Levels and Instability of Daily Self-Esteem in Adolescents:
 Relations to Depressive and Anxious Symptoms

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Abstract

The current study examined whether individual differences in depressive and anxious symptoms relate to level of daily self-esteem and instability of daily self-esteem in adolescence. Participants were a racially and ethnically diverse sample of adolescents (79 girls, 65 boys; $M$ age = 13.53 years; $SD = 1.32$). Adolescents reported on their depressive and anxious symptoms during a baseline home visit. Then, adolescents reported on their daily self-esteem over the course of 12 consecutive days. Using hierarchical linear modeling analyses, level of daily self-esteem was negatively associated with depressive but not anxious symptoms. In addition, a positive relation emerged between instability of daily self-esteem and depressive symptoms when controlling for level of self-esteem; a similar relation did not emerge for anxious symptoms. Implications for advancing our understanding of the association between self-esteem and internalizing symptoms in adolescence are discussed.

Keywords: self-esteem, depression, anxiety, daily, adolescence
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Global self-esteem is conceptualized as an individual’s overall evaluation of self-worth, or the extent to which he/she likes and values him/herself (Leary & Baumeister, 2000; Rosenberg, Schooler, Schoenbach & Rosenberg, 1995). Global self-esteem is understood to be separate from, though related to, domain-specific self-esteem, or self-appraisals of value in specific areas (e.g., social, academic, athletic; von Soest, Wichstrom & Kvalem, 2016).

Existing literature points to self-esteem as an important influence on individuals’ experiences and well-being. Cross-sectional studies have found positive relations between self-esteem and relationship satisfaction (e.g., Shackelford, 2001), occupational status (e.g., Kammeyer-Mueller, Judge, & Piccolo, 2008), salary (e.g., Judge, Hurst, & Simon, 2009), and physical health (e.g., Benyamini, Leventhal, & Leventhal, 2004) and negative relations to neuroticism/negative affectivity (Dua, 1993; Watson, Suls & Haig, 2002). Similar relations emerge in longitudinal studies. For example, one study found low self-esteem in early adolescence predicted delinquency and aggression two years later (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005). A follow-up study of this same sample found that the negative effects of low self-esteem extended into adulthood, predicting physical health problems, criminal convictions, and financial difficulties (Trzesniewski et al., 2006).

Self-esteem and Internalizing Symptoms

Given this literature, it is unsurprising that self-esteem plays an important role in the development and expression of psychopathology (Zeigler-Hill, 2011). This interplay is highlighted by the inclusion of low self-esteem as a diagnostic criterion or associated feature for a number of disorders, including many mood and anxiety disorders (American Psychiatric
Association, 2013). Two major theoretical models have been proposed to explain the relation between self-esteem and psychopathology; the vulnerability model proposes that low self-esteem serves as a predisposing risk factor for psychopathology, while the scar model suggests that psychopathology depletes psychological resources, resulting in lowered self-evaluations (Zeigler-Hill, 2011). Although some researchers have questioned whether self-esteem is in fact a meaningful predictor of psychopathology, rather than simply a correlate (e.g., Baumeister, Campbell, Krueger, & Vohs, 2003, 2005; Crocker & Park, 2004), recent prospective studies controlling for psychopathology symptoms at baseline have provided evidence to the contrary (e.g., Trzesniewski et al., 2006).

In particular, a large body of research has examined the relation between self-esteem and both depressive and anxious symptoms. The existing literature overwhelmingly suggests that the negative relation between self-esteem and depressive symptoms is better explained by the vulnerability model than by the scar model. In fact, a recent meta-analysis of longitudinal studies found a weighted mean effect size of -.16 for earlier self-esteem predicting later depression, but only -.08 for earlier depression predicting later self-esteem (the confidence intervals for these two effect sizes were non-overlapping; Sowislo & Orth, 2013). Additionally, self-esteem has proven to be a useful negative predictor of depressive symptoms years later. For example, Orth, Robins, Trzesniewski, Maes, and Schmitt (2009) examined the temporal relations between depression and self-esteem in two separate longitudinal studies, following their adult participants for either 4 or 9 years; in both samples, low self-esteem predicted subsequent depressive symptoms, controlling for baseline depressive symptoms, but the reverse temporal order was not supported. Longitudinal studies beginning in adolescence have found similar results, including effects extending into participants’ early 20s (Orth, Robins & Roberts, 2008) and mid 30s.
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(Steiger, Allemand, Robins & Fend, 2014).

The picture is murkier when examining longitudinal relations between self-esteem and anxiety, although the constructs are strongly negatively correlated cross-sectionally (Lee & Hankin, 2009; Riketta, 2004; Roberts, 2006; Watson et al., 2002). Some investigations support the vulnerability model, with earlier low self-esteem predicting later anxiety, particularly social anxiety (e.g., van Tuijl, de Jong, Sportel, Hullu & Nauta, 2014). Further support for this direction of effects is provided by a study in which self-esteem was experimentally increased through positive feedback, with participants then reporting reduced anticipatory anxiety of a painful shock as well as less anxiety after exposure to a distressing stimulus (Greenberg et al., 1992).

However, when Sowislo and Orth (2013) conducted a meta-analysis of longitudinal studies of self-esteem and anxiety to examine the temporal relations between the two constructs, they found evidence for a symmetric reciprocal relation, with similar effect sizes for both directions. This meta-analysis provides support for both the vulnerability and scar models and suggests that effects may be bidirectional or cyclical.

Self-esteem Instability

Self-esteem is considered a fairly stable trait, such that individuals with relatively high self-esteem during one developmental period are likely to have high self-esteem at later points in development (Kernis, 2003; Orth & Robins, 2014). However, fluctuations in self-esteem do occur throughout the lifespan. A number of longitudinal studies have documented decreases in self-esteem over the course of childhood (e.g., Marsh, 1989; Marsh, Barnes, Cairns, & Tidman, 1984; Trowbridge, 1972) and through the transition to early adolescence (e.g., Eccles et al., 1989; Robins, Trzesniewski, Tracy, Gosling & Potter, 2002; Simmons, Rosenberg & Rosenberg, 1973). In contrast, self-esteem generally increases from late adolescence into middle adulthood.
Evidence regarding the direction of self-esteem trajectories during adolescence itself is mixed, with some studies reporting a rise in self-esteem during this time (e.g., von Soest, et al., 2016; Wigfield, Eccles, Mac Iver, Reuman & Midgley, 1991) while others report a decline (e.g., Keltikangas-Jarvinen, 1990). Some of these contradictory findings regarding adolescent self-esteem trajectory may be due to gender differences; males are more likely to demonstrate increases in self-esteem throughout adolescence, whereas females tend to show decreases (Block & Robins, 1993; Zimmerman, Copeland, Shope & Dielman, 1997).

Moreover, some theorists argue that self-esteem may be temporally unstable across short spans of time or even at the daily level, given its dependence on situational and environmental factors (e.g., Kernis, 2005). In fact, level and instability of self-esteem may be distinct constructs, with evidence suggesting that the relation between the two is weak but negative (Okada, 2010). In comparison to the large body of research reviewed above on level of self-esteem, relatively few studies have examined the stability of self-esteem at the daily level.

Though the existing literature is not expansive, it does provide evidence that self-esteem instability negatively predicts well-being above and beyond level of self-esteem. Negative relations have emerged between self-esteem instability and the adaptive outcomes of intrinsic motivation (Waschull & Kernis, 1996) and the development of self-concept (Kernis, Paradise, Whitaker, Wheatman, & Goldman, 2000). In contrast, positive relations have emerged between self-esteem instability and maladaptive outcomes as diverse as defensiveness and rejection following negative feedback (Kernis, Cornell, Sun, Berry & Harlow, 1993), health risk behaviors (e.g., Martin & Knox, 1997), external self-regulatory style (Kernis et al., 2000), and adult attachment anxiety (Foster, Kernis, & Goldman, 2007).
Self-esteem Instability and Internalizing Symptoms

Furthermore, and most relevant to the current project, self-esteem instability is linked to internalizing symptoms. However, studies differ in their approach to examining the link between self-esteem instability and internalizing symptoms. The first set of studies examines the link without controlling for baseline self-esteem or level of self-esteem. These studies paint a clear picture of a positive relation between self-esteem instability and internalizing symptoms. For example, Hayes, Harris & Carver (2004) found that severity of past symptoms of depression positively predicted self-esteem variability in a sample of undergraduates. Similar relations emerged between self-esteem instability and social anxiety in studies of both clinical and community samples (Farmer & Kashdan, 2015; Oosterwegel, Field, Hart & Anderson, 2001).

The second set of studies investigates the link between self-esteem instability and internalizing symptoms while controlling for baseline self-esteem or level of self-esteem. When this analytic approach is taken, findings are more mixed. In some studies, the positive relation between self-esteem instability and internalizing symptoms holds; these investigations utilized both undergraduate and adult clinical samples (Franck et al., 2016; Franck & De Raedt, 2007; Roberts, Kassel & Gotlib, 1995, Study 1). However, other studies of undergraduate samples found that self-esteem instability and depressive symptoms were unrelated once level of self-esteem was included as a covariate (De Man & Gutierrez, 2002; Kernis, Grannemann & Mathis, 1991; Roberts et al., 1995, Studies 2 and 3).

The Current Study

Given the evidence reviewed above suggesting that self-esteem may vary even at the daily level, daily ratings of self-esteem may provide more accurate estimates of level of self-esteem than retrospective self-report, even for the same period of time. However, as is evident
from the literature review above, few existing investigations of level of self-esteem and internalizing symptoms have approached the question using daily diary methodology and hierarchical linear modeling (HLM) analyses. Moreover, none of those investigations have utilized adolescent samples. Given the critical role of self-esteem in shaping adolescents’ daily experiences (e.g., Dumont & Provost, 1999), as well as the fact that depressive and anxious symptoms often onset during adolescence (Kessler, et al., 2012; Kessler et al., 2005; Lewinsohn, Clarke, Seeley & Rohde, 1994), it is important to evaluate self-esteem at the daily level during this crucial developmental period. Therefore, the first goal of the current study was to examine relations between daily level of self-esteem and both depressive and anxious symptoms in a normative adolescent sample using HLM. Based on the literature reviewed above, we hypothesized that level of self-esteem would be negatively associated with both depressive and anxious symptoms.

The second goal of the current study was to investigate relations between self-esteem instability and internalizing symptoms using this same daily diary and HLM approach. Across the studies of self-esteem instability reviewed above, researchers have taken one of two approaches to the operationalization of the construct. In some studies, self-esteem instability was calculated as the standard deviation of daily reports of self-esteem, which fails to account for the temporal structure of fluctuations between daily measurements. Other studies operationalized self-esteem instability as a mean square of successive differences (MSSD), which takes into account the temporal nature of the fluctuations, but fails to account for error introduced through parameter estimation and participant differences in number of diaries completed (Jahng, Wood & Trull, 2008). However, to our knowledge, no investigation of self-esteem instability has approached the question using hierarchical linear modeling (HLM). In this approach, the
absolute value of the change in self-esteem from one day to the next is calculated, and these change scores are used as Level 1 dependent variables in HLM analyses. This approach is an improvement over the standard deviation and MSSD approaches because it accounts for the temporal structure of the daily data, accurately represents the number of daily measurements each participant completed, and harnesses the power of HLM to examine relations between within-person differences in fluctuations in daily self-esteem and between-person individual differences in internalizing symptoms. We predicted that self-esteem instability would be positively associated with both depressive and anxious symptoms and that these relations would remain significant when controlling for daily level of self-esteem.

**Method**

**Participants**

Participants included 150 adolescents (84 girls, 66 boys; \( M \) age = 13.53 years; \( SD = 1.32 \)). Parents reported participants’ race or ethnicity as 60% European American, 12% African American, 11% Latino American, 9% Asian American, and 8% of mixed race or ethnicity. Parents reported annual household income as less than $20,000 (3%), $20,000-$50,000 (15%), $50,000-$100,000 (26%) and greater than $100,000 (56%). All participants had taken part in previous research in our laboratory, and their parents agreed to be contacted about future studies. A total of 662 adolescents met this criterion. The families of these adolescents were contacted in a random order, and the first 150 families to complete data collection were enrolled.

**Procedure**

Families were initially recruited by telephone call, at which time the purpose of the study, as well as the procedures of the home visit and daily diaries, were explained in detail. Families who agreed to participate were scheduled for a home visit.
Home visit. Participating parents provided consent and youth provided assent at the beginning of the home visit for both home visit and daily diary procedures. Afterward, parents and youth each completed questionnaires. Adolescents reported on their depressive and anxious symptoms. Parents reported on family demographic information and pubertal status (Petersen, Crockett, Richards, & Boxer, 1988). Daily diary procedures were then explained, and parents and adolescents were each compensated $20 at the end of the visit.

Daily diaries. On the Monday after the home visit, participants began completing daily diaries. For twelve consecutive evenings, participants received a text or email reminder about 30-60 minutes before going to bed. Diaries were completed through the online survey website Qualtrics.com on the participant’s choice of internet-connected device. Diary questions asked adolescents to report on their daily positive and negative affect and daily self-esteem, as well as their sleep hours the previous evening. On average, diaries required 16 minutes to complete. While completing the diaries, participants were asked to reflect on the entirety of their day.

Diaries were included in analyses if they were completed between 7PM and 3AM. At the conclusion of the daily diary period, participants were paid $2 for each diary they completed. In addition, participants received one entry into each of three separate lotteries for each diary completed, and they received 12 additional entries into each lottery if they completed all 12 daily diaries. At the end of the study, a participant was randomly selected from each lottery to win a $100 Amazon gift card.

A small number of participants continued to complete surveys beyond the twelve-day daily diary period. Specifically, three participants completed 13 surveys, and two participants completed 14 surveys. For the purposes of calculating daily diary compliance, these participants were considered to be 100% compliant.
For all remaining participants, daily diary compliance was calculated by dividing the number of diaries completed by 12. Overall, participants completed an average of 82.94% of the daily diaries. However, only those participants who completed at least five daily diaries were included in analyses. Of the 150 participants, six did not complete at least five daily diaries, yielding a final sample of 144. These 144 participants completed an average of 85.6% of daily diaries. Specifically, 39.0% completed 12+ surveys, 21.5% completed 11 surveys, 11.1% completed 10 surveys, 3.8% completed 9 surveys, 11.5% completed 8 surveys, 6.9% completed 7 surveys, 3.5% completed 6 surveys, and 2.8% completed 5 surveys.

Measures

**Depressive symptoms.** During the home visit, adolescents completed the 12-item Child Depression Inventory 2, Short Version (Kovacs, 2011). For each item, adolescents marked one of three statements best describing their feelings within the past two weeks. For example, adolescents were asked to mark one of the following statements: “I am sad once in a while,” “I am sad many times,” “I am sad all the time.” The CDI-2 has demonstrated good internal consistency and short-term stability and is able to distinguish youth with Major Depressive Disorder from those with other psychopathology (e.g., Bae, 2012). In the current study, Cronbach’s alpha was .83.

**Anxious symptoms.** During the home visit, adolescents completed the 39-item Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997). A sample item is “I feel tense or uptight.” Adolescents responded on a scale from 1=*never true about me* to 4=*often true about me*. The MASC has demonstrated good internal reliability across diverse clinical and community samples (Grills-Taquechel, Ollendick & Fisak, 2008; Kingery, Ginsburg & Burnstein, 2009; Rynn et al., 2006). Additionally, it is
positively related to other measures of anxiety (Baldwin & Dadds, 2007; Rynn, et al., 2006) and is appropriately accurate in distinguishing children with anxiety disorder diagnoses from those without (e.g., Grills-Taquechel et al., 2008). In the current study, Cronbach’s alpha was .91.

**Daily self-esteem.** Participants completed an adapted version of the Rosenberg Self-esteem Scale (RSES; Rosenberg, 1979) each evening. The adaptation consisted of adding the word “Today” to the beginning of each item. Participants rated the degree to which they agreed with 10 statements on a scale from 1=strongly agree to 4=strongly disagree. A sample item is “Today, at times, I thought I was no good at all.” The RSES is a valid and reliable measure of adolescent self-esteem (e.g., Hagborg, 1993; Keith & Bracken, 1996). Regarding convergent and discriminant validity, in both community and clinical samples, the RSES relates positively to other measures of global self-esteem, including the Lerner Self-Esteem Scale (Savin-Williams & Jaquish, 1981) and the Global Self-Worth factor of the Harter Self Perception Profile for Adolescents (e.g., Hagborg, 1993), as well as negatively to emotional and behavioral problems, including somatic, depressive and anxious symptoms (e.g., Bagley, Bolitho, & Bertrand, 1997; Bagley & Mallick, 2001). Furthermore, previous studies have reported Cronbach’s alphas for the RSES between .72 and .88 (Gray-Little, Williams & Hancock, 1997), and factor analyses suggest a one-factor model across samples (Hensley, 1977; Shevlin, Bunting & Lewis, 1995). The RSES has been previously adapted for daily use as a measure of self-esteem instability (e.g., Kernis, Granneman & Barclay, 1989).

To calculate the reliability of the RSES, between- and within-person reliability coefficients were obtained (Bolger & Laurenceau, 2013). The between-person coefficient indicates how well the items capture daily self-esteem across adolescents, while the within-person coefficient indicates how reliably the items capture day-to-day changes in self-esteem.
Reliability was acceptable for both between- and within-person estimates for the RSES (Bolger & Laurenceau, 2013; Iida, Shrout, Laurenceau, & Bolger, 2012; see Table 1).

**Daily affect.** Participants completed the Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999) each evening. Participants rated the extent to which they felt each of 27 emotions over the course of the day on a 5-point scale (i.e., “How much did you feel…”; 1 = *very slightly* and 5 = *extremely*). Ratings on 12 positive affect items were averaged to form a measure of daily positive affect, and ratings on 15 negative affect items were averaged to form a measure of daily negative affect. The PANAS-C is a valid and reliable measure of child and adolescent positive and negative affect (e.g., Huebner & Dew, 1995; Laurent et al., 1999). In both clinical and community samples, the positive affect scale negatively predicts depression, whereas the negative affect scale relates positively to both depression and anxiety (Laurent et al., 1999). Additionally, multilevel confirmatory factor analyses reveal that the PANAS-C reliably estimates both trait (i.e., between-person) and state (i.e., within-person) levels of daily moods (e.g., Merz & Roesch, 2011). Reliability was acceptable for both between- and within-person estimates for both negative and positive affect (see Table 1).

**Results**

**Preliminary Analyses**

Means, standard deviations, and ranges for all variables are provided in Table 1. Both depressive and anxious symptoms were positively skewed. To reduce risk of biased estimates due to non-normally distributed errors, we used maximum likelihood estimation with robust standard errors (MLR) in all primary analyses via Mplus Version 7.

We examined whether age, gender, race/ethnicity, or pubertal status related to adolescents’ daily self-esteem at the between-person level. No significant associations emerged
for age, race/ethnicity or pubertal status. However, gender (dummy coded as 0 = girls and 1 = boys in all analyses) significantly predicted adolescents’ self-esteem across the daily diary days. Specifically, girls reported lower levels of self-esteem than boys, $F(1,142)=6.754, p<.05$. As such, gender was included as a between-person covariate in all analyses.

In terms of within-subjects covariates, time (daily diary day 1-12) was included as a within-person covariate in all analyses, in line with guidance provided by Bolger and Laurenceau (2013). In addition, we assessed the effects of sleep hours on daily self-esteem, and it was a significant predictor ($B=.192, t= 2.74, p=.006$). Thus, time and sleep hours were included as within-person covariates in all analyses.

**Internalizing Symptoms as Predictors of Level of Daily Self-Esteem**

The goal of the first analysis was to examine whether individual differences in internalizing symptoms predicted the level of self-esteem adolescents reported on a daily basis. We hypothesized that both depressive symptoms and anxious symptoms would negatively predict adolescents’ daily levels of self-esteem.

**Data analytic approach.** HLM was used to account for the nested structure of the data (12 diary days within 144 adolescents). In this analysis, daily self-esteem served as the dependent variable and depressive and anxious symptoms served as predictors. A random intercept was additionally included in the model. Within-person covariates were time (daily diary day, centered by subtracting 1 to aid interpretation of the intercept), sleep hours (group-mean-centered for each adolescent), and daily positive and negative affect (both group-mean centered for each adolescent). Between-person predictors were gender, the adolescent’s average positive and negative affect across the daily diary period, and depressive and anxious symptoms. Because affect is strongly correlated with both internalizing symptoms and self-esteem, daily positive and
negative affect were included as covariates to isolate the effect of self-esteem on internalizing symptoms.

**Results.** Results are presented in Table 2. In line with expectations, depressive symptoms emerged as a significant negative between-person predictor of level of daily self-esteem. However, contrary to expectations, a similar relation did not emerge for anxious symptoms.

**Internalizing Symptoms as Predictors of Instability of Daily Self-Esteem**

The goal of the second analysis was to examine whether individual differences in internalizing symptoms predicted self-esteem instability across the daily diary days. We hypothesized that both depressive and anxious symptoms would positively predict instability in daily self-esteem.

**Data analytic approach.** HLM was again used to account for the nested structure of the data. To calculate instability in daily self-esteem, the absolute value of the change in self-esteem from one day to the next was used as the dependent variable. For example, adolescents with 12 completed daily diaries had 11 within-person self-esteem change scores, with the first score representing the absolute value of the change from the first to the second day and the last score representing the absolute value of the change from the 11th to the 12th day. These change scores were used as Level 1 variables in our model. A random intercept was included in the model. Within-person predictors were time, sleep hours (the number of hours the adolescent reported sleeping between the two daily diary days for which a difference score was calculated; group-mean centered for each adolescent), and adolescents’ positive and negative affect and level of self-esteem on the second of the two days for which a difference score was calculated (each group-mean centered for each adolescent). Between-person predictors were gender, the adolescent’s average positive and negative affect across the daily diary period, and depressive
and anxious symptoms (grand-mean centered in all analyses).

**Results.** Results are presented in Table 3. As expected, depressive symptoms emerged as a significant positive between-person predictor of daily changes in level of self-esteem. This effect indicates that, for the average adolescent, a one unit increase in depressive symptoms was associated with a 0.19 change in the absolute value of self-esteem from day to day. Anxious symptoms did not emerge as a significant predictor of self-esteem instability.

**Discussion**

The goals of the current study were to investigate the relations of depressive and anxious symptoms with both level and instability of daily self-esteem in a community sample of adolescents. We hypothesized that both depressive and anxious symptoms would be negatively related to level of daily self-esteem and positively related to instability of daily self-esteem. To our knowledge, studies of self-esteem instability have not taken a daily diary or HLM approach, and so this investigation is notable for the rigor of its methodology and analyses.

**Internalizing Symptoms and Level of Daily Self-Esteem**

In line with hypotheses, a negative association emerged between level of daily self-esteem and depressive symptoms. When both anxious and depressive symptoms at baseline were included in the model, adolescents who reported higher levels of depressive symptoms during an initial home visit reported lower levels of self-esteem as they completed their daily diaries. Given the strong body of empirical evidence supporting negative links between self-esteem level and depressive symptoms (e.g., Sowislo & Orth, 2013), that depression and self-esteem were related is unsurprising. This negative relation is consistent with theoretical models that implicate self-esteem in the etiology and maintenance of Major Depressive Disorder (e.g. Beck, 2003; Brown & Harris, 2011), as well as related empirical work linking lower self-esteem with
dampened positive affect following positive events (Wood, Heimpel & Michela, 2003).

Importantly, these findings extend previous research by asking participants to rate their self-esteem each day for 12 consecutive days, when the vast majority of previous work has asked participants to provide a single global rating of their self-esteem. This is an important step, given documented fluctuations in level of daily self-esteem (e.g., Kernis et al., 1993), as well as self-esteem reactivity to daily events (e.g., Nezlek & Plesko, 2001), including peer experiences in adolescence (Thomaes, Reigntjes, Orobio de Castro, Bushman, Poorthuis & Telch, 2010). Furthermore, the use of daily ratings of self-esteem limits retrospective bias inherent in global self-report measures and may reduce socially-influenced responding, which results in non-normal distributions of self-esteem on global measures (Schmitt & Allik, 2005). Finally, and notably, the relation between depressive symptoms and daily self-esteem emerged even after controlling for level of daily positive and negative affect, providing evidence that the relation between self-esteem and depressive symptoms at the daily level is not simply an artifact of the relation between affect and internalizing symptoms, as has sometimes been suggested (e.g., Clausen, Fisher & Beevers, 2015).

However, and contrary to predictions, when controlling for depressive symptoms, adolescents’ anxious symptoms were not significantly related to level of self-esteem as they completed their daily diaries. This null finding is surprising given strong links between anxious symptoms and self-esteem in previous research (e.g., Sowislo & Orth, 2013). However, while we chose to include depressive and anxious symptoms in the same model, most previous research did not control for depressive symptoms when examining links between self-esteem and anxious symptoms. It is possible that anxious symptoms are not uniquely related to self-esteem when depressive symptoms are covaried. Another possible explanation for these discrepant findings is
our use of daily diary methodology and an HLM analytic approach, which differs from previous work and may add to our understanding of whether a relation between self-esteem and anxious symptoms in fact exists.

**Internalizing Symptoms and Instability of Daily Self-Esteem**

As hypothesized, a positive relation emerged between instability of daily self-esteem and depressive symptoms. Using rigorous HLM analyses in which day-to-day change in self-esteem served as the Level 1 dependent variable, adolescents who reported more depressive symptoms also reported greater day-to-day fluctuations in their self-esteem, even after controlling for daily level of self-esteem. Thus, this result suggests that adolescents suffering from depressive symptoms tend not only to feel worse about themselves on average on any given day, but also to experience greater ebbs and flows in their self-esteem from day to day. This finding clarifies inconsistencies in previous studies which operationalized self-esteem instability in a way that did not account for the temporal structure of the fluctuations or differences in the number of daily diaries completed. Moreover, this approach mitigates concern about the shared method variance inherent in having adolescents report on both their depressive symptoms and self-esteem instability, since participants are unlikely to pay close attention to the extent to which their self-esteem ratings vary from one day to the next.

Contrary to hypotheses and previous research (Farmer & Kashdan, 2015; Oosterwegel et al., 2001), instability of daily self-esteem was unrelated to adolescents’ anxious symptoms. However, prior work differed from the current study in that previous studies focused on social anxiety specifically, whereas we assessed anxious symptoms more broadly; although the measure of anxiety used in the current study includes a subscale to assess social anxiety, the discriminant validity of that subscale as a stand-alone measure is questionable (Anderson,
Jordan, Smith, & Inderbitzen-Nolan, 2009). Given the role that social interactions play in self-esteem (sociometer theory; Leary & Baumeister, 2000), fluctuations in self-esteem may be more closely linked to the sensitivity to social feedback inherent in social anxiety than to more generalized worry.

The differential findings that emerged between instability of daily self-esteem and depressive versus anxious symptoms may also be linked to differences in the temporal orientation of these two types of internalizing symptoms. Specifically, depressive symptoms result from backward-looking rumination over previous experiences, whereas anxious symptoms emerge from forward-looking worry about future events (Wenze, Gunthert & German, 2012). Rumination about the ups-and-downs of previous daily experiences may be more closely linked to concordant fluctuations in daily self-esteem, whereas more trait-like anticipatory worry characteristic of anxious symptoms may not demonstrate such strong ties to the ebbs and flows of daily self-esteem. Of course, this speculation would be best tested in an investigation using daily measures of both self-esteem and depressive and anxious symptoms, a goal that we consider an important next step in this line of work.

Limitations and Future Directions

This study is marked by several important limitations, each of which suggests a direction for future research. First, the current study utilized a community sample rather than a clinical sample; the adolescents evaluated here experienced relatively low levels of depressive and anxious symptoms and high levels of self-esteem. It is notable that strong links between daily self-esteem and depressive symptoms emerged even in such a normative sample of adolescents. At the same time, the findings reported here may not generalize to a higher-risk sample or a sample of adolescents currently experiencing clinically significant depressive symptoms. It will
be important for future researchers to address the connections between daily self-esteem and depressive symptoms using daily diary methodology and HLM analyses in clinical samples of adolescents.

Second, the concurrent nature of our data means that no assumptions about causation should be made regarding the links between daily self-esteem and depressive symptoms. Research investigating the directionality of the relation between level of self-esteem and depressive symptoms is mixed, with some studies finding that low self-esteem is a preceding risk factor for depressive symptoms (e.g., Butler, Hokanson, & Flynn, 1994), whereas others find a bidirectional relation (e.g., Rosenberg, Schooler & Schoenbach, 1989). Investigations of the directionality of the relation between self-esteem instability and internalizing symptoms are far more limited, but both the existing empirical literature (e.g., Butler et al., 1994) and theory (e.g., Roberts & Monroe, 1994) purport that self-esteem instability may make individuals more vulnerable to the future onset of internalizing symptoms. Given the limited scope of previous work, it will be important to continue longitudinal investigations of the directionality of relations between internalizing symptoms and both level and instability of daily self-esteem, with an emphasis on analyses that differentiate between overall variability versus day-to-day instability in self-esteem.

Finally, a subset of the studies reviewed above on self-esteem instability and internalizing symptoms included the interaction between self-esteem level and self-esteem instability in their models (DeMan & Gutierrez, 2002; Kernis et al., 1991; Roberts et al., 1995). Unfortunately, the nature of our analyses precluded us from examining this interaction. Specifically, in investigations which do not take a daily diary approach, self-esteem variables often serve as predictor variables, and internalizing symptoms often serve as outcome variables, making the
examination of the interaction described above feasible. In contrast, when HLM analyses are used, instability of daily self-esteem serves as the Level 1 outcome variable, internalizing symptoms serve as a Level 2 predictor, and level of daily self-esteem may be included as a Level 1 covariate, an approach which makes the examination of the interaction between level and instability of self-esteem impossible. The results of studies examining this interaction are quite inconsistent. Kernis and colleagues (Kernis et al., 1991) found that the relation between self-esteem level and depressive symptoms was stronger for individuals with stable self-esteem than those with unstable self-esteem, although Roberts and colleagues (Roberts et al., 1995) were unable to replicate this result. In contrast, De Man and Gutierrez (2002) reported that individuals with unstable low self-esteem reported more suicidal ideation than those with stable low self-esteem, stable high self-esteem, or unstable high self-esteem. Given these inconsistencies, it seems important to continue to work to understand how level and instability of self-esteem interact with one another in the prediction of internalizing symptoms, although this line of work may need to continue separately from investigations that take a daily diary and HLM approach.

Conclusions

In summary, the current study examined relations between depressive and anxious symptoms and level and instability of daily self-esteem in a normative adolescent sample. Both level and instability of daily self-esteem demonstrated a link to depressive symptoms and not anxious symptoms. We look forward to future work building on these findings through continued use of daily diary methods and HLM analyses, the incorporation of longitudinal designs, and extension to clinical samples.
References


Experimental Psychiatry, 50, 15–22. DOI:10.1016/j.jbtep.2015.04.010


Judge, T. A., Hurst, C., & Simon, L. S. (2009). Does it pay to be smart, attractive, or confident (or all three)? Relationships among general mental ability, physical attractiveness, core self-evaluations, and income. *Journal of Applied Psychology, 94*(3), 742–755. DOI:10.1037/a0015497


esteem in psychological functioning. *Journal of Personality, 73*(6), 1–37. DOI:10.1111/j.1467-6494.2005.00359.x


DOI:10.1007/s10578-009-0126-0


DOI:10.1037/1040-3590.11.3.326


DOI:10.1080/15374410802698396

DOI:10.1097/00004583-199407000-00006


Riketta, M. (2004). Does social desirability inflate the correlation between self-esteem and anxiety? *Psychological Reports, 94*, 1232–1234. DOI:10.2466/PR0.94.3.1232-1234


DOI:10.1037/a0028931


DOI:10.1177/002248717202300114


von Soest, T., Wichström, L., & Kvalem, I. L. (2016). The development of global and domain-


Table 1

*Bivariate Correlations and Descriptive Statistics*

<table>
<thead>
<tr>
<th></th>
<th>Self-esteem</th>
<th>Self-esteem Change</th>
<th>Positive Affect</th>
<th>Negative Affect</th>
<th>Depressive Symptoms</th>
<th>Anxious Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem</td>
<td>-</td>
<td>-.480***</td>
<td>.552***</td>
<td>-.446***</td>
<td>-.632***</td>
<td>-.436***</td>
</tr>
<tr>
<td>Self-esteem Change</td>
<td>-.142</td>
<td>-</td>
<td>-.399**</td>
<td>.361</td>
<td>.589***</td>
<td>.337*</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>.382***</td>
<td>.050</td>
<td>-</td>
<td>-.036</td>
<td>-.501***</td>
<td>-.343**</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>-.351***</td>
<td>.168**</td>
<td>-.166**</td>
<td>-</td>
<td>.302**</td>
<td>.206</td>
</tr>
<tr>
<td>Depressive Symptoms</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.570***</td>
</tr>
<tr>
<td>Anxious Symptoms</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mean</td>
<td>3.441</td>
<td>0.230</td>
<td>3.298</td>
<td>1.352</td>
<td>1.273</td>
<td>2.026</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.509</td>
<td>0.298</td>
<td>0.912</td>
<td>0.559</td>
<td>0.285</td>
<td>0.395</td>
</tr>
<tr>
<td>Range</td>
<td>1.30-4.00</td>
<td>0.00-2.20</td>
<td>1.00-5.00</td>
<td>1.00-5.00</td>
<td>1.00-2.83</td>
<td>1.31-3.13</td>
</tr>
<tr>
<td>Within-Person Reliability</td>
<td>.78</td>
<td>-</td>
<td>.86</td>
<td>.82</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Between-Person Reliability</td>
<td>.91</td>
<td>-</td>
<td>.93</td>
<td>.89</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* Within-person correlations are shown below the diagonal, and between-person correlations are shown above the diagonal. Means, standard deviations, and ranges are between-person. *p < .05, **p < .01, ***p < .001
Table 2
Multilevel Models of Daily Self-Esteem Level as a Function of Depressive and Anxious Symptoms

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>Est/SE</th>
<th>p</th>
<th>CI95 Lower</th>
<th>CI95 Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>3.401</td>
<td>.033</td>
<td>101.804</td>
<td>.000</td>
<td>3.335</td>
<td>3.466</td>
</tr>
<tr>
<td>Within</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>0.005</td>
<td>.003</td>
<td>1.962</td>
<td>.050</td>
<td>0.000</td>
<td>0.010</td>
</tr>
<tr>
<td>Sleep Hours</td>
<td>0.006</td>
<td>.007</td>
<td>0.836</td>
<td>.403</td>
<td>-0.008</td>
<td>0.020</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>0.189</td>
<td>.026</td>
<td>7.258</td>
<td>.000</td>
<td>0.138</td>
<td>0.240</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>-0.239</td>
<td>.049</td>
<td>-4.885</td>
<td>.000</td>
<td>-0.335</td>
<td>-0.143</td>
</tr>
<tr>
<td>Between</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.049</td>
<td>.053</td>
<td>0.916</td>
<td>.360</td>
<td>-0.056</td>
<td>0.153</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>0.178</td>
<td>.039</td>
<td>4.604</td>
<td>.000</td>
<td>0.102</td>
<td>0.253</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>-0.277</td>
<td>.087</td>
<td>-3.188</td>
<td>.001</td>
<td>-0.447</td>
<td>-0.107</td>
</tr>
<tr>
<td>Depressive Symptoms</td>
<td>-0.490</td>
<td>.109</td>
<td>-4.491</td>
<td>.000</td>
<td>-0.704</td>
<td>-0.276</td>
</tr>
<tr>
<td>Anxious Symptoms</td>
<td>-0.067</td>
<td>.075</td>
<td>-0.901</td>
<td>.367</td>
<td>-0.214</td>
<td>0.079</td>
</tr>
</tbody>
</table>

Note. B = unstandardized beta, SE = standard error.
Table 3
Multilevel Models of Daily Self-Esteem Instability as a Function of Depressive and Anxious Symptoms

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>Est/SE</th>
<th>p</th>
<th>CI&lt;sub&gt;95&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercepts</td>
<td>0.310</td>
<td>0.025</td>
<td>12.498</td>
<td>.000</td>
<td>0.261 0.358</td>
</tr>
<tr>
<td>Within Time</td>
<td>-0.008</td>
<td>0.003</td>
<td>-2.707</td>
<td>.007</td>
<td>-0.013 -0.002</td>
</tr>
<tr>
<td>Sleep Hours</td>
<td>-0.010</td>
<td>0.010</td>
<td>-1.081</td>
<td>.280</td>
<td>-0.029 0.008</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>0.030</td>
<td>0.024</td>
<td>1.262</td>
<td>.207</td>
<td>-0.017 0.076</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>0.120</td>
<td>0.039</td>
<td>3.089</td>
<td>.002</td>
<td>0.044 0.197</td>
</tr>
<tr>
<td>Between Gender</td>
<td>-0.082</td>
<td>0.025</td>
<td>-3.274</td>
<td>.001</td>
<td>-0.131 -0.033</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>-0.015</td>
<td>0.023</td>
<td>-0.637</td>
<td>.524</td>
<td>-0.059 0.030</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>0.079</td>
<td>0.062</td>
<td>1.276</td>
<td>.202</td>
<td>-0.042 0.201</td>
</tr>
<tr>
<td>Self-esteem Level</td>
<td>-0.033</td>
<td>0.057</td>
<td>-0.581</td>
<td>.561</td>
<td>-0.146 0.079</td>
</tr>
<tr>
<td>Depressive Symptoms</td>
<td>0.194</td>
<td>0.069</td>
<td>2.799</td>
<td>.005</td>
<td>0.058 0.330</td>
</tr>
<tr>
<td>Anxious Symptoms</td>
<td>-0.017</td>
<td>0.056</td>
<td>-0.310</td>
<td>.756</td>
<td>-0.128 0.093</td>
</tr>
</tbody>
</table>

Note. B = unstandardized beta, SE = standard error.