowislo & Orth, 2013). A series of clinical intervention studies provided more direct evidence for the causal impact of (low) self-esteem on anxiety and depression by showing that cognitive-behavioral therapy for low self-esteem not only resulted in improved self-esteem but also in a reduction in symptoms of both depression and anxiety (Beattie & Beattie, 2018; e.g., Morton, Roach, Reid, & Stewart, 2012; Waite, McManus, & Shafran, 2012). Contributing further to the evidence that self-esteem has a causal influence on the course of symptoms, randomized controlled trials involving patients with depression or anxiety disorders showed that targeting self-esteem resulted in large, positive effects in reducing depression and anxiety, next to the improvements in self-esteem (Korrelboom, Maarslingh, & Huijbrechts, 2012; Staring et al., 2016). Perhaps, then, low self-esteem may also help explain the recurrence of anxiety and depression. Supporting this notion, it has been observed that self-esteem in those who have recovered from a depression or anxiety disorder is still lower than in individuals without a history of depression or anxiety (van Tuijl et al., 2016). It is, therefore, feasible that low self-esteem in recovered individuals may contribute to the recurrence of both depression and anxiety. To determine the relevance of low self-esteem as a causal factor in recurrence, a critical first step is to establish whether self-esteem in individuals who are recovered from a depression or anxiety disorder has predictive value for recurrence. Therefore, the major aim of the current study is to test whether self-esteem at baseline predicts recurrence during a three year-follow-up in a sample of participants with a history of a depression or anxiety disorder.

Based on dual-processing models, research has increasingly differentiated explicit self-esteem from more implicit levels of self-esteem (Greenwald & Farnham, 2000). Explicit self-esteem (ESE) is the outcome following the appraisal of positive or negative self-related propositions in the working memory (i.e., a person is consciously considering the extent of their capabilities, traits, or value; e.g., “I am a failure” is a negative proposition). Low levels of ESE indicate that negative self-related propositions are considered truer reflections of the self (or positive self-related propositions are considered untrue). Self-reported self-esteem questionnaires are therefore measuring explicit self-esteem as respondents purposively consider the relevance of each statement to themselves. Implicit self-esteem (ISE) refers to relatively automatic and not always conscious appraisals of the self. Constructs

(including the “self”) are represented in memory structures, and because of repetitive or strong concurrent activation, bonds develop between constructs (Greenwald & Farnham, 2000). As a result, a construct might be activated in the absence of a direct external trigger, but because an associated construct was activated. ISE is said to be low when the constructs associated to the self, and therefore triggered when the “self” is activated, are mostly negative. Supporting the distinction between implicit and explicit self-esteem, ISE was related to experimenter-rated anxiety behaviors and independent observer-rated spontaneous behaviors of participants during a public speaking task, while ESE was related to self-rated anxiety and nervousness, and controlled behaviors during the public speaking task (Rudolph, Schröder-Abé, Riketta, & Schütz, 2010). Furthermore, neural activity in the reward-related brain regions during passive viewing of participants’ own faces was positively related to their level of implicit self-esteem, but not to explicit self-esteem (Izuma, Kennedy, Fitzjohn, Sedikides, & Shibata, 2018). As such, implicit and explicit self-esteem can be considered distinct constructs with distinct outcomes, and therefore may play distinct roles in the recurrence of depression and anxiety.

Both implicit and explicit self-esteem are theorized to be involved in the etiology of depression (e.g., Beevers, 2005) and anxiety (e.g., Tanner, Stopa, & De Houwer, 2006). ESE is theorized to trigger symptoms of depression and anxiety when the content is negative which may trigger dysfunctional coping strategies in attempt to resolve or understand the negative content (e.g., rumination and worrying). ISE is theorized to trigger symptoms of depression and anxiety where reflective processes are ineffective (e.g., not positive enough to counter the low ISE) or not activated (e.g., because of unawareness, lack of cognitive resources) to correct low ISE. Low ISE may then trigger negative thoughts or behaviors without the individual being aware of the trigger. The few longitudinal studies that have included both measures of ISE and ESE suggest that particularly ISE was related to symptoms of depression, both six months later in formerly- and never-depressed adults (Franck, De Raedt, & De Houwer, 2007), and four months later in undergraduate students with more cognitive vulnerability and more negative life events (Steinberg, Karpinski, & Alloy, 2007). However, it remained untested whether ISE and ESE are risk factors increasing the likeliness of recurrence in individuals with a history of depression or anxiety. Furthermore, as a recent study found that neuroticism could significantly account for the association between depression and (explicit) self-esteem (Mu, Luo, Rieger, Trautwein, & Roberts, 2019), it is important to test the association between self-esteem and recurrence while statistically controlling for neuroticism.

Some studies support the notion that low self-esteem may (also) be a consequence of prior depression and anxiety. Indeed, in the meta-analysis of longitudinal studies focusing exclusively on ESE, both symptoms of depression and symptoms of anxiety predicted levels of self-esteem (weighted mean effect size  $-.08$  for both; Sowislo & Orth, 2013). The extent of this “scarring effect” is hypothesized to relate to the risk of recurrence. In this model, low self-esteem is therefore not a causal risk factor, but rather a mediator between an episode of depression or anxiety and subsequent recurrence (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). It is important to note that self-esteem could be both a (causal) risk factor and a scarring effect. To further elucidate the

role of self-esteem in recurrence, we explored whether ISE and ESE in current depression or anxiety increased when recovered.<sup>1</sup> If self-esteem does not improve substantially, this indicates that there may be a scarring effect on self-esteem.

The first aim of the present study was to test whether relatively low implicit and explicit self-esteem increase the risk of depression or anxiety recurrence during a 3-year follow-up. We hypothesized that ISE and ESE have (partly) unique associations with the recurrence of depression and anxiety. We also explored whether ISE and ESE change when recovered from depression or anxiety, and whether extent of change differed from those with no history of depression or anxiety disorders.

## Method

### Participants

The Netherlands Study of Depression and Anxiety (NESDA; [www.nesda.nl/](http://www.nesda.nl/)) is an ongoing longitudinal cohort study that, at baseline (2004 to 2007), involved 2,981 participants who either had a current depression or anxiety disorder ( $n = 1,701$ ), were at risk for depression or anxiety (e.g., lifetime diagnosis;  $n = 907$ ), or who had no history of depression or anxiety ( $n = 373$ ). Exclusion criteria included (1) A primary, clinical diagnosis of a psychotic disorder, an obsessive-compulsive disorder, a bipolar disorder, or a severe addiction; (2) A nonfluent command of the Dutch language. Participants were followed-up biannually until the 6-year follow-up, and every 3 years thereafter (i.e., next measurement is a 9-year follow-up). For a thorough overview of the recruitment process, design, and aims of NESDA, see Penninx et al. (2008). All participants provided written consent, and ethical approval was granted by the VUmc Medical Ethical Committee (2003/183).

The present study makes use of data collected in the last two measurement waves at the time of writing, which was 6 and 9 years since baseline, as these included measures of self-esteem. For ease of reading, in this article we refer to the 6-year follow-up and 9-year follow-up as baseline and follow-up, respectively, from this point on. From the 2,256 participants at baseline, 286 (12.6%) were missing at follow-up, and 457 (20.3%) had not completed measures of self-esteem at baseline (e.g., technical problems, participation via telephone).<sup>2</sup> From the remaining 1,626, 100 had nonvalid ISE scores at baseline (see description in Measures section to follow), 105 met the criteria for a bipolar disorder (Types I and II) at any point in their lives (up to follow-up), and 21 had an alcohol dependence between baseline and follow-up. These were excluded from the analysis. From the final 1408, the following were selected:

**Recovered depression.** To test the hypothesis that self-esteem predicts recurrence of depression, participants were selected who were anxiety and depression free in the last six months at baseline and had a previous major depressive disorder (MDD) and/or dysthymia ( $n = 618$ ). Excluding those who had an anxiety recurrence but not a depression recurrence ( $n = 59$ ) which may contaminate the results, at follow-up resulted in a final sample of 559. Of this group, 286 had a history of an anxiety disorder too (51%). During follow-up, 85 had a recurrence of a depressive disorder (15%), and 34 had a recurrence of both a depressive disorder and an anxiety disorder (6%), whereas 440 remained depression free (79%).

**Recovered AD.** To test the hypothesis that self-esteem predicts recurrence of an anxiety disorder, participants were selected who were anxiety and depression free in the last 6 months at baseline and met the diagnostic criteria of social anxiety ( $n = 266$ ), generalized anxiety disorder ( $n = 246$ ), panic disorder (with and without agoraphobia;  $n = 245$ ), and/or agoraphobia ( $n = 112$ ) at some point in their lives. Excluding those who had a depression recurrence during follow-up but no anxiety recurrence ( $n = 61$ ), which may contaminate the results, resulted in a final sample of 458. From the final sample, 223 had more than one type of anxiety disorder in the past (49%) and 286 had a history of either dysthymia and/or MDD (62%). During follow-up, 70 had a recurrence of an anxiety disorder (15.3%), 34 had a recurrence of both a depressive disorder and an anxiety disorder (7.4%), and 354 remained anxiety free (77.3%).

### Measures

**Explicit self-esteem.** Explicit self-esteem was measured with the Rosenberg Self-Esteem Scale (Franck, Raedt, Barbez, & Rosseel, 2008; Rosenberg, 1989), a 10-item self-report questionnaire. Participants indicated on a scale from 1 (strongly agree) to 4 (strongly disagree) the extent that each item represents general feelings about the self (e.g., "I take a positive attitude toward myself"). Total scores can range from 10 to 40, with higher scores being indicative of more positive self-esteem. The measure showed good internal reliability in the present study (baseline [ $N = 1,799$ ]: Cronbach's  $\alpha = .92$ ).

**Implicit self-esteem.** The Implicit Association Test (IAT; Greenwald & Farnham, 2000) was used to measure implicit self-esteem. The IAT is a computer-based word-sorting task where words are randomly presented one at a time from four categories: two target categories (*I* [I, myself, self, my, own] and *other* [other, you, they, them, themselves]) and two attribute categories (*positive* [meaningful, successful, important, worthwhile, confident] and *negative* [worthless, unimportant, weak, failure, useless; translated from Dutch]). Following two practice rounds of 10 trials, participants sorted positive- and I-related words with the same key and negative- and other-related words with the other key (pairing 1). This was repeated for two blocks of 20 trials. Participants then completed another practice block of 10 trials with only target words, although key allocation have been swapped. Participants ended the task with two blocks of 20 trials where negative- and I-related words (and other- and positive-related words) shared the same key (pairing 2). Reaction of the initial response and accuracy were recorded. The D4-algorithm was used to derive IAT scores (see Glashouwer, Smulders, de Jong, Roefs, & Wiers, 2013 for a comparison of the different algorithms) and has been reported in detail previously (van Tuijl et al., 2016). Higher scores were indicative of a relatively fast response when categories *I* and *positive* (and *other* and *negative*) shared a key than when *I* and *negative* (and *other* and *positive*) shared a key, thus indicating

<sup>1</sup> We consider this an explorative analysis as this was added later, during the review process, following recommendations from reviewers.

<sup>2</sup> Previous missing analyses suggest those who did not complete self-esteem measures (but were further present at baseline) had significantly more symptoms of depression and anxiety at baseline (van Tuijl et al., 2016). Given that this would suggest the data was not missing at random, we did not conduct multiple imputation.



higher implicit self-esteem. Participants were excluded from any analysis involving IAT scores when more than 10% of trials were faster than 300 ms (i.e., preemptive responses), an error rate of over 20%, or where more than 1% of trials were longer than 10,000 ms (Glashouwer et al., 2013; Greenwald & Farnham, 2000;  $n = 94$  at follow-up). Spearman-Brown corrected correlation between test halves was .85 (test halves based on Trials 1, 2, 5, 6, etc. and 2, 4, 7, 8; van Tuijl et al., 2016).

**Diagnosis of depression or anxiety.** Diagnosis of a depression or anxiety disorder was determined using the Composite International Diagnostic Interview v2.1 (Robins et al., 1988; Wittchen, 1994). Previous research has observed high interrater reliability (Wittchen et al., 1991), high test–retest reliability (Wacker, Battegay, Mulleijans, & Schlosser, 1990), and high validity for depressive and anxiety disorders (Wittchen, 1994; Wittchen et al., 1989). Diagnosis of MDD, dysthymia, panic disorder (both with and without agoraphobia), generalized anxiety disorder, social anxiety, and agoraphobia (without panic) were determined based on the criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [DSM–IV]; American Psychiatric Association, 1994). In the current study, those with a history of an anxiety disorder could therefore refer to any (or more) of these anxiety disorders. Composite International Diagnostic Interview (CIDI; Robins et al., 1988) was also used to determine bipolar disorder and alcohol dependence (exclusion criteria in the present study). Trained research staff conducted the interview. For more information of the use of the CIDI in NESDA and also how staff were trained in giving the CIDI see Penninx et al. (2008).

**Symptoms of depression.** Inventory of Depressive Symptomatology–Self-Report (IDS; Rush et al., 1986). Symptoms of depression in the preceding 7 days were measured with a 28-item self-report questionnaire. Twenty-eight symptoms, based on the DSM–IV criteria for MDD, were presented (e.g., “Feeling sad”) and participants chose from four corresponding answers ranging from 0 (e.g., *I do not feel sad*) to 3 (e.g., *I feel sad nearly all the time*). Higher total scores (possible range = 0–84) were indicative of relatively severe depressive symptomatology. Those with more than six missing items were excluded from any relevant analysis ( $n = 4$ –21). Baseline IDS showed excellent internal reliability across all those who had completed it (Cronbach’s  $\alpha = .90$   $n = 2,150$ ) and was included in the current analyses to control for residual depressive symptoms.

**Symptoms of anxiety.** Symptoms of anxiety were measured with a 21-item self-report questionnaire, the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). Participants indicated how much they were bothered by 21 possible symptoms (e.g., “nervous”) in the last week on a four-point Likert scale ranging from 1 (*not at all*) to 4 (*severely* [“I could barely stand it”]). Higher total scores (possible range = 21–84) were indicative of more anxious symptoms present. Those with more than nine missing items were excluded from any relevant analysis ( $n = 6$ –22). The BAI showed excellent internal reliability across all those who had completed it at baseline (Cronbach’s  $\alpha = .92$ ;  $n = 2,084$ ) and was included in the current analyses to control for residual anxiety symptoms.

**Neuroticism.** Scores on the neuroticism subscale of the NEO Five-Factor Inventory (Costa & McCrae, 1992) completed at NESDA Wave 4 (i.e., 2 years prior to completing baseline self-

esteem measured in the present study) were used to statistically control for neuroticism. The subscale consisted of 12 statements (e.g., “I am not a worrier”) rated on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores were indicative of a more neurotic personality. Eleven and five participants from the recovered depression and recovered anxiety subsamples, respectively, did not complete the measure of neuroticism and were excluded from any relevant analyses. The internal consistency of the neuroticism subscale was good (Cronbach’s  $\alpha = .93$ ; Spinhoven, Penelo, de Rooij, Penninx, & Ormel, 2014). For ease of reading, we refer to the Neuroticism measure as a baseline measure, whereas this was completed approximately 2 years prior.

## Procedure

Assessments in NESDA took between three and five hours for each participant and were completed during a single visit. Trained staff administered self-report questionnaires, interviews, biological measures, and computer tasks. Participants always completed the RSES after the IAT. Participants were reimbursed any travel expenses and received a €15 gift certificate (approximately 17.50 USD) as a token of thanks. The list of published articles using NESDA data can be found on the NESDA website ([www.NESDA.nl/](http://www.NESDA.nl/)).

## Statistical Analysis

For the main analysis, univariate (i.e., single predictor) and multivariate (i.e., multiple predictors) binary logistic regression was conducted to predict recurrence (1) from nonrecurrence (0) in the 3-year follow-up. Univariate models included ISE, ESE, and symptoms of depression/anxiety. In the multivariate models, ISE and ESE were centered and entered along with symptoms of depression/anxiety, gender (female = 1), age, and history of comorbid depression or anxiety. At Step 2, neuroticism was entered.

We conducted additional explorative analysis to test whether self-esteem remained low following recovery from depression or anxiety. To do this, two 3 (group)  $\times$  2 (timepoints) analyses of variance were conducted, one for ESE and one for ISE. The three groups were as follows: (1) participants with a depressive disorder (and no anxiety disorder) in the last 6 months at baseline, who were depression and anxiety free for at least 6 months a follow-up ( $n = 48$  for ISE and  $n = 60$  for ESE); (2) participants with an anxiety disorder (and no depressive disorder) in the last 6 months at baseline, who were depression and anxiety free for at least 6 months at follow-up ( $n = 47$  and 55, respectively); (3) participants with no history of depression or anxiety at baseline and follow-up ( $n = 241$  and 264, respectively).

## Results

### Descriptives

Means and standard deviations for the variables of interest split by recovered from depression or anxiety are presented in Table 1. Spearman’s rank correlations (as all variables, except neuroticism, and ESE at baseline and follow-up were significantly skewed) collapsed across recovered depression and recovered anxiety are

Table 1  
Descriptive Statistics at Baseline and Follow-Up

| Variable                      | Recovered depressed<br>( <i>n</i> = 559) | Recovered anxiety<br>( <i>n</i> = 458) |
|-------------------------------|------------------------------------------|----------------------------------------|
|                               | <i>M</i> ( <i>SD</i> ) or %              | <i>M</i> ( <i>SD</i> ) or %            |
| Baseline                      |                                          |                                        |
| Age                           | 47.72 (13.16)                            | 47.56 (13.23)                          |
| History of anxiety/depression | 51%                                      | 62%                                    |
| Female                        | 68%                                      | 68%                                    |
| Neuroticism                   | 32.07 (7.16)                             | 32.97 (7.04)                           |
| Explicit self-esteem          | 31.64 (4.51)                             | 31.29 (4.71)                           |
| Implicit self-esteem          | 0.66 (0.44)                              | 0.64 (0.43)                            |
| Depression symptoms           | 12.24 (8.16)                             | 12.43 (7.85)                           |
| Anxiety symptoms              | 6.14 (5.92)                              | 6.85 (6.01)                            |
| Follow-up                     |                                          |                                        |
| Explicit self-esteem          | 31.11 (4.82)                             | 30.95 (4.65)                           |
| Implicit self-esteem          | 0.72 (0.45)                              | 0.70 (0.45)                            |
| Depression symptoms           | 13.37 (9.79)                             | 13.11 (9.30)                           |
| Anxiety symptoms              | 6.25 (6.72)                              | 6.80 (6.85)                            |

Note. Some participants (*n* = 286) appeared both in the recovered depressed and recovered anxiety groups. The sample size differs slightly per measure due to missing data.

presented in Table 2. It is worth noting that ESE was related to symptoms of depression and anxiety, both cross-sectionally and prospectively. For ISE, however, only the prospective relationship with symptoms of depression and anxiety reached significance. Furthermore, more (severe) depressive symptoms at baseline was related to lower levels of ESE and ISE at follow-up. More (severe) anxiety symptoms were related only to lower levels of ESE at follow-up.

## Recurrence of Depression

In the univariate models, ISE, ESE, and symptoms of depression were all significant predictors of depression recurrence during follow-up in those with a history of depression. In the multivariate model, when statistically controlling for age, gender, and history of anxiety, implicit but not explicit self-esteem was a significant predictor, along with depressive symptoms at baseline and a history of an anxiety disorder (see Table 3 for overview of coefficients in both univariate and multivariate models). In other words, those with relatively low ISE, more depressive symptoms, and a history of an anxiety disorder were more likely to have a depression recurrence at 3-year follow-up. The Step 1 of the multivariate model was significant,  $\chi^2(6) = 56.36$ ,  $p < .001$ , Nagelkerke  $R^2 = .15$ . With the addition of neuroticism, the model improved slightly,  $\chi^2(1) = 4.70$ ,  $p = .03$  (final model: Nagelkerke  $R^2 = .17$ ).<sup>3</sup> ISE remained a significant predictor of depression recurrence.

## Recurrence of Anxiety Disorder(s)

In those with a history of anxiety (*n* = 458), during follow-up: 43 had a social anxiety disorder (9.4%), 40 had a panic disorder (with or without agoraphobia; 9%), 24 had agoraphobia (5%), and 22 had generalized anxiety disorder (5%). Thirteen met the diagnosis of more than one anxiety disorder (3%), and 104 met the diagnosis for any (single) anxiety disorder (23%). In the univariate

models, implicit self-esteem, explicit self-esteem, and residual anxiety symptoms were all significant predictors of anxiety recurrence. When entered into one model, while controlling for age, gender, and a history of a depressive disorder, the model was a significant predictor of anxiety recurrence,  $\chi^2(6) = 38.14$ ,  $p < .001$ , Nagelkerke  $R^2 = .13$ , with significant contribution from baseline symptoms of anxiety, ISE and ESE. In other words, those with lower levels of ISE and ESE, and relatively more symptoms of anxiety at baseline were more likely to have a recurrence of anxiety during follow-up. The inclusion of neuroticism at Step 2 did not improve the model significantly,  $\chi^2(1) = 2.20$ ,  $p = .14$ . While ESE was no longer a significant predictor of anxiety recurrence, ISE remained a significant predictor. The coefficients in the univariate and multivariate models are outlined in Table 4.<sup>4</sup>

## Exploratory Analyses: Changes in Self-Esteem Following Recovery

We first explored whether explicit self-esteem following recovery from depression or anxiety increased. Across all groups, scores changed from baseline to follow-up,  $F(1, 376) = 12.38$ ,  $p < .001$  (partial  $\eta^2 = 0.03$ ). This was qualified by a significant Time  $\times$  Group interaction,  $F(2, 376) = 8.39$ ,  $p < .001$  (partial  $\eta^2 = .043$ , based on Greenhouse-Geisser as Box's  $M$  was significant [ $p = .004$ ]), as plotted in Figure 1. Subsequent repeated-measures  $t$  tests indicated that only those who had recovered from a depressive disorder showed significant increases in ESE. Those who recovered from an anxiety disorder and those with no history of depression or anxiety showed no statistically significant change in ESE (see Table 5).

For ISE, scores increased across groups from baseline to follow-up,  $F(1, 333) = 9.26$ ,  $p = .003$  (partial  $\eta^2 = .03$ ), but this did not differ between depression, anxiety or never depression or anxiety,  $F(2, 333) = 0.10$ ,  $p = .90$  (partial  $\eta^2 = .001$ ; see Figure 2). Subsequent repeated-measures  $t$  test indicated that only those without a history of depression and anxiety showed a statistically significant increase in ISE from baseline to follow-up.

## Discussion

For both depression and anxiety, the high recurrent nature of these disorders contributes substantially to the high individual and societal burdens. To improve current treatment options, it is crucial to understand which factors play an important role in the recurrence of depression and anxiety. The present study was therefore designed to examine the relevance of low self-esteem as a promising transdiagnostic factor in the recurrence of both depression and anxiety. The main findings can be summed as follows: (1) Both explicit and implicit self-esteem were significant predictors of anxiety recurrence and depression recurrence in unadjusted

<sup>3</sup> Excluding those who developed both an anxiety disorder and a depressive disorder at follow-up (*n* = 34) led to similar conclusions. The only difference is that a history of an anxiety disorder and neuroticism were no longer significant predictors.

<sup>4</sup> Excluding those who had developed a depressive disorder at follow-up as well as an anxiety disorder (*n* = 34), led to slightly different conclusions. In the final step of the model, ISE was no longer a significant predictor ( $OR = 0.54$ ,  $p = .057$ ), although it was a significant predictor at Step 1 ( $OR = 0.52$ ,  $p = .04$ ).

Table 2  
*Spearman's Rank Correlations*

| Variable               | 1 | 2     | 3      | 4      | 5      | 6      | 7      | 8      | 9      |
|------------------------|---|-------|--------|--------|--------|--------|--------|--------|--------|
| Baseline               |   |       |        |        |        |        |        |        |        |
| 1. ISE                 | — | .15** | -.05   | -.03   | -.19** | .57**  | .16**  | -.09*  | -.08*  |
| 2. ESE                 |   | —     | -.52** | -.43** | -.56** | .12**  | .73**  | -.46** | -.37** |
| 3. Depression symptoms |   |       | —      | .67**  | .49**  | -.09*  | -.45** | .64**  | .51**  |
| 4. Anxiety symptoms    |   |       |        | —      | .39**  | -.04   | -.40** | .48**  | .61**  |
| 5. Neuroticism         |   |       |        |        | —      | -.14** | -.54** | .46**  | .36**  |
| Follow-up              |   |       |        |        |        |        |        |        |        |
| 6. ISE                 |   |       |        |        |        | —      | .17**  | -.11** | -.14** |
| 7. ESE                 |   |       |        |        |        |        | —      | -.56** | -.44** |
| 8. Depression symptoms |   |       |        |        |        |        |        | —      | .69**  |
| 9. Anxiety symptoms    |   |       |        |        |        |        |        |        | —      |

Note. ISE = implicit self-esteem; ESE = explicit self-esteem; follow up = 3-year follow up.

\*  $p < .01$ . \*\*  $p < .001$ .

models; (2) when statistically controlling for baseline symptoms, neuroticism, age, sex, and history of comorbid depression/anxiety (i.e., adjusted models), particularly implicit self-esteem was a predictor of anxiety recurrence and depression recurrence; (3) in the adjusted models, explicit self-esteem predicted anxiety recurrence, but not recurrence of a depressive disorder, when statistically controlling for baseline depressive symptoms and neuroticism.

For both anxiety recurrence and depression recurrence, low ISE at baseline was related to an increased risk for recurrence during the 3-year follow-up, even when statistically controlling for baseline symptoms and neuroticism. Specifically, a unit increase in ISE scores was associated with more than 45% decrease in recurrence risk. As not everyone with a history of depression and anxiety will experience a recurrence, indeed at least a third will not (Scholten et al., 2016), it appears that variations within a recovered sample (i.e., the current findings) is predictive of recurrence, whereas there were no differences in ISE at a group level in comparison with those who currently have a depression or anxiety disorder, or

those with no history of depression or anxiety (van Tuijl et al., 2016). Furthermore, as low ISE was associated with both the recurrence of depression and the recurrence of anxiety, it is feasible that ISE may have a transdiagnostic role. Given the high rates of comorbidity, and high rates of diagnostically unstable recurrences (i.e., recurrence across and within anxiety and depressive disorders; Scholten et al., 2016), identifying transdiagnostic factors could improve the efficiency of identifying or preventing recurrence. Future studies should aim to manipulate low ISE to determine whether the relationship with depression recurrence and anxiety recurrence is causal.

Whereas low ESE did not predict recurrence when statistically controlling for baseline symptoms and neuroticism, it may be premature to suggest that explicit self-esteem plays no role. ESE was a significant predictor of depression and anxiety recurrence in the unadjusted models and is highly correlated with both baseline symptoms and levels of neuroticism. Kraemer and colleagues (2001) point out that any construct that is strongly correlated with a risk factor may also appear to be a risk factor. The problem

Table 3  
*Predicting Recurrence of Depression During Follow-Up*

| Variable                   | Univariate model |              |          | Multivariate model |               |          |
|----------------------------|------------------|--------------|----------|--------------------|---------------|----------|
|                            | OR               | 95% CI       | <i>p</i> | OR                 | 95% CI        | <i>p</i> |
| Step 1                     |                  |              |          |                    |               |          |
| Implicit self-esteem       | 0.52             | [0.33, 0.82] | <.01     | 0.49               | [0.29, 0.81]  | .01      |
| Explicit self-esteem       | 0.90             | [0.86, 0.94] | <.001    | 0.99               | [0.93, 1.05]  | .65      |
| Depression symptoms        | 1.08             | [1.05, 1.10] | <.001    | 1.07               | [1.04, 1.11]  | <.001    |
| Age                        |                  |              |          | 1.00               | [0.99, 1.02]  | .80      |
| Female                     |                  |              |          | 1.30               | [0.80, 2.13]  | .29      |
| History of anxiety present |                  |              |          | 1.92               | [1.16, 3.18]  | .01      |
| Step 2                     |                  |              |          |                    |               |          |
| Neuroticism                | 1.09             | [1.06, 1.13] | <.001    | 1.05               | [1.004, 1.09] | .03      |
| Implicit self-esteem       |                  |              |          | 0.49               | [0.30, 0.82]  | <.01     |
| Explicit self-esteem       |                  |              |          | 1.02               | [0.96, 1.09]  | .59      |
| Depression symptoms        |                  |              |          | 1.06               | [1.03, 1.10]  | <.001    |
| Age                        |                  |              |          | 1.00               | [0.99, 1.02]  | .74      |
| Female                     |                  |              |          | 1.31               | [0.80, 2.14]  | .29      |
| History of anxiety present |                  |              |          | 1.75               | [1.05, 2.92]  | .03      |

Table 4  
Predicting the Recurrence of Anxiety During Follow-Up

| Variable                      | Univariate model |              |       | Multivariate model |              |       |
|-------------------------------|------------------|--------------|-------|--------------------|--------------|-------|
|                               | OR               | 95% CI       | p     | OR                 | 95% CI       | p     |
| Step 1                        |                  |              |       |                    |              |       |
| Implicit self-esteem          | 0.53             | [0.32, 0.87] | .01   | 0.53               | [0.31, 0.91] | .02   |
| Explicit self-esteem          | 0.90             | [0.86, 0.94] | <.001 | 0.94               | [0.89, 1.00] | .04   |
| Anxiety symptoms              | 1.09             | [1.05, 1.13] | <.001 | 1.08               | [1.04, 1.12] | <.001 |
| Age                           |                  |              |       | 1.00               | [0.98, 1.01] | .65   |
| Female                        |                  |              |       | 0.91               | [0.55, 1.52] | .73   |
| History of depression present |                  |              |       | 1.30               | [0.73, 2.31] | .38   |
| Step 2                        |                  |              |       |                    |              |       |
| Neuroticism                   | 1.07             | [1.04, 1.11] | <.001 | 1.03               | [0.99, 1.08] | .14   |
| Implicit self-esteem          |                  |              |       | 0.53               | [0.31, 0.92] | .02   |
| Explicit self-esteem          |                  |              |       | 0.97               | [0.91, 1.03] | .27   |
| Anxiety symptoms              |                  |              |       | 1.07               | [1.03, 1.12] | .001  |
| Age                           |                  |              |       | 1.00               | [0.98, 1.01] | .65   |
| Female                        |                  |              |       | 0.92               | [0.55, 1.52] | .74   |
| History of depression present |                  |              |       | 1.24               | [0.69, 2.22] | .47   |

emerges in determining which is the most likely causal risk factor, and which is the proxy—moreover, there may be more than one causal risk factor. A more important question maybe which construct requires the minimal amount of manipulation to observe the largest effect on recurrence rates. There are numerous intervention studies that have aimed to reduce depression or anxiety symptoms, levels of neuroticism, and improve self-esteem, and a systematic comparison of effects while controlling for costs may reveal which factor future research should (primarily) focus on in preventing depression and anxiety recurrence. It is worth noting that residual symptoms, neuroticism, and ESE also share a common measurement method (self-report questionnaires) and are therefore likely to overestimate relationships given shared-method variance. Indeed, this may explain why ISE, which is measured using a very different method (response times on a computer task), remains significant when including measures of symptoms and neuroticism.

The rise in studies looking at risk factors for the recurrence of depression and anxiety has triggered the need to clearly define the criteria that needs to be met. [Kraemer and colleagues \(1997\)](#) defined a number of steps necessary before a construct can be considered a causal risk factor. Applied to the current context, this includes the following: (1) establishing a correlation between self-esteem and recurrence (*correlate*); (2) establishing that low self-esteem precedes recurrence (*risk factor*); (3) establishing whether self-esteem is variable (*variable risk factor*); and (4) when self-esteem is manipulated a subsequent influence on the risk for recurrence is observed (*causal risk factor*). The findings from the current study suggests that both implicit and explicit self-esteem are risk factors for the recurrence of depression and anxiety. Furthermore, studies suggest that both explicit ([Korrelboom et al., 2012](#)) and implicit ([Dijksterhuis, 2004](#)) self-esteem are variable with targeted interventions. Further research is required to establish whether this is

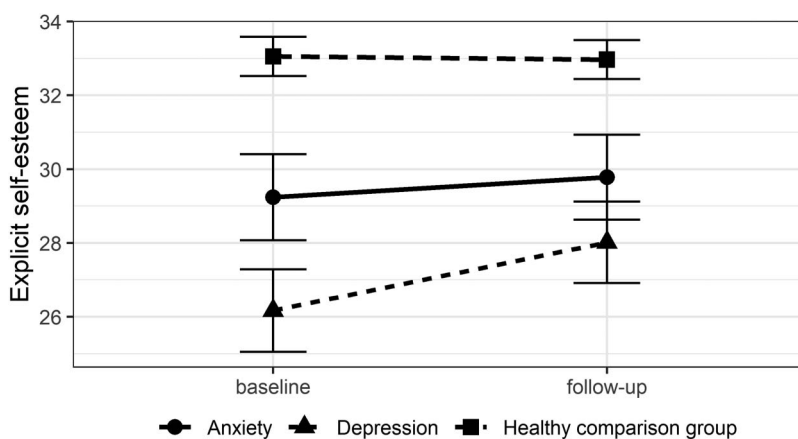


Figure 1. Estimated marginal means for explicit self-esteem at baseline (when those with anxiety or depression currently met the requirements for diagnosis) and at the 3-year follow-up (when those with anxiety or depression were recovered). Error bars indicate 95% confidence intervals.



Table 5

*Comparison of Self-Esteem at Baseline and Follow-Up in Those Who Recovered From Depression or From Anxiety Before Follow-Up and in Those With No History of Depression or Anxiety*

| Group                               | Explicit self-esteem (ESE) |              |                  | Implicit self-esteem (ISE) |           |                  |
|-------------------------------------|----------------------------|--------------|------------------|----------------------------|-----------|------------------|
|                                     | Baseline                   | Follow-up    | Cohen's <i>d</i> | Baseline                   | Follow-up | Cohen's <i>d</i> |
| Depression                          |                            |              |                  |                            |           |                  |
| ESE ( <i>n</i> = 60)                | 26.17 (5.36)               | 28.02 (5.01) | 0.41*            | .69 (.52)                  | .77 (.44) | 0.14             |
| ISE ( <i>n</i> = 48)                |                            |              |                  |                            |           |                  |
| Anxiety                             |                            |              |                  |                            |           |                  |
| ESE ( <i>n</i> = 55)                | 29.24 (4.38)               | 29.78 (4.59) | 0.17             | .64 (.50)                  | .73 (.48) | 0.18             |
| ISE ( <i>n</i> = 47)                |                            |              |                  |                            |           |                  |
| No history of depression or anxiety |                            |              |                  |                            |           |                  |
| ESE ( <i>n</i> = 264)               | 33.06 (4.16)               | 32.97 (4.14) | 0.03             | .70 (.45)                  | .80 (.80) | 0.26**           |
| ISE ( <i>n</i> = 241)               |                            |              |                  |                            |           |                  |

Note. Sample sizes indicate number of ESE and ISE *t* tests, respectively.

\**p* < .01. \*\**p* < .001.

also the case in a recovered population before testing the effect of manipulating self-esteem on recurrence risk.

Another theoretically important question remains as to whether low self-esteem in those recovered represents a “scar” from the prior depression or anxiety, or whether this is a premorbid vulnerability factor suggesting that prior to the depression or anxiety it is already possible to identify who will have a recurrence (Burcusa & Iacono, 2007). Explorative analyses in the current study suggests that while both ISE and ESE do improve from current depression or anxiety to recovery, this only reached statistical significance for ESE in depression, and means at follow-up were still lower than for those with no history of depression and anxiety. Indeed, self-esteem may also act as a mediator between episode of depression and anxiety where the severity or duration of a depression or anxiety disorder influences self-esteem which in turn influences the risk of recurrence. To test this, it would require a longitudinal study, ideally with participants who have no history of depression or anxiety at baseline to establish whether pre-onset levels of self-esteem can predict who will have recurrent depression or

anxiety, and with frequent measures of self-esteem for a long follow-up. For clinical application, however, it seems not crucial to know if low self-esteem is a scar or a pre-vulnerability factor for the next depression or anxiety, but rather whether targeting this reduces the risk for recurrence.

### Strengths and Limitations

While there are many criticisms of the IAT as a measure of implicit self-esteem (e.g., Rothermund & Wentura, 2004), in the current study there was clear predictive value pertaining to the reliability of the measure to be sensitive to individual differences. Furthermore, the low correlation between ESE and ISE supports the notion that each measure captures a distinct construct. Although the IAT is certainly no perfect measure, we believe it would be presumptuous to suggest that it has no value. Indeed, validation studies also support the use of the IAT to capture implicit self-esteem (Izuma et al., 2018; Rudolph et al., 2010).

Several studies have suggested that discrepancy between ISE and ESE is more strongly related to depression, than either ISE or

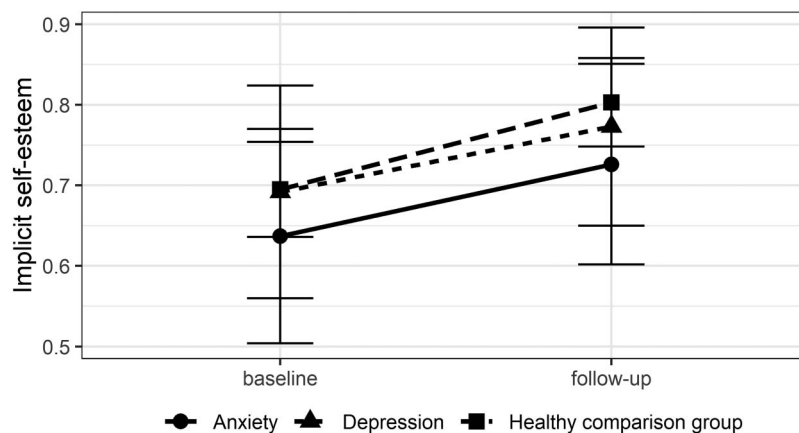


Figure 2. Estimated marginal means for implicit self-esteem at baseline (when those with anxiety or depression currently met the requirements for diagnosis) and at the 3-year follow-up (when those with anxiety or depression were recovered). Error bars indicate 95% confidence intervals.

ESE alone (e.g., Creemers, Scholte, Engels, Prinstein, & Wiers, 2012). In a more recent article, we outline the issues with previous approaches to testing self-esteem discrepancy, which is frequently done in the absence of controlling for the main effects of ISE and/or ESE, and when the main effects are controlled for, there is no support for the role of discrepant self-esteem in both depression and anxiety (van Tuijl et al., 2016).

Use of NESDA data allowed for careful selection of those meeting the diagnostic criteria for depression and anxiety and controlling for history of comorbid anxiety and depression. Furthermore, we were able to exclude those with recurrence of the other disorder (e.g., recurrence of depression when predicting anxiety recurrence) which could otherwise have contaminated the results. Considering both depression and anxiety is crucial in identifying potential transdiagnostic factors which may ultimately lead to time- and cost-effective interventions that can be used for both types of disorders. Given the high degree of comorbidity between depression and anxiety (39% across both subsamples in the current study had both a history of depression and anxiety), identifying targets for interventions that may be relevant for depression and anxiety is desirable. Furthermore, we were able to employ a longer follow-up period than previous longitudinal studies looking at ISE, thereby allowing us to consider recurrence that meets diagnostic criteria rather than an increase in symptoms. As such, the present study suggests that implicit self-esteem predicts recurrence of clinical levels of depression and anxiety over a 3-year period.

It should be noted that for anxiety disorders, guidelines do not appear to exist on how long an individual should be diagnosis-free before they can be considered recovered. Indeed, previous studies seem to vary quite a lot (e.g., 8 weeks; Rodriguez et al., 2006). For consistency, the definition of recurrence for both anxiety and depression was based on recommendations by Frank et al. (1991). However, in one study it was suggested that basing recovery on duration criteria is arbitrary, and that recovery should be defined as the absence of symptoms, and factors like social functioning, subjective well-being, and absence of related treatment (de Zwart, Jeronimus, & de Jonge, 2019). While these endpoints are desirable in the treatment of anxiety and depression, it may be quite some time before someone meets these criteria following an episode of depression or anxiety while ongoing intervention until these endpoints are met is not always necessary. Indeed, there will always be a gray area between episode and full recovery. Perhaps it would be more poignant to use a term other than *recovery* when applying duration cut-offs as “recovery” insinuates that an individual is well, which for many this may not be the case. Regardless of semantics, using duration helps to identify from which point on risk markers may be observed for early indication of recurrence.

In the present study, there were not enough recurrences to disentangle potential differences in those with more comorbid forms of depression and anxiety, and those with more singular forms. Indeed, a substantial few had a history of both a depressive and an anxiety disorder although not necessarily at the same time. A prior study did observe differences in self-esteem in those with a comorbid depression and anxiety, compared to those with either a depressive disorder or an anxiety disorder. Specifically, those with comorbid depression and anxiety had lower ISE than the healthy comparison group, and even lower ESE than those with depression or anxiety (van Tuijl et al., 2016). As such, it is feasible

that ISE may predict recurrence specifically in those with comorbidity and, given the high rates of those with a history of both depression and anxiety, that this is driving the effects observed. Future studies with more power should test this, as it may suggest that targeting ISE to prevent recurrence may only be effective in those with comorbid depression and anxiety.

It is worth noting that the confidence intervals for ISE in the multivariate model would suggest that the risk for recurrence was reduced by 9% to 71% and 19% to 71% for every unit increase in ISE for anxiety and depression, respectively. Given the relatively small range of ISE scores (−1.31 to 1.69 within the recovered depression and/or recovered anxiety groups) which is normal for the IAT, it may be unfeasible to attain a unit change in ISE scores through intervention. ISE interventions in depression or anxiety samples are lacking, and as such, estimations of the clinical relevance of targeting ISE is hard to judge. For example, if an increase of .20 in ISE score is attainable with intervention, and ISE has a causal role in recurrence, then this would suggest that recurrence risk could drop by up to 14%—based on the upper bounds of the CIs in the current study. Future studies should focus on developing methods to increase ISE to establish whether there is a causal role and to clarify the potential clinical relevance of the findings in the present study.

## Conclusion

Low ISE was found to predict recurrence of both depression and anxiety disorders during a 3-year follow-up. Further research is needed to understand how, and under what conditions, ISE predicts recurrence. Regardless of this, it does justify further research into looking at how we may increase ISE. Not only would this enable the testing of a causal role of ISE in the recurrence of depression and anxiety, but also provide innovative interventions which may contribute to the reduction of risk for anxiety and depression recurrence. ESE also shows promise; however, it requires further research to disentangle the effects from the effects of residual symptoms and neuroticism. Given the similar findings in those with depression and anxiety, preventative interventions targeting self-esteem may have transdiagnostic application in two highly comorbid disorders.

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