UNDERSTANDING INSTABILITY OF DAILY SELF-ESTEEM IN ADOLESCENTS:

TEMPORAL RELIABILITY AND CONCURRENT AND LONGITUDINAL RELATIONS TO DEPRESSIVE AND ANXIOUS SYMPTOMS

by

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ABSTRACT

Though much of the research on self-esteem has focused on level of self-esteem, a growing body of research has examined implications of self-esteem instability, or the degree to which an individual's self-esteem tends to fluctuate across relatively short time periods. Existing research suggests that self-esteem instability and internalizing symptoms are related. However, this linkage has seldom been explored in adolescence, and little is known about how these constructs are related over time. The current study addressed three questions: 1) How consistent is the construct of self-esteem instability during adolescence? 2) Is daily self-esteem instability positively related to depressive symptoms, but unrelated to anxious symptoms in mid-adolescence, as our previous research found during early adolescence? 3) Does self-esteem instability in early adolescence predict internalizing symptoms in mid-adolescence, do internalizing symptoms in early adolescence predict self-esteem instability in mid-adolescence, or are relations between the two constructs bidirectional across this age span?

The current project used data collected at two time points [Time 1 (T1) and Time 2 (T2)]. At T1, the Hubbard Lab collected data from 150 adolescents in the 7th or 8th grade. During a home visit, adolescents reported on their internalizing symptoms (depression, anxiety). In addition, adolescents completed an online daily diary each evening for 12 consecutive evenings, in which they reported on their daily self-esteem.

At T2, the Hubbard Lab collected data from 147 adolescents in the 10th or 11th grade. Participants included 82 of the 150 adolescents from T1, plus 65 additional adolescents from the same cohort. During a lab visit, adolescents reported on their internalizing symptoms (depression and anxiety). In addition, adolescents completed an online daily diary each evening for 14 consecutive evenings, in which they reported on their daily self-esteem.

For Question 1, we hypothesized that the extent to which adolescents' self-esteem fluctuates day-to-day at age 13 would not differ from the extent to which their self-esteem fluctuates day-to-day at age 15. For Question 2, we hypothesized that daily self-esteem instability would be positively related to depressive symptoms but unrelated to anxious symptoms at age 15, mirroring our results at age 13. For Question 3, we hypothesized that stronger support would emerge for the vulnerability model (earlier self-esteem instability predicting later internalizing symptoms) than the scar model (earlier internalizing symptoms predicting later self-esteem instability), particularly for depressive symptoms.

Findings for Question 1 were in line with our hypothesis; self-esteem instability remained consistent between the ages of 13 and 15. However, results for Questions 2 and 3 were in contrast to our hypotheses. For Question 2, instability of daily self-esteem was positively linked to anxious but not depressive symptoms at age 15. For Question 3, results provide support for the scar model and not the vulnerability model; moreover, the scar model was supported for anxious symptoms but not depressive symptoms.

Findings are discussed in the context of developmental trends in both self-concept formation and internalizing symptoms. In addition, we discuss implications

for advancing our understanding of cross-sectional and longitudinal relations between self-esteem instability and internalizing symptoms.

Chapter 1

INTRODUCTION

Global self-esteem is conceptualized as the evaluative component of self-concept (e.g., Blascovich & Tomaka, 1991). The construct is defined as an individual's overall assessment of their worth, or the extent to which they like and value themself (Leary & Baumeister, 2000; Rosenberg et al., 1995). Like other attitudes, self-esteem is composed of both a set of specific evaluative beliefs and an overall affective (positive or negative) alignment (Brown, 2014). 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 et al., 2016).

Self-Esteem Across the Lifespan

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 et al., 1984; Trowbridge, 1972) and through the transition to early adolescence (e.g., Eccles et al., 1989; Robins et al., 2002; Simmons et al., 1973). In contrast, self-esteem generally increases from late adolescence into middle adulthood (e.g., Erol & Orth, 2011; Galambos et al., 2006; Shaw et al., 2010).

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 et al., 1991) while others report a decline (e.g., Keltikangas-Järvinen, 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 et al., 1997).

Given the shifting nature of self-esteem in adolescence, researchers have theorized that this developmental stage may be a particularly important time to study the construct (e.g., Birkeland et al., 2012; Trzesniewski et al., 2013). Adolescence is a critical developmental period during which individuals experience dramatic maturational, interpersonal, and contextual changes. Strong evidence supports the importance of similar self- and identity-related constructs, such as self-concept (e.g., Shapka & Keating, 2005; Tanti et al., 2008) and identity formation (e.g., Klimstra et al., 2010; Luyckx, et al., 2008), in understanding developmental trajectories in adolescence.

Self-Esteem and Internalizing Symptoms

Existing literature points to self-esteem as an important correlate of 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 et al., 2008), salary (e.g., Judge et al., 2009), and physical health (e.g., Benyamini et al., 2004) and negative relations to neuroticism/negative affectivity (Dua, 1993; Watson et al., 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 et al., 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).

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 et al., 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 and colleagues (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 et al., 2008) and mid 30s (Steiger et al., 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 et al., 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

While most research has focused on self-esteem at the trait level, 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 are likely distinct constructs, with evidence suggesting that the relation between the two is weak but negative (Okada, 2010). Theorists have suggested that self-esteem instability is a fairly consistent trait (Deci & Ryan, 1995; Kernis, 2003) and likely reflects an individual's reactivity to both external and internal stimuli (e.g., sensitivity to evaluation, sources of self-esteem, salient components of identity; Kernis et al., 1992).

Importantly, both theory and research support the argument that, though conceptually related, self-esteem instability and contingent self-esteem should be considered distinct constructs. Whereas self-esteem instability is the degree to which self-esteem fluctuates across relatively short periods (e.g., Kernis, 2003, 2005), contingent self-esteem is the degree to which self-esteem fluctuates in response to self-relevant events (e.g., Crocker & Park, 2004; Crocker & Wolfe, 2001). Contingent self-esteem can play a role in daily fluctuations in self-esteem; for example, Crocker and colleagues (2002) found that the more students' self-esteem was contingent on academic competence, the greater the impact of their acceptances and rejections to graduate programs on their daily self-esteem. However, and importantly, research suggests that self-esteem instability and contingencies of self-worth are only modestly related (Meier et al., 2011; Sowislo et al., 2014). Furthermore, recent research suggests that self-esteem instability may help explain the links between contingent self-esteem and later internalizing symptoms; in a sample of adolescent females, Ching and colleagues (2021) found that self-esteem instability mediated the

relationship between body contingent self-worth and later depressive symptoms (Ching et al., 2021). This likely reflects both non-contingent shifts in self-esteem (e.g., due to internal processes), as well as differences in the ways that individuals interpret the self-esteem relevance, and evaluative implications, of daily events (Greenier et al., 1999; Kernis, 2005). In other words, even at the same levels of contingent self-worth, individual differences in event interpretation may result in variation in reactivity to an event. For example, after receiving a poor grade on an exam, two individuals who place the same importance on academic competence may experience differing changes in their self-esteem, if one catastrophizes that a poor exam grade is going to cause them to fail the course and flunk out of school, whereas the other rationalizes that there will be other graded assignments in the course to bring up their grade.

In his recent work reviewing the neuroscience of self-concept, Heatherton (2011) argues that instability of self-esteem fundamentally reflects a failure of a self-regulatory process. Self-regulation consists of affective, motivational, behavioral, and cognitive components, and problems in any of these components may promote distress (e.g., Bandura, 1991; Endler & Kocovski, 2000). Endler and Kocovski (2000) posit that an important cognitive and affective component of self-regulation is self-evaluation, or the analysis of how one is doing in comparison to a goal. A primary means by which individuals self-evaluate is by comparing one's own performance to others' performance; this self-evaluative process occurs across domains (e.g., social, academic, athletic; Dijkstra et al., 2010; Festinger, 1954). Consistent with the idea of self-evaluation through social comparison, fMRI research has identified the mentalizing system, specifically the medial prefrontal cortex and the precuneus, as

responsible for modulating changes in state self-esteem (Eisenberger et al., 2011; Kawamichi et al., 2018).

Social evaluative comparisons lead to self-related affective reactions and cognitions, which then feed back into self-esteem as part of the self-regulatory cycle (Rhodewalt & Tragakis, 2003). Stable self-esteem requires clear contingencies between these self-evaluative comparisons and self-worth. Individuals with stable self-esteem have a clear self-concept (be it positively or negatively valenced), and as a result, when they make self-evaluative comparisons, their affective reactions and cognitions are both predictable and predictably impact self-esteem, reinforcing their existing level of self-esteem. For example, when individuals with positively-valenced stable self-esteem are not meeting their goals, they adjust their behavior to better meet those goals without engaging in negative affective reactions and cognitions that would adversely impact their self-worth. Similarly, even when individuals with negatively-valenced stable self-esteem are meeting their goals, they still engage in negative affective reactions and cognitions that serve to reinforce their poor self-worth.

In contrast, individuals with unstable self-esteem do not have fixed contingencies between their self-evaluative comparisons and their self-worth, leading to affective reactions and cognitions that are unpredictable and that unpredictably impact self-esteem. These individuals often engage in maladaptive behaviors and self-regulatory strategies, such as perseverative self-monitoring and self-appraisal (Endler & Kocovski, 2000), that generate external feedback and resulting affective reactions and cognitions, which in turn reinforce their level of self-esteem (Rhodewalt & Tragakis, 2003). Using an example in the social domain, individuals with low unstable self-esteem may engage in problematic or alienating behaviors toward relational

partners who treat them well. In contrast, individuals with high unstable self-esteem may make repeated attempts to solicit positive feedback and may be hypervigilant to, as well as defensively reactive against, negative feedback. These same processes apply to self-evaluation in both interpersonal (e.g., social performance) and non-interpersonal (e.g., academic or athletic performance) contexts and suggests that self-esteem instability may be driven by heightened sensitivity to feedback and attentional biases to failure (e.g., Crocker, 2002; Strauman, 2017).

These shorter-term fluctuations in self-esteem have been assessed using two distinct approaches in existing research (Altmann & Roth, 2018). The first is to ask participants to provide a one-time report of the degree to which their self-esteem tends to fluctuate (self-esteem instability; e.g., Roth & Altmann, 2020) or is dependent on external factors (contingent self-worth; e.g., Crocker & Wolfe, 2001). Much of the existing research on self-esteem instability has taken this approach. This body of research emphasizes the importance of self-esteem instability in understanding psychological distress (Roth & Altmann, 2020), linking self-esteem instability to internalizing symptoms (e.g., Chabrol et al., 2006; van Tuijl et al., 2018), borderline personality symptoms (e.g., Chabrol et al., 2006; Maraz et al., 2016), paranoia (Raes & van Gucht, 2009), self-handicapping (behaviors intended to change performance attributions and assessment; e.g., Arab Mohebi Shahrabi et al., 2016), and the imposter phenomenon (Schubert & Bowker, 2019).

The second is to statistically calculate the instability of self-esteem using repeated (often daily) ratings on a general measure of self-esteem (e.g., Kernis et al., 1989). The latter approach is considered to be the "gold standard" for measuring self-esteem instability as it reduces the cognitive complexity of the measure (Chabrol et al.,

2006, p. 137), in addition to reducing the impact of retrospective bias on reporting. In comparison to the large body of research reviewed above on level of self-esteem, and the smaller body of research examining one-time measures of self-esteem instability, 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 (e.g., Zeigler-Hill & Wallace, 2012). 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 et al., 2000). In contrast, positive relations have emerged between self-esteem instability and maladaptive outcomes as diverse as defensiveness and rejection following negative feedback (Kernis et al., 1993), health risk behaviors (e.g., Martin & Knox, 1997), external self-regulatory style (Kernis et al., 2000), and adult attachment anxiety (Foster et al., 2007).

Self-esteem instability is also a key feature of both Narcissistic (e.g., Rhodewalt et al., 1998; Westen, 1990; Zeigler-Hill et al., 2010) and Borderline Personality Disorders (e.g., Hochschild Tolpin et al., 2004; Lumsden, 1993; Zeigler-Hill & Abraham, 2006). Empirical work in these populations has further clarified these assertions, specifically linking high unstable self-esteem to narcissism (e.g., Di Pierro et al., 2019; Rhodewalt et al., 1998) and low unstable self-esteem to borderline traits (e.g., Richmond et al., 2021; Zeigler-Hill & Abraham, 2006).

Importantly, the literature on self-esteem instability in personality disorders also provides support for the argument that self-esteem instability and affect instability are distinct constructs and that self-esteem instability uniquely predicts distress above

and beyond affective instability. In a recent paper focused on self-esteem and affective instability in individuals diagnosed with borderline personality disorder, Santangelo and colleagues (2017) found that although self-esteem instability and affective instability were highly correlated, group differences in self-esteem instability between Borderline Personality Disorder patients and healthy controls remained after controlling for affective instability. The same was true for affective instability after controlling for self-esteem instability. In addition, while psychopathology was related to both constructs separately, self-esteem instability was the only significant predictor of psychopathology when both self-esteem instability and affective instability were included in a multiple regression predicting psychopathology (Santangelo et al., 2017). In combination, these findings suggest that affective instability and self-esteem instability are unique and separable constructs.

Self-Esteem Instability and Internalizing Symptoms

Beyond work on personality disorders, existing literature has persuasively linked daily fluctuations in self-esteem to psychological distress more broadly (e.g., Zeigler-Hill & Wallace, 2012). Most relevant to the current project, theorists posit that self-esteem instability increases vulnerability to internalizing symptoms. This argument is consistent with the description above of self-esteem instability as a failure of the self-regulatory process driven by both affect and cognition that are reactive to positive and negative events (e.g., heightened sensitivity to feedback and attentional biases to failure). Moreover, it links this self-regulatory failure to increased internalizing symptoms specifically, as demonstrated in recent fMRI research identifying the neural processes underlying these linkages. In a study examining neural correlates of self-esteem fluctuations, Will and colleagues (2017) noted that

changes in self-esteem related to discrepancies between expected and received interpersonal feedback were associated with activity in the ventromedial prefrontal cortex (vmPFC). Importantly, the vmPFC is thought to play a role in processes underlying both depressive and anxious symptoms, including fear generalization (e.g., Greenberg et al., 2013), altered reward processing (e.g., Hu, 2018; Keedwell et al., 2005), emotion regulation (e.g., Motzkin et al., 2015), and social cognition (e.g., Hiser & Koenigs, 2018).

Consistent with these etiological models, existing research has found relations between self-esteem instability and internalizing symptoms. However, studies differ in their approach to examining this link. The first set of studies examines the association 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 and colleagues (2004) found that severity of past symptoms of depression positively predicted self-esteem variability in a sample of undergraduates. Similarly, Crowe and colleagues (2019) found that intra-day fluctuations in self-esteem were significantly higher for participants with Major Depressive Disorder than for controls. Similar relations emerged between self-esteem instability and social anxiety in studies of both clinical and community samples (Farmer & Kashdan, 2015; Oosterwegel et al., 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 & De Raedt, 2007; Franck et al., 2016; Roberts et al., 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 & Gutiérrez, 2002; Kernis et al., 1991; Roberts et al., 1995, Studies 2 and 3). Another study examined the impact of self-esteem level, self-esteem instability, and self-esteem contingency on depressive symptoms in young adults over a 6-month span. Over this time period, earlier self-esteem instability predicted later depressive symptoms even when self-esteem level and contingency were included in the model; no significant relation emerged between earlier depressive symptoms and later self-esteem instability (Sowislo et al., 2014).

Notably, none of these investigations utilized adolescent samples. As detailed above, the importance of studying self-esteem during adolescence has been well established. Given developmental shifts in self-regulation during this period (e.g., Lerner et al., 2011), as well as the critical role of self-esteem in shaping adolescents' daily experiences (e.g., Dumont & Provost, 1999), it seems especially important to examine self-esteem instability during the adolescent period. Moreover, as depressive and anxious symptoms often onset during adolescence (Kessler, et al., 2012; Kessler et al., 2005; Lewinsohn et al., 1994), understanding how daily fluctuations in self-esteem predict depressive and anxious symptoms may provide critical insight into internalizing symptoms during the crucial developmental period of adolescence. For all of these reasons, both the previous and current studies described below focused on an adolescent sample.

The Previous Study

The literature reviewed above provided a foundation for an investigation conducted in the Hubbard Lab at the University of Delaware in 2016-2017. That study served as my second-year project, as well as a precursor to the current investigation. The goals, methods, and results of this previous study are detailed below.

The first goal was to examine relations between daily level of self-esteem and global levels of both depressive and anxious symptoms in a normative sample of adolescents using multilevel modeling (MLM). 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 approached the question using daily diary methodology and multilevel modeling, and none utilized adolescent samples. Based on the literature reviewed above, we hypothesized that level of self-esteem would be negatively associated with global levels of both depressive and anxious symptoms.

The second goal was to investigate relations between self-esteem instability and global levels of internalizing symptoms using this same daily diary and MLM approach. 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 MLM analyses. 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.

We tested these hypotheses on a racially and ethnically diverse sample of 13-year-old 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 MLM analyses, level of daily self-esteem was negatively associated with depressive symptoms but not anxious symptoms. In addition, a positive relation emerged between instability of daily self-esteem and depressive symptoms when controlling for level of daily self-esteem; a similar relation did not emerge for anxious symptoms (Mlawer et al., 2021).

The Current Study

The project described above provided a good first step toward understanding the nature of daily fluctuations of self-esteem during adolescence, as well as the implications of those fluctuations for internalizing symptoms. However, the extant work on self-esteem instability and internalizing symptoms in adolescence is quite scarce, and for this reason, the overarching aim of the current investigation was to further our understanding of the construct of self-esteem instability and its relation to depressive and anxious symptoms in adolescence. Three specific goals within this overarching aim are described below.

The first goal of the current study was to examine the temporal consistency of self-esteem instability during adolescence. To our knowledge, this was the first longitudinal investigation of the consistency of self-esteem instability across any age span, although an incidental finding from a previous study indicated that initial self-esteem variability was a significant positive predictor of self-esteem variability six months later (Sowislo et al., 2014). The current investigation of self-esteem instability

expands upon this earlier research and provides important psychometric information about the construct of self-esteem instability. Based on a small literature suggesting stability during the early adolescent years in similar constructs, such as contingent self-worth (e.g., Burwell & Shirk, 2006), we hypothesized that the extent to which adolescents' self-esteem fluctuated day-to-day in early adolescence would not be different from the extent to which their self-esteem fluctuated day-to-day in mid-adolescence.

The second goal was to investigate whether the pattern of findings in the previous study during early adolescence (Mlawer et al., 2021) continued to hold during the mid-adolescent years. We hypothesized that daily self-esteem instability would be positively related to depressive symptoms but unrelated to anxious symptoms in our mid-adolescent sample, mirroring our findings during early adolescence. If a similar pattern were to be found, it would provide convergent support for the concurrent link between self-esteem instability and depressive symptoms and extend this finding to a later developmental period within adolescence.

The third goal was to examine whether self-esteem instability in early adolescence predicts internalizing symptoms during mid-adolescence, whether internalizing symptoms in early adolescence predict self-esteem instability during mid-adolescence, or whether the links between the two constructs are bidirectional across this adolescent age span. To our knowledge, extant research on self-esteem instability, including our own previous study, has primarily utilized a concurrent design, making it impossible to determine the direction of effects between the two constructs. This goal allowed us to extend the vulnerability and scar models linking self-esteem and internalizing symptoms from the construct of self-esteem itself to the

construct of self-esteem instability. Based on the work reviewed above on longitudinal links between self-esteem and internalizing symptoms, and the one existing study on longitudinal links between self-esteem variability and depressive symptoms, we hypothesized that stronger support would emerge for the vulnerability model (earlier self-esteem instability predicting later internalizing symptoms) than the scar model (earlier internalizing symptoms predicting later self-esteem instability), particularly for depressive symptoms. In further support of this hypothesis, previous research has implicated cognitive vulnerabilities such as low self-esteem and contingent self-worth in increases in depressive symptoms during adolescence (e.g., Burwell & Shirk, 2006; Roberts & Monroe, 1992).

Chapter 2

METHOD

Overview

The current project used data collected at two time points (T1, December 2016 to July 2017; T2, June 2019 to February 2020). At T1, the Hubbard Lab collected data from 150 adolescents in the 7th or 8th grade and their parents. During a home visit, adolescents reported on their internalizing symptoms (depression, anxiety), and parents reported on family demographics. In addition, adolescents completed an online daily diary each evening for 12 consecutive evenings, in which they reported on their daily self-esteem and daily positive and negative affect.

At T2, we collected data when these adolescents were in 10th or 11th grade. Participants included 82 of the 150 adolescents and their parents from T1, plus 65 additional adolescents from the same cohort, for a total *N* of 147. During a lab visit, adolescents reported on their internalizing symptoms (depression, anxiety); at the same time, parents reported on family demographics. In addition, adolescents completed an online daily diary each evening for 14 consecutive evenings, in which they reported on their daily self-esteem and daily positive and negative affect.

Participants

For the purposes of the current study, the time point we refer to as T1 was actually the second time we collected data from these participants, and the time point we refer to as T2 was actually the third time we collected data from these participants.

We decided to use this nomenclature because only the latter two time points are pertinent to the current study. However, we describe the original cohort below, because a subset of participants were recruited from that cohort.

Original Cohort

During the 2013-2014 academic year, we recruited participants from 74 4th- and 5th-grade classrooms in 9 elementary schools in the Red Clay Consolidated School District. We sent home parental permission forms with 1,910 children from these classrooms, and 62% of these children received both parental consent and child assent and completed data collection (*N* = 1191*)*. The sample was 50% males and 50% females. The racial/ethnic breakdown was 51% European American, 16% Latino American, 18% African American, 8% Asian American, and 7% of mixed race or ethnicity. The average age of the children was 10.15 years. The 9 elementary schools from which these children were recruited varied widely in the percentage of children qualifying for free or reduced lunch (range 6-93%). Of these 1191 children, 988 parents' provided permission to be re-contacted for future studies.

Time 1

At T1, we recruited a subsample of 150 of these children for additional data collection when they were in 7th or 8th grade (56% female, 44% male). The racial/ethnic breakdown was 60% European American, 12% African American, 11% Latino American, 9% Asian American, and 8% of mixed race or ethnicity. The average age of adolescents at T1 was 13.53 years. 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%).

Time 2

At T2, we recruited a subsample of the T1 sample for additional data collection when they were in 10th or 11th grade, (82 total; 42 female, 39 male, 1 other). The racial/ethnic breakdown for this subset of T1-T2 sample was 72% European American, 11% African American, 11% Asian American, 9.8% Latino American, and 6.1% of mixed race or ethnicity. We use this longitudinal T1-T2 sample to address the first and third goals of the current study.

We also recruited 65 additional adolescents from the original cohort for a total T2 *N* of 147. The gender breakdown of the full T2 sample of 147 was 68 males, 78 females, and 1 other, and the racial/ethnic breakdown of the full T2 sample was 64.6% European American, 12.2% African American, 10.2% Latino American, 6.8% Asian American, and 6.1% of mixed race or ethnicity. For adolescents without T1 data, we over-sampled those who reported high levels of internalizing symptoms in 4th and 5th grade (defined as +.70 standard deviations above the mean). This criterion has been used in previous research as a moderately conservative cutoff for identifying youth who experience elevated rates of internalizing symptoms (e.g., Feng et al., 2009). We use this full T2 sample to address the second goal of the current study.

Recruitment Procedures

At Time 2, families were initially recruited through mail, email (recruitment mail/email attached as Appendix A), and telephone contacts. Mail and email contacts were followed by a phone call, during which the purposes and procedures of the study were explained in full detail (see Appendix B for recruitment phone script). Families who verbally agreed to participate scheduled a 2-hour lab visit during which parental consent (Appendix C) and adolescent assent (Appendix D) was obtained.

Procedures

Time 1

Home visit procedures at T1

One graduate research assistant (RA) and one undergraduate RA conducted two-hour visits to each adolescent's home to collect data using paper-and-pencil measures. The graduate RA worked with the adolescent, while the undergraduate RA worked with the parent. At the beginning of the visit, parents provided consent and adolescents provided assent for both home visit and daily diary procedures. Afterward, parents and adolescents each completed a series of questionnaires, including the measures of internalizing symptoms and family demographics described below. The graduate/undergraduate RA provided the adolescent/parent participant the option of completing measures independently or having him/her read the questions aloud. Participants who chose to have the items read loud were provided with a separate packet to mark their answers privately. The graduate RA then explained and set up the daily diary procedures, and parents and adolescents were each compensated $20 at the end of the visit.

Daily diary procedures at T1

On the Monday after the home visit, the adolescent began completing daily diaries. For twelve consecutive evenings, the adolescent received a pre-programmed text or email reminder about 30-60 minutes before going to bed through a service called Letter Me Later. Diaries were completed through the online survey website Qualtrics.com on the adolescent's choice of internet-connected device. At T1, all

participants had access to an internet-connected device in their home. On average, diaries required 16 minutes to complete.

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.

At the conclusion of the daily diary period, participants were paid $2 for each diary they completed, for a possible total of $24. 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.

Time 2

Lab visit procedures at T2

A graduate RA and two undergraduate RAs conducted two-hour lab visits with each adolescent and his/her parent. An additional undergraduate RA was available as needed to babysit siblings. Following consent and assent procedures, the adolescent and his/her parent worked in separate rooms via Qualtrics on a tablet or computer to complete a series of questionnaires including the measures of internalizing symptoms and family demographics described below. The RA working with each parent and adolescent provided the participant the option of completing measures independently or having him/her read the questions aloud. Participants who chose to have the items read loud were provided with a separate tablet or computer to mark their answers privately. The graduate RA then explained and set up the daily diary procedures (including determining the adolescent's bedtime each evening that the daily diary was to be completed and determining whether the adolescent preferred to receive reminders about the diary via text or email). Parents ($10) and adolescents ($25) were compensated at the end of the visit.

Daily diary procedures at T2

The adolescent began completing daily diaries the evening after the lab visit. For fourteen consecutive evenings, the adolescent received a pre-programmed text or email reminder about 30-60 minutes before going to bed through a service called Letter Me Later. Diaries were completed through the online survey website Qualtrics.com on the adolescent's choice of internet-connected device. All adolescents had access to an internet-connected device. On average, diaries required 13 minutes to complete.

A small number of participants continued to complete surveys beyond the fourteen-day daily diary period. Specifically, six participants completed 15 surveys, one participant completed 16 surveys, and one participant completed 18 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 14. Overall, participants completed an average of 82.19% of the daily diaries. However, only those participants who completed at least five daily diaries were included in analyses. Of the 147 participants, nine did not complete at least five daily diaries, yielding a final sample of 138.

These 138 participants completed an average of 87.2% of daily diaries. Specifically, 40.1% completed 14+ surveys, 20.4% completed 13 surveys, 13.9% completed 12 surveys, 5.8% completed 11 surveys, 8.0% completed 10 surveys, 3.6% completed 9 surveys, 1.5% completed 8 surveys, 2.2% completed 7 surveys, 1.5% completed 6 surveys, and 2.9% completed 5 surveys.

At the conclusion of the daily diary period, participants were paid $2 for each diary they completed, for a possible total of $28. In addition, participants received one entry into each of three separate lotteries for each diary completed, and they received 14 additional entries into each lottery if they completed all 14 daily diaries. At the end of the study, a participant was randomly selected from each lottery to win a $100 Amazon gift card.

Measures

Home visit and lab visit measures.

At both time points, adolescents reported on their internalizing symptoms (depression, anxiety), and parents reported on family demographics.

Depressive symptoms

Depressive symptoms were assessed using the 12-item Children's Depression Inventory 2 (CDI 2) Self-Report Short Version, with a response scale ranging from 1 = *low level of sympto*m to 3 = *high level of symptom* (Kovacs, 2011; see Appendix E for all home visit and lab visit measures). 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 forms of psychopathology (e.g., Bae, 2012). At T1, Cronbach's alpha was .83, and at T2, it was .82. Items were reverse-scored as needed and averaged to create the variables T1 (T2) Depressive Symptoms, with higher scores reflecting greater depressive symptoms.

Anxious symptoms

Anxious symptoms were assessed using the 39-item Multidimensional Anxiety Scale for Children (MASC; March et al., 1997), with a response scale ranging from 0 = *never true about me* to 4 = *often true about me*. The MASC has demonstrated good internal consistency across diverse clinical and community samples (Grills-Taquechel et al., 2008; Kingery et al., 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). At T1, Cronbach's alpha was

.91, and at T2, it was .92. Items were reverse-scored as needed and averaged to create the variables T1 (T2) Anxious Symptoms, with higher scores reflecting more anxious symptoms.

Family demographics

Parents completed a demographic form at the end of the home or lab visit. This questionnaire was collected late in the visit to ensure that rapport was established before asking parents to respond to potentially sensitive questions.

Daily diary measures

At T1 and T2, adolescents reported on their daily self-esteem and daily positive and negative affect. In addition, at both time points, we collected data on covariate variables assessing how many hours the adolescent slept the previous night, the day of the week (dummy coded 0 = *weekday* vs. 1 = *weekend*), and whether the participant was in school that day (dummy-coded as 0 = *no* vs. 1 = *yes*).

Daily self-esteem

Daily self-esteem was assessed using an adapted version of the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979; see Appendix F for all daily diary measures) with a response format ranging from 1 = *strongly agree* to 4 = *strongly disagree*. The adaptation consists of adding the word "Today" to the beginning of each item. 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 et al., 1997; Bagley & Mallick, 2001).The RSES has been previously adapted for use as a measure of daily self-esteem instability (e.g., Kernis et al., 1989). At T1, between- and within-person reliability was strong for the RSES at .91 and .78 respectively. At T2, between- and within-person reliability was also strong at .93 and .83 respectively. The between-person coefficients indicate how reliable the items assessing these constructs are across adolescents, while the within-person coefficients indicate how reliably the items capture day-to-day changes in self-esteem within individuals (Bolger & Laurenceau, 2013). Items were reverse-scored as needed and averaged to create the variables T1 (T2) Daily Self-Esteem, with higher scores reflecting more self-esteem.

Daily affect

Daily affect was assessed using the Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999). 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 at T1 was acceptable for both between- and within-person estimates for both negative (.89 and .82 respectively) and positive affect (.93 and .86 respectively). Reliability at T2 was acceptable for both between- and within-person estimates for both negative (.90 and .86 respectively) and positive affect (.93 and .78 respectively). Items were averaged to create the variables T1 (T2) Daily Positive (Negative) Affect, with higher scores reflecting more affect.

Chapter 3

RESULTS

We conducted analyses in four steps. In preliminary analyses, we examined descriptive statistics and missing data and evaluated potential covariates. To address the first goal of the study, we examined the temporal consistency of self-esteem instability between early and mid-adolescence using the two one-sided tests (TOST) procedure test of equivalence. To address the second goal of the study, we assessed relations between daily self-esteem instability and internalizing symptoms during mid-adolescence using multilevel modeling (MLM). Finally, to address the third goal of the study, we evaluated longitudinal relations between self-esteem instability and internalizing symptoms in early and mid-adolescence using a multi-level cross-lagged panel model. Analyses addressing the first and third goals utilized the T1-T2 sample, while those addressing the second goal utilized the T2 sample. Focal analyses used robust maximum likelihood estimation in Mplus Version 8 to account for missing data and possible variable skew (Muthén & Muthén, 1998-2017).

Preliminary Analyses

Descriptive statistics (mean, standard deviation, range) for study variables are presented in Table 1 for the T2 sample (used to address Question 2) and in Table 2 for the T1-T2 sample (used to address Questions 1 and 3). Bivariate correlations at both the between- and within- levels as appropriate are also presented in these tables.

Table 1 Descriptive Statistics and Bivariate Correlations for T2 Sample

	1	2	3	4	5	6
1. Daily Self-Esteem	-	-.25**	.50***	-.50***	-.61***	-.41***
2. Daily Self-Esteem SSD	-.27***	-	-.03	.26**	.14	.24**
3. Positive Affect	.49***	-.08**	-	-.10	-.40***	-.22**
4. Negative Affect	-.49***	.27***	-.31***	-	.46***	.35***
5. Depressive Symptoms	-	-	-	-	-	.54***
6. Anxious Symptoms	-	-	-	-	-	-
Mean	3.26	0.16	2.60	1.35	1.39	2.09
Standard Deviation	0.50	0.19	0.80	0.39	0.30	0.43
Minimum	1.90	0.00	1.00	1.00	1.00	1.38
Maximum	4.00	1.15	4.62	3.55	2.25	3.31
Within-Person Reliability	.83	-	.78	.86	-	-
Between-Person Reliability	.93	-	.93	.90	.82	.92

Note. Daily Self-Esteem SSD refers to the squared successive difference of consecutive daily self-esteem scores. 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 Descriptive Statistics and Bivariate Correlations for T1-T2 Sample

	1	2	3	4	5	6	7	8
1. T1 Daily Self-Esteem	-	-.08	.52***	.09	-.62***	-.36**	-.46***	-.29*
2. T1 Daily Self-Esteem SSD	-.15***	-	-.12	.34**	.31***	.28*	.33**	.25*
3. T2 Daily Self-Esteem	-	-	-	-.24*	-.54***	-.30**	-.67***	-.46***
4. T2 Daily Self-Esteem SSD	-	-	-.30***	-	.15	.26*	.19	.35**
5. T1 Depressive Symptoms	-	-	-	-	-	.51***	.67***	.44***
6. T1 Anxious Symptoms	-	-	-	-	-	-	.29*	.57**
7. T2 Depressive Symptoms	-	-	-	-	-	-	-	.59***
8. T2 Anxious Symptoms	-	-	-	-	-	-	-	-
Mean	3.44	0.13	3.35	0.17	1.23	2.02	1.37	2.13
Standard Deviation	0.49	0.32	0.56	0.39	0.22	0.39	0.29	0.44
Minimum	2.00	0.00	1.00	0.00	1.00	1.33	1.00	1.38
Maximum	4.00	3.24	4.00	4.84	2.17	3.13	2.25	3.31
Within-Person Reliability	.78	-	.83	-	-	-	-	-
Between-Person Reliability	.91	-	.93	-	.83	.91	.82	.92

We assessed whether missing data for primary study variables was non-random. In the T2 sample, daily report of self-esteem was missing for 0.7% of diaries. In the T1-T2 sample, daily report of self-esteem was missing for 0.1% of diaries at T1 and for 0.6% of diaries at T2. There were no missing data in either sample for depressive or anxious symptoms. We first assessed whether days on which adolescents missed surveys varied by day of the week (weekday versus weekend) in both samples. Analyses revealed no significant differences in missed surveys by day of the week[1]. We then used independent samples *t*-tests for gender and race/ethnicity and one-way ANOVA for SES to identify whether number of surveys completed varied by group. Analyses revealed no significant differences in number of surveys completed by gender[2], race/ethnicity[3], or SES[4].

We then used an independent samples *t*-test to compare daily diary days with and without missing data on hours of sleep. Across both samples, analyses revealed no significant differences in daily diary days with and without missing data on sleep

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[1] T2 – $\chi^2(1, 2063) = 0.02$, $p = .895$; T1-T2: T1 – $\chi^2(1, 823) = 3.78$, $p = .052$; T1-T2: T2 – $\chi^2(1, 964) = 0.43$, $p = .512$

[2] T2 – $M_{male} = 12.00$, $M_{female} = 12.66$, $t(134) = 1.67$, $p = .098$; T1-T2: T1 – $M_{male} = 10.95$, $M_{female} = 10.97$, $t(74) = 0.08$, $p = .938$; T1-T2: T2 – $M_{male} = 12.27$, $M_{female} = 12.53$, $t(74) = 0.65$, $p = .540$

[3] T2 – $M_{caucasian} = 12.28$, $M_{other} = 12.52$, $t(134) = -0.58$, $p = .564$; T1-T2: T1 – $M_{caucasian} = 11.14$, $M_{other} = 10.62$, $t(74) = -1.39$, $p = .169$; T1-T2: T2 – $M_{caucasian} = 12.42$, $M_{other} = 12.38$, $t(74) = -0.08$, $p = .939$

[4] T2 – $M_{<50,000} = 12.13$, $M_{50,000\text{-}100,000} = 12.73$, $M_{100,000\text{-}150,000} = 12.06$, $M_{>150,000} = 12.42$, $F(3,132) = 0.53$, $p = .663$; T1-T2: T1 – $M_{<50,000} = 10.55$, $M_{50,000\text{-}100,000} = 11.25$, $M_{100,000\text{-}150,000} = 11.04$, $M_{>150,000} = 11.00$, $F(3,71) = 0.45$, $p = .715$; T1-T2: T2 – $M_{<50,000} = 11.44$, $M_{50,000\text{-}100,000} = 12.58$, $M_{100,000\text{-}150,000} = 12.55$, $M_{>150,000} = 12.50$, $F(3,72) = 0.89$, $p = .453$

hours[5]. In addition, we used chi-square tests to compare diary days with and without missing data on day of week and school absence. Across both samples, analyses revealed no significant differences in daily diary days with and without missing data on day of week[6] or school absence[7].

Next, we assessed possible between-person covariates, examining whether age, gender, or race/ethnicity related to depressive symptoms, anxious symptoms, or adolescents' average daily self-esteem change at T2 in the cross-sectional sample, as well as at T1 and T2 in the longitudinal sample. In the longitudinal sample, female participants reported significantly more depressive symptoms than male participants at T1[8] and more anxious symptoms[9] and daily self-esteem change[10] than male participants at T1 and T2. In the cross-sectional sample, female participants reported

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[5] T2 – $M_{missing}$ = 7.89, M_{other} = 7.67, $t(1668) = -0.34$, $p = .735$; T1-T2: T1 – $M_{missing}$ = 8.17, M_{other} = 7.78, $t(929) = -0.50$, $p = .618$); T1-T2: T2 – $M_{missing}$ = 8.00, M_{other} = 8.07, $t(810) = 0.41$, $p = .967$)

[6] T2 – $\chi^2(1, 1681) = 0.55$, p = .459; T1-T2: T1 – $\chi^2(1, 816) = 0.21$, $p = .645$; T1-T2: T2 – $\chi^2(1, 939) = 0.08$, $p = .785$

[7] T2 – $\chi^2(1, 1676) = 0.73$, p = .392; T1-T2: T1 – $\chi^2(1, 816) = 0.63$, $p = .428$; T1-T2: T2 – $\chi^2(1, 939) = 0.02$, $p = .879$

[8] T1-T2: T1 – M_{male} = 1.18, M_{female} = 1.29, $t(74) = 2.23$, $p = .029$; T1-T2: T2 – M_{male} = 1.33, M_{female} = 1.42, $t(74) = 1.33$, $p = .188$

[9] T1-T2: T1 – M_{male} = 1.93, M_{female} = 2.11, $t(74) = 2.01$, $p = .048$; T1-T2: T2 – M_{male} = 2.02, M_{female} = 2.23, $t(74) = 2.16$, $p = .034$

[10] T1-T2: T1 – M_{male} = 0.10, M_{female} = 0.20, $t(74) = 2.39$, $p = .019$; T1-T2: T2 – M_{male} = 0.18, M_{female} = 0.16, $t(74) = -0.34$, $p = .736$

significantly more anxious symptoms than male participants[11]. Gender was therefore included as a covariate in Analyses 2 and 3. Gender did not predict change in self-esteem instability from T1 to T2[12], and therefore was not included as a covariate in Analysis 1. Neither race/ethnicity nor age were significantly related to study variables in either sample, and therefore neither variable was included as a covariate in any analysis.

Finally, we assessed day of the week[13] (dummy coded as 0 = *weekday* and 1 = *weekend*) and sleep hours[14] as possible within-person covariates on daily self-esteem change at T2 in the cross-sectional sample, as well as at T1 and T2 in the longitudinal sample. No significant relations emerged, and thus neither variable was included as a covariate in any analysis.

First Goal: Consistency of Self-Esteem Instability from Early to Mid-Adolescence

The first goal of the current study was to examine the consistency of self-esteem instability from early to mid-adolescence using the TOST procedure. We hypothesized that the extent to which adolescents' self-esteem fluctuated day-to-day in

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[11] Depressive Symptoms – $M_{male} = 1.37$, $M_{female} = 1.42$, $t(144) = 1.00$, $p = .319$; Anxious symptoms – $M_{male} = 1.95$, $M_{female} = 2.18$, $t(144) = 3.37$, $p = <.001$; Self-esteem change – $M_{male} = 0.16$, $M_{female} = 0.16$, $t(135) = 0.12$, $p = .907$

[12] $M_{male} = 0.08$, $M_{female} = -0.03$, $t(74) = -1.933$, $p = .057$

[13] T2 – $M_{weekday} = 0.005$, $M_{weekend} = -0.025$, $t(1348) = 1.18$, $p = .237$; T1-T2: T1 – $M_{weekday} = 0.005$ $M_{weekend} = -0.018$, $t(680) = 0.663$, $p = .527$; T1-T2: T2 – $M_{weekday} = 0.016$, $M_{weekend} = -0.0300$, $t(768) = 1.37$, $p = .172$

[14] T2 – $r(1340) = 0.04$, $p = .194$; T1-T2: T1 – $r(676) = 0.04$, $p = .316$, $p = .527$; T1-T2: T2 – $r(761) = 0.03$, $p = .353$.

early adolescence would not be different from the extent to which their self-esteem fluctuated day-to-day in mid-adolescence.

Traditional null hypothesis statistical testing (NHST) allows researchers to reject the null hypothesis (that there is no effect) but does not allow for confirmation of the null hypothesis. The TOST procedure (Schuirmann, 1987) allows researchers to set a range of values at which they would consider the effect to be "close enough to zero" (Lakens, 2017, pp. 355) and test two separate directional null hypotheses: a) that the difference is less than or equal to the lower bound of that range, and b) that the difference is greater than or equal to the upper bound of that range (Lakens, 2017). The TOST procedure was carried out using the TOSTER module (Lakens, 2017) in Jamovi, an R-based, free and open statistical platform (The jamovi project, 2021). To determine appropriate equivalence bounds for this analysis, we calculated the smallest potential effect size (Lakens, 2017) given our estimated sample size, desired power, and significance level. Extrapolating from existing literature (e.g., Hansen et al., 1990) and diary compliance in our T1 sample, we anticipated retaining approximately two-thirds of our T1 sample (N = 144) and that 95% of participants would have usable diary data, for an estimated sample size of 91. A sensitivity power analysis in G*Power determined that the smallest potential effect size for the estimated sample size of 91, at 80% desired power, and at an α of .05 is a Cohen's d_z of 0.297. Therefore, Cohen's d_z type bounds of +/- 0.297 were used for the TOST procedure.

We used the mean square of successive differences (MSSD) of daily self-esteem scores as a measure of instability of self-esteem. To do this, we calculated the difference in self-esteem between each pair of consecutive diary days and squared each value to obtain the squared successive difference (SSD). The mean of the squared

successive difference scores for each participant was then calculated to obtain the MSSD. The TOST procedure was then used to evaluate equivalency between self-esteem instability scores at T1 and T2.

An initial paired samples t-test revealed no significant differences between self-esteem instability at T1 and T2, $t(75) = -0.91$, $p = 0.37$. Given Cohen's d_z type bounds of +/- 0.297, the TOST procedure indicates that, consistent with expectations, self-esteem instability at T1 and T2 were statistically equivalent, $t_{upper}(75) = -1.68$, $p = 0.04$, $t_{lower}(75) = 3.50$, $p = 0.004$.

Second Goal: Relations between Daily Self-Esteem Instability and Internalizing Symptoms During Mid-Adolescence

The second goal of the current study was to determine whether the pattern of findings regarding the relations between daily self-esteem instability and internalizing symptoms that emerged in the previous study when the sample was 13 years old (Mlawer et al., 2021) continued to hold when the sample was 15 years old. We hypothesized that daily self-esteem instability would be positively related to depressive symptoms but unrelated to anxious symptoms at age 15, mirroring our prior findings.

The squared successive difference (SSD) of self-esteem for each set of consecutive diary days was computed and used as the dependent variable in our multi-level model. MLM was used to account for the nested structure of the data (up to 13 SSD self-esteem scores nested within 138 adolescents). A random intercept was included in the model. There were no predictors at level 1 of the model, allowing the intercept to be interpreted as the mean of the SSD of daily self-esteem scores. Between-person predictors were adolescents' average positive and negative affect

across the daily diary period, depressive and anxious symptoms (grand-mean centered in all analyses), and gender[15]. In addition, a separate regression equation was run for each participant such that SSDs of daily self-esteem were regressed on daily diary day (1-14). The coefficient of each participant's regression equation was saved and included in the analysis as an additional between-person covariate to control for the effect of time on average daily self-esteem change.

Results are presented in Table 3. Contrary to expectations, anxious symptoms emerged as a significant positive between-person predictor of daily change in self-esteem. This effect indicates that, for the average adolescent, a one unit increase in anxious symptoms was associated with a 0.11 change in the MSSD of self-esteem from day to day. Depressive symptoms did not emerge as a significant predictor of self-esteem instability.

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[15] Of note, this analytic strategy differs somewhat from the strategy used originally to analyze the T1 data in Mlawer et al. (2021). We believe that the current analytic strategy provides a more complete answer to our multilevel research questions. Importantly, we repeated the analyses from T1 using the approach used here, and the original pattern of findings held, such that daily self-esteem instability was related to depressive but not anxious symptoms.

Table 3 Multilevel Model of Daily Self-Esteem Instability as a Function of Depressive and Anxious Symptoms at Time 2

	B	*SE*	Est/*SE*	*p*	CI_{95} Lower	Upper
Intercept	0.15	.02	7.55	.000	0.110	0.187
Within						
Daily Self-Esteem SSD	0.12	.03	1.32	.000	0.061	0.117
Between						
Gender	0.04	.03	1.32	.187	-0.019	0.098
Positive Affect	0.00	.03	0.04	.965	-0.051	0.053
Negative Affect	0.18	.10	1.82	.068	-0.014	0.379
Slope of Daily Self-Esteem SSD x Diary Day	0.09	.47	0.19	.849	-0.826	1.005
Depressive Symptoms	-0.07	.09	-0.74	.460	-0.251	0.113
Anxious Symptoms	0.11	.05	2.14	.033	0.009	0.216

Note. B = unstandardized beta, *SE* = standard error, SSD = squared successive difference, CI_{95} = 95% Confidence Interval

Third Goal: Longitudinal Relations Between Self-Esteem Instability and Internalizing Symptoms

The third goal of the current study was to examine whether self-esteem instability during early adolescence predicts internalizing symptoms in mid-adolescence, whether internalizing symptoms during early adolescence predict self-esteem instability in mid adolescence, or whether the links between the two constructs are bidirectional across this age span. We hypothesized that stronger support would emerge for earlier self-esteem instability predicting later internalizing symptoms (vulnerability model) than earlier internalizing symptoms predicting later self-esteem instability (scar model), particularly for depressive symptoms.

We assessed these relations using a multi-level cross-lagged panel model, depicted in Figure 1. Paralleling the previous analysis, the squared successive difference of self-esteem for each set of consecutive daily diaries days was computed for T1 and T2 separately and included without predictors at level 1 of the model, allowing the intercepts to be interpreted as the means of the SSD of daily self-esteem scores. To address our hypotheses, in level 2 of our model, we regressed T2 self-esteem instability on T1 depressive and anxious symptoms and T2 depressive and anxious symptoms on T1 self-esteem instability. To account for within-construct stability over time, we regressed T2 self-esteem instability, depressive symptoms, and anxious symptoms on T1 self-esteem instability, depressive symptoms, and anxious symptoms, respectively. Furthermore, all variables were allowed to covary at each time point. Gender as reported by the adolescent at T2 was included as a between-

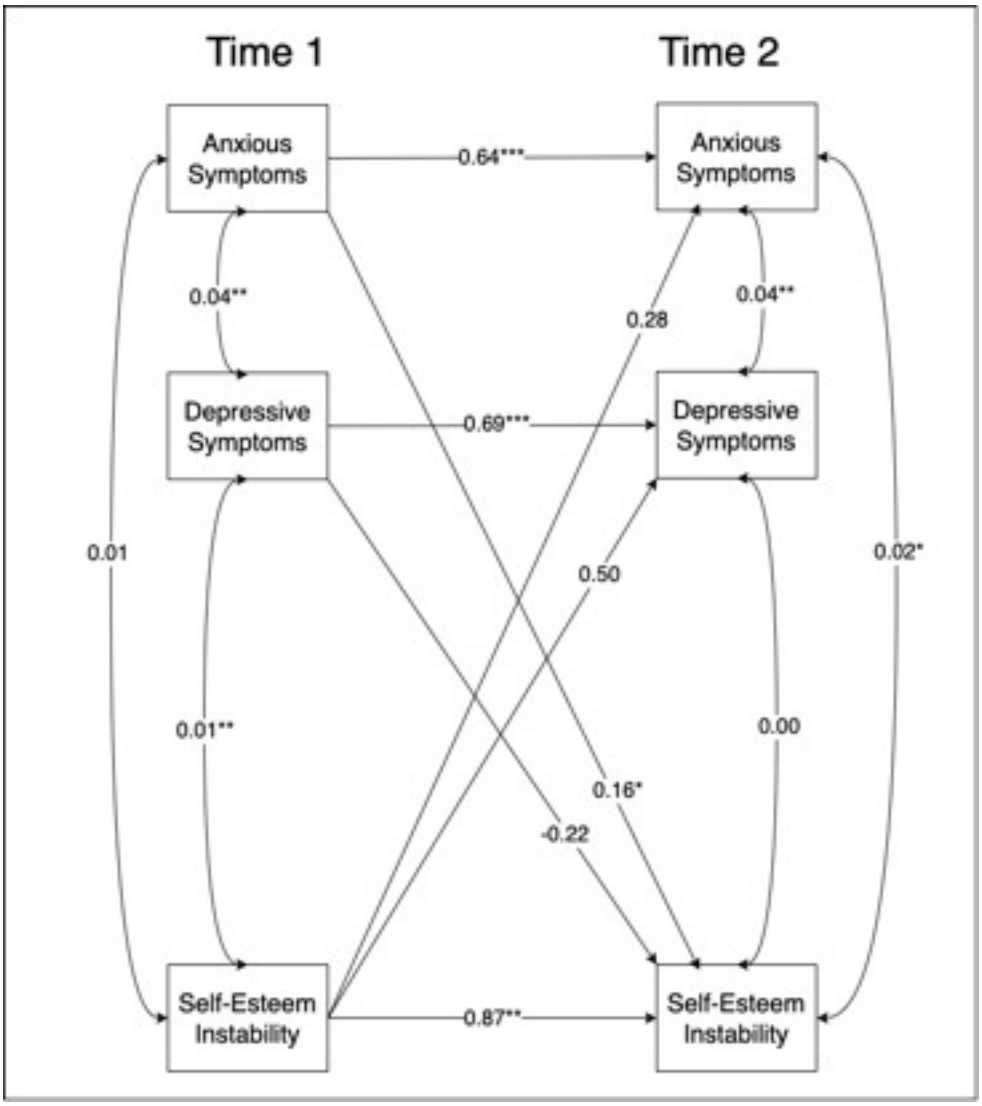

Figure 1 Cross-Lagged Model of Bidirectional Longitudinal Associations amongst Self-Esteem Instability, Depressive Symptoms, and Anxious Symptoms

person covariate based on preliminary analyses[16.] Positive and negative affect were initially included as between-person covariates to mirror previous analyses, but were ultimately dropped from analyses due to model nonconvergence. In addition, a separate regression equation was run for each participant at each time point, such that SSD of daily self-esteem was regressed on daily diary day (1-12, or 1-14). The coefficients of each participant's regression equation at each time were saved and covariances between the coefficient and self-esteem instability at each time point were included in the analysis as additional between person covariates to control for the effect of time on daily self-esteem change.

We assessed model fit using the Bentler Comparative Fit Index (CFI; Bentler, 1990), Root Mean Square Error of Approximation (RMSEA), the Tucker-Lewis Index (TLI), and the Standardized Root Mean Squared Residual (SRMR; Bentler, 1995). Accepted cutoffs for these indices are CFI and TLI values greater than .95, RMSEA values of less than .06, and SRMR values of less than .08 (Hu & Bentler, 1999). In combination, these fit statistics indicate that the model fits the data well (CFI = 0.983, TLI = 0.967, RMSEA = 0.008, SRMR within = 0.000, SRMR between = 0.087). Of note, the SRMR for the between portion of the model was slightly above the cutoff of 0.08. Because SRMR is a positively biased measure, and this bias is greater for smaller sample sizes (Kenny, 2020), Hu and Bentler's (1999) suggested cutoff of

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[16]At T2, one teen reported a gender identity that differed from their report at T1. Data were separately analyzed including T2 gender versus T1 gender as a between-person covariate. The pattern of results did not differ between these two approaches. Therefore, to honor the experience and identity of this adolescent, we opted to use T2 gender in this analysis.

“close to .08” may be too strict for sample sizes smaller than 200 (Asparouhov & Muthén, 2018).

Table 4 Multilevel Cross-Lagged Panel Model Examining Bidirectional Relations between Daily Self-Esteem Instability and Depressive and Anxious Symptoms at Ages 13 and 15

	B	*SE*	Est/*SE*	*p*	CI_{95} Lower	Upper
Intercepts						
T2 Daily Self-Esteem SSD	-0.02	.05	0.32	.750	-0.108	0.109
T2 Anxious Symptoms	0.00	.12	0.02	.981	-0.303	0.235
T2 Depressive Symptoms	-0.08	.07	-1.11	.273	-0.266	0.063
Within						
T1 Daily Self-Esteem SSD	0.13	.04	3.64	.000	0.058	0.195
T2 Daily Self-Esteem SSD	0.09	.02	4.04	.000	0.046	0.132
Between						
T2 Daily Self-Esteem SSD						
T1 Daily Self-Esteem SSD	0.87	.33	2.62	.009	0.220	1.522
Gender	0.07	.04	1.68	.093	-0.011	0.148
T2 Slope of Daily Self-Esteem SSD x Diary Day	0.00	.00	-0.50	.619	-0.001	0.001
T2 Anxious Symptoms	0.02	.01	2.22	.026	0.002	0.039
T2 Depressive Symptoms	0.00	.01	0.93	.351	-0.005	0.014
T1 Anxious Symptoms	0.16	.06	2.53	.012	0.035	0.278
T1 Depressive Symptoms	-0.22	.13	-1.90	.058	-0.452	0.007
T2 Anxious Symptoms						
T1 Anxious Symptoms	0.64	.10	6.21	.000	0.435	0.836
Gender	-0.09	.090	-0.98	.326	-0.259	0.086
T2 Depressive Symptoms	0.04	.01	2.97	.003	0.014	0.065
T1 Daily Self-Esteem SSD	0.28	.58	0.49	.626	-0.847	1.409
T2 Depressive Symptoms						
T1 Depressive Symptoms	0.69	.14	5.07	.000	0.423	0.956
Gender	0.02	.06	0.35	.725	-0.089	0.127
T1 Daily Self-Esteem SSD	0.50	.37	1.34	.181	-0.233	1.232
T1 Daily Self-Esteem SSD						
T1 Slope of Daily Self-Esteem SSD x Diary Day	0.00	.00	0.60	.549	-0.001	0.002
T1 Anxious Symptoms	0.01	.01	1.83	.067	-0.001	0.028
T1 Depressive Symptoms	0.01	.00	2.89	.004	-0.003	0.018
T1 Anxious Symptoms						
T1 Depressive Symptoms	0.04	.02	2.93	.003	0.015	0.073

Note. B = unstandardized beta, *SE* = standard error, SSD = squared successive difference, CI_{95} = 95% Confidence Interval.

Results are presented in Table 4 and Figure 1. As predicted, auto-regressive paths (e.g., T1 self-esteem instability, T1 depressive symptoms, and T1 anxious symptoms predicting T2 self-esteem instability, T2 depressive symptoms, and T2 anxious symptoms, respectively) were all positive and significant.

In regards to cross-lagged paths, contrary to predictions, stronger support emerged for earlier internalizing symptoms predicting later self-esteem instability (scar model) than for earlier self-esteem instability predicting later internalizing symptoms (vulnerability). In particular, T1 anxious symptoms emerged as a significant positive between-person predictor of daily changes in self-esteem at T2. This effect indicates that, for the average adolescent, a one unit increase in anxious symptoms at T1 was associated with a 0.16 unit change in the MSSD of self-esteem from day to day at T2. In contrast, depressive symptoms at T1 did not predict daily changes in self-esteem at T2. Also contrary to hypotheses, daily self-esteem instability at T1 did not predict anxious or depressive symptoms at T2.

Chapter 4

DISCUSSION

The goals of the current study were to a) examine the temporal consistency of self-esteem instability during adolescence, b) investigate whether the pattern of findings in the previous study during early adolescence – a positive association between self-esteem instability and depressive symptoms, but not anxious symptoms – continued to hold during mid-adolescence, and c) examine links between self-esteem instability and internalizing symptoms across this adolescent age span. Adolescents completed measures of depressive and anxious symptoms during a home visit at age 13 and a lab visit at age 15, as well as online daily diaries to assess self-esteem instability at both time points. We hypothesized that adolescents' self-esteem instability would be consistent during adolescence, that daily self-esteem instability would be positively related to depressive symptoms but unrelated to anxious symptoms in mid-adolescence, and that stronger support would emerge for the vulnerability model (earlier self-esteem instability predicting later internalizing symptoms) than the scar model (earlier internalizing symptoms predicting later self-esteem instability), especially for depressive symptoms. To our knowledge, this is one of the first longitudinal investigations of the construct of self-esteem instability.

Consistency of Self-Esteem Instability during Adolescence

As hypothesized, self-esteem instability did not differ between early and mid-adolescence. To our knowledge, the current study is the first investigation focused on

the question of consistency in self-esteem instability across any age span. In the only other study we know of to measure self-esteem instability twice in the same sample, Sowislo and colleagues (2014) found that adults' earlier self-esteem instability was a significant positive predictor of their self-esteem instability six months later. However, this finding was tangential and not relevant to study goals, and the authors did not directly address the question of statistical equivalence. Therefore, the current investigation provides novel and important psychometric information about the construct of self-esteem instability. Our finding that self-esteem instability is consistent over a two-year span underscores the importance of further investigations of self-esteem instability and the vulnerabilities it may represent.

This finding is in line with theories suggesting that self-esteem instability is trait-like, or stated differently, that there are individual differences in the degree to which self-esteem fluctuates day-to-day (e.g., Kernis, 2003). That self-esteem instability remains consistent in the early adolescent years is notable given the dramatic maturational, interpersonal, and contextual changes occurring during this critical developmental period. This finding parallels previous research identifying self-concept clarity, a related but distinct construct, as relatively stable across adolescence (e.g., Schwartz et al., 2012; van Dijk et al., 2014).

In light of previous research examining relations between psychological functioning and self-esteem instability, understanding self-esteem instability as a trait that is consistent over time may improve our understanding of adolescents' later risk for maladjustment. Across a small but robust body of research, self-esteem instability has been linked to a range of maladjustment constructs in undergraduate and adult samples, including borderline personality traits (e.g., Zeigler-Hill & Abraham, 2006),

narcissistic personality traits (e.g., Rhodewalt et al., 1998), suicidality (De Man & Gutiérrez, 2002), hostility (Kernis et al., 1989), attachment anxiety (Foster et al., 2007), and maladaptive self-regulatory styles (Kernis et al., 2000). In future studies, if self-esteem instability demonstrates consistency not only across early adolescence, but into adulthood, the construct may come to represent an early adolescent marker of risk for maladjustment later in life.

Relations between Self-Esteem Instability and Internalizing Symptoms in Mid-Adolescence

Contrary to hypotheses, using rigorous MLM analyses in which day-to-day change in self-esteem served as the Level 1 dependent variable, a positive relation emerged between instability of daily self-esteem and global anxious symptoms at age 15. Thus, adolescents who experienced more anxious symptoms tended to experience greater shifts in their self-esteem from day to day. This finding is consistent with previous research that demonstrated greater self-esteem instability in participants with anxiety disorders than controls (van Tuijl et al., 2018). However, it is inconsistent with our previous finding that self-esteem instability and anxious symptoms were unrelated during early adolescence (Mlawer et al., 2021).

Also contrary to hypotheses and previous research (e.g., Franck & De Raedt, 2007; Franck et al., 2016; Hayes et al., 2004; Mlawer et al., 2021), self-esteem instability was unrelated to depressive symptoms at age 15. The current study differs from much of the prior research in important ways. To the best of our knowledge, and excluding our previous study, prior research has focused on evaluating the relation between self-esteem instability and depressive symptoms without controlling for anxious symptoms. However, a robust body of research suggests that anxious

symptoms are common in depressed individuals (e.g., Fried et al., 2016; Yang et al., 2019) and that depressive disorders and anxiety disorders are highly comorbid (e.g., Fava et al., 2000). It is therefore difficult to know if prior findings of positive associations between self-esteem instability and depressive symptoms are identifying a unique link between these two constructs, or whether this association is due to an overlap between depressive and anxious symptoms.

However, this line of thinking does not explain the discrepancy between the findings in our previous study in early adolescence (in which self-esteem instability was positively related to depressive but not anxious symptoms) and our current study during mid-adolescence (in which self-esteem instability was positively related to anxious but not depressive symptoms). In both these studies, we examined links between self-esteem instability and each internalizing symptom while controlling for the other internalizing symptoms. In interpreting our divergent findings across adolescence, it is important to consider the changing landscape of both anxious and depressive symptoms as individuals progress through adolescence.

Though overall anxiety seems to remain somewhat stable across adolescence (e.g., Bosquet & Egeland, 2006), prevalence rates of discrete anxiety disorders shift across this developmental period (e.g., Burstein et al., 2011; Steinsbekk et al., 2022). Specifically, from early- to mid-adolescence, rates of social anxiety disorder (e.g., Burstein et al., 2011; Costello et al., 2003) and generalized anxiety disorder (e.g., Burstein et al., 2014; Steinsbekk et al., 2022) appear to increase, while the prevalence of other anxiety disorders decreases (e.g., Burstein et al., 2012; Steinsbekk et al., 2022). As a result, when researchers assess anxious symptoms in adolescence without regard for the markers of these distinct anxiety disorders, as we did in the current

study, they may be missing shifting presentations of anxiety as participants progress through the adolescent period.

The increase in social anxiety from early- to mid-adolescence is particularly relevant to the current investigation, given the timing of our two data collection efforts. Epidemiological research examining social anxiety disorder has found that although the most common age of onset is mid-adolescence (e.g., Grant et al., 2005), about half of all cases onset prior to age 13 (Stein, 2006). In the current study, T1 data collection likely preceded the adolescent increase in prevalence of social anxiety disorder, while T2 data collection likely followed this increase. Thus, we would expect symptoms of social anxiety to account for a larger portion of overall anxious symptoms at T2 than at T1.

Post-hoc analyses of our data provide some preliminary support for this interpretation. Mean change in ratings on the social anxiety subscale of the MASC-2 from T1 to T2 (M=.36) was significantly larger than mean change of the total MASC-2 score (M=.09; $t(82) = 5.58$, $p<.001$). In addition, social anxiety symptoms made up a significantly larger proportion of total anxiety symptoms at T2 than at T1 (M**Δ**=-.02; $t(82)=-5.56$, $p<.001$).

Shifts in the prevalence of discrete anxiety disorders from early- to mid-adolescence may provide an important lens through which to understand concurrent increases in depressive symptoms. Rates of depression (e.g., Costello et al., 2011; Kessler et al., 2001) and depressive symptoms (Kessler et al., 2001) increase in mid-adolescence, and the etiology of adolescent-onset depression likely differs from that of childhood-onset depression (e.g., Hill et al., 2004; Jaffee et al., 2002). In particular, childhood-onset depression often emerges from an even earlier onset of social anxiety

and its related behavioral impairments (e.g., avoidance of social situations, deficits in social skills, social isolation, interpersonal dysfunction; e.g., Baytemir & Yildiz, 2017; Gazelle & Ladd, 2003; Starr et al., 2014). In contrast, teens with adolescent-onset depression display decreased rates of social anxiety disorder (Korczak & Goldstein, 2009). Thus, given decreasing comorbidity between social anxiety and depression from early to mid-adolescence, we would expect to see weaker relations between social anxiety symptoms and depressive symptoms at T2 than at T1.

Post-hoc analyses of our data provide some preliminary support for this interpretation. Comparison of the correlation between depressive symptoms and the humiliation/rejection component of the social anxiety subscale at T1 ($r = .59$, $p < .001$) and T2 ($r = .47$, $p < .001$) approached significance ($z = 1.48$, $p = .07$).

Empirical and theoretical work further suggests that self-esteem instability may be more closely linked to social anxiety in particular than to either overall anxious symptoms or depressive symptoms. Sociometer theory (Leary & Baumeister, 2000) postulates that social comparison, a critical component of social anxiety, plays a critical role in self-esteem, and by extension, in self-esteem instability. This argument is further supported by models of social anxiety that implicate processes underlying self-esteem instability as playing a role in the development and maintenance of the disorder, such as increased self-focused attention and attentional biases in social situations (Clark & Wells, 1995; Moscovitch, 2009). In fact, Clark and Wells (1995) suggest that self-esteem instability may actually distinguish social anxiety disorder from depression. Consistent with these models, empirical studies have found higher self-esteem instability (Farmer & Kashdan, 2015) and lower self-concept clarity (e.g., Wilson & Rapee, 2006) in adults diagnosed with social anxiety than in matched

healthy controls. A similar pattern was identified in a community sample of undergraduates examining the relation between self-esteem instability and symptoms of social anxiety (Oosterwegel et al., 2001).

In combination, this reasoning suggests that our divergent findings may be explained by the degree to which our measures of depressive and anxious symptoms capture symptoms of social anxiety at each time point. Socially anxious symptoms may account for a greater proportion of anxious symptoms at T2 than at T1 due to increases in socially anxious symptoms during adolescence. At the same time, T2 depressive symptoms are likely less related to social anxiety than T1 depressive symptoms. Finally, self-esteem instability is likely linked more closely to social anxiety than to either overall anxious symptoms or depressive symptoms. This pattern of relations may help to explain why self-esteem instability was linked to depressive symptoms at T1 but anxious symptoms at T2.

To further assess this interpretation of our findings, we repeated our original analysis evaluating relations between self-esteem instability and internalizing symptoms at age 15, but included the four MASC-2 subscales (harm avoidance, physical symptoms, separation anxiety, and social anxiety) rather than the overall MASC score. Unfortunately, no significant results emerged from this model, likely due in part to limited discriminant validity of individual MASC-2 subscales (e.g., Wei et al., 2013). When subscales were considered individually, the humiliation/rejection component of the social anxiety subscale ($B = 0.06$, $z = 2.092$, $p = 0.036$) and the perfectionism component of the harm avoidance subscale ($B = 0.07$, $z = 2.630$, $p = 0.009$) were significantly related to self-esteem instability. Of course, this speculation

would be best tested in an investigation using a well validated measure of social anxiety, which will be an important next step in this line of research.

Longitudinal Relations Between Self-Esteem Instability and Internalizing Symptoms

Contrary to hypotheses, when we examined longitudinal links between self-esteem instability and internalizing symptoms from early to mid-adolescence, support emerged for the scar model but not for the vulnerability model. It is possible that our longitudinal study occurred too late in development to capture the process of the vulnerability model at work. Social comparison emerges early in development (e.g., Butler, 1998; Higgins, 1989) and plays a role in self-evaluation long before adolescence (e.g., Pomerantz et al., 1995; Ruble et al., 1980; Stipek et al., 1992). For this reason, self-esteem instability may contribute to the development of internalizing symptoms early in development, much like other cognitive vulnerabilities (e.g., Brown et al., 2016; Jacobs et al., 2008). By early adolescence, these cognitive patterns would be well established, and self-esteem instability may confer no additional risk for internalizing symptoms above and beyond the internalizing symptoms themselves. In other words, early adolescence may be too late in development to evaluate the impact of self-esteem instability on later internalizing symptoms.

This line of thinking may help to explain why the vulnerability model was not supported in our study. But, why was the scar model supported? The answer to this question may lie in another unexpected finding, that anxious symptoms but not depressive symptoms in early adolescence predicted self-esteem instability in mid-adolescence. Previous research has identified earlier anxiety as a risk factor for identity (Crocetti et al., 2009) and self-concept uncertainty (van Dijk et al., 2014) in

adolescence. In contrast, identity and self-concept uncertainty has not been identified as a consequence of depression (e.g., Kuzucu et al., 2014; van Dijk et al., 2014); in fact, there is some evidence that self-concept clarity is higher in depressed individuals than in non-depressed individuals (Pelham, 1991). The structure of the self-concept influences the degree to which self-evaluative comparisons impact self-worth; individuals who lack clarity in self-concept do not have a stable frame of reference for those comparisons. Therefore, anxious symptoms may be related to later self-esteem instability as a result of the identity and self-concept uncertainty experienced by anxious individuals. Because this same self-concept uncertainty is not observed in depression, it makes sense that earlier depressive symptoms do not predict self-esteem instability in mid-adolescence.

Our model also provided information regarding stability of each construct during adolescence. Unsurprisingly, and consistent with past research (e.g., Bosquet & Egeland, 2006; Tram & Cole, 2006), depressive and anxious symptoms at T1 predicted depressive and anxious symptoms at T2, respectively. Moreover, self-esteem instability at T1 predicted self-esteem instability at T2, even when accounting for cross-sectional and longitudinal relations between self-esteem instability and both depressive and anxious symptoms. This finding builds on our previous analysis examining consistency of self-esteem instability.

Limitations and Future Directions

This study has several important limitations, each of which suggests a direction for future research. First, the current study utilized a community sample of adolescents; most participants reported relatively low levels of depressive and anxious symptoms, and small daily fluctuations in self-esteem. Given our normative sample, it

is notable that concurrent and longitudinal links between self-esteem instability and internalizing symptoms emerged. However, these findings may not generalize to adolescents with highly unstable self-esteem or high levels of internalizing symptoms. It will be important for future research to explore both the nature of self-esteem instability over time, and connections between daily fluctuations in self-esteem and internalizing symptoms, in clinical samples of adolescents.

Second, the current study focused on the relations between self-esteem instability and internalizing symptoms across approximately two years during adolescence. Research regarding self-esteem instability during childhood and adolescence is relatively limited, and most of this research is cross-sectional. Existing research has found that individual differences in regulatory processes implicated in self-esteem instability, including social comparison (e.g., Frey & Ruble, 1985; Ruble et al., 1980) and biases in information processing (e.g., Dodge & Price, 1994), emerge early in middle childhood. It will therefore be important for future research to investigate the nature and consistency of self-esteem instability, and its relations to internalizing symptoms, prior to adolescence.

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Appendix A

RECRUITEMENT MAIL/EMAIL

For Families Who Last Participated in 2013-2014

Hello [Parent Name],

My name is [Name], and I work in the Peer Relations Lab at the University of Delaware.

Five years ago, during the 2013-2014 school year, your child, [Adolescent's Name], participated in the KiVa Bullying Prevention Program at school, and our lab directed the KiVa Program. At that time, you signed a form giving us permission to contact you about future studies. Our lab is now conducting another study in which families can earn up to $63 dollars for participating ($10 for you and up to $53 dollars for your child). You and [Adolescent's Name] have been randomly selected from the students who participated in the KiVa Program in 2013-2014 to participate in this study if you would like to do so. If you would be interested in talking to me further about the study, **would you please call me at 302-831-0355 at your earliest convenience or email me about a good time to call you?**

Thank you for your help, and I hope to talk with you soon!

Sincerely,

Name
Peer Relations Lab
University of Delaware
Lab phone number: 302-831-0355
Lab email: udpeerrelations@psych.udel.edu

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For Families Who Last Participated in 2017

Hello [Parent Name],

My name is [Name], and I work in the Peer Relations Lab at the University of Delaware.

Two years ago, in 2017, your child, [Adolescent's Name], participated in a study our lab conducted about bullying. At that time, you signed a form giving us permission to

contact you about future studies. Our lab is now conducting another study in which families can earn up to $63 dollars for participating ($10 for you and up to $53 dollars for your child). You and [Adolescent's Name] have been randomly selected from the students who participated in previous studies to participate in this study if you would like to do so. If you would be interested in talking to me further about the study, **would you please call me at 302-831-0355 at your earliest convenience or email me about a good time to call you?**

Thank you for your help, and I hope to talk with you soon!

Sincerely,

Name
Peer Relations Lab
University of Delaware
Lab phone number: 302-831-0355
Lab email: udpeerrelations@psych.udel.edu

Appendix B

RECRUITMENT PHONE SCRIPT

Hello, may I please speak with the parent of [Adolescent's Name]? My name is [Name], and I'm calling from the Peer Relations Lab at the University of Delaware. Five years ago, your child participated in the KiVa Bullying Prevention Program that our lab directed [*If family last participated in 2017:* Two years ago, your child participated in a study our lab conducted about bullying]. At that time, you gave permission for us to contact you about future studies. Is now a good time to talk?

(IF NO): When would be a better time to call back?
(IF YES): Our lab is conducting a study to learn more about teens' experiences with bullying, peer pressure, and self-esteem. We would like you and your child to participate. If you are interested, we would schedule a two-hour visit for you and your child at our lab on the campus of the University of Delaware.

When you are here, you and your child will fill out questionnaires. These questions will ask about how much your child is bullied and about your child's thoughts, feelings, and behaviors. These questions are in English, so it's important that you and your child are fluent in English. Is that true for your family? *(If no, thank parent and do not schedule visit).*

After the questions, your child will complete three tasks while we record how fast his/her heart beats, how fast he/she breathes, and how much his/her hand sweats. These reactions help us understand teens' feelings. We do this by placing nine sensors on your child's hand, chest, stomach, and back. If your child is a girl, the person who puts the sensors on your child will be female. You will be in the room with your child while we put the sensors on. Your child should wear a two-piece outfit, like a shirt and shorts or pants, to make it easier to put on the sensors. Also, girls may feel more comfortable if they wear something like a sports bra. One thing – is your child allergic to adhesives? That's important, because the sensors are attached with adhesive. *(If yes, thank parent and do not schedule visit).* Oh, and one more thing – your child should not engage if vigorous exercise or drink caffeine for two hours before the visit, because those things interfere with the information the sensors collect. Okay?

Here's a little more information about each task. In the Star Task, your child will try to trace a star on a computer screen with a mouse. This task is difficult, because the mouse moves in the opposite direction than you expect. We use this task to understand how teens handle frustration.

In the Token Task, your child will play an online game with three teens. In each round, he/she will decide how many tokens to keep and how many to donate. Other teens online will give your child feedback about how much they like his/her choices. We use this task to understand more about peer pressure.

In the Chatroom Task, your child will interact with two other teens online and take turns choosing whom they would like to chat with about different topics. However, the other teens will only choose your child about 20% of the time. This task helps us understand how teens handle being left out.

There are two things that we request you not tell your child before the visit. First, your child will believe that the other teens online are real kids in studies at other universities. But, really, they are computer-simulated, or what we call "virtual peers." Second, you will be watching your teen behind a one-way mirror and can stop the tasks if you are uncomfortable for any reason. However, your child will not know you are watching. The reason we don't tell kids these two things is because it makes it harder for them to behave naturally and for us to learn all that we can from them. At the end of the visit, we will tell your child both of these things. Are you comfortable not sharing this information with your child until then? *(If no, thank parent and do not schedule visit).*

We will pay you $10 and your child $20 for the lab visit. Also, your child will earn up to $5 in the Token Task. Finally, we will ask your child to complete a 10-minute online questionnaire each evening for 14 evenings after the visit, and your child can earn up to $28 more for doing so.

Would you be interested in participating in this study?

(IF NO): Okay, thank you for your time. Goodbye.
(IF YES): Great! At the beginning of the visit, we will provide more details about all parts of the study. Do you have any questions for me at this time before we schedule?

(IF YES): *Answer questions.*
(IF NO): Thank you so much for agreeing to participate. *[Schedule visit, secure contact information, ask if childcare for siblings will be needed.]* Thank you! We will send you a reminder text, email, and phone call the day before our visit. We look forward to seeing you at [*date and time*]. Please call us at 302-831-0355 if you have any questions or need to reschedule.

Appendix C

PARENTAL CONSENT FORM

PARENTAL PERMISSION FOR CHILD TO PARTICIPATE IN A RESEARCH STUDY

Title of Study: Bullying, Peer Pressure, and Self-Esteem Among Adolescents
Principal Investigator(s): Julie A. Hubbard, Ph.D.

KEY INFORMATION
Important aspects of the study you should know about first:

- **Purpose:** The purpose of the study is to learn more about teens' experiences with bullying, peer pressure, and self-esteem. We are also interested in how teen's bodies react when they are excluded by peers or face peer pressure.
- **Procedures**: If you and your child choose to participate, the study will be divided into two parts. In the first part here in the lab today, you and your child will each answer questions about your child's experiences, thoughts, feelings, and behaviors. Then, your child will complete three tasks called the Chatroom Task, the Star Task, and the Token Task (described below) while we measure how fast his/her heart beats, how fast he/she breathes, and how much his/her hand sweats. In the second part of the study, we will ask your child to complete online questions each evening for 14 evenings. These questions will ask your child about that particular day, and the questions will be similar to those we complete today.
- **Duration:** This study will take about two hours of your and your child's time today, plus another ten minutes of your child's time each evening for 14 evenings.
- **Risks**: The first risk of participating in this study is that answering our questions may make you or your child feel uncomfortable, sad, worried, embarrassed, or more aware of concerns than you were previously. The second risk is that the tasks will cause your child to experience negative emotions such as frustration, worry, or sadness.
- **Benefits:** You and your child will not benefit directly from taking part in this research.
- **Alternatives:** There are no known alternatives available to you and your child other than not taking part in this study.
- **Costs and Compensation:** There is no cost to you and your child for participating. You will be compensated $10 and your child will be compensated $20 for the lab visit today. Your child will also be compensated $2 for each evening that he/she completes the online questions. Finally, your child will receive $5 at the conclusion of the Token Task.
- **Participation:** Allowing your child to take part or not in this research study is your decision. You can decide to allow your child to participate and then change your

mind at any point. Even if you agree for your child to participate, we will ask him/her if he/she wants to participate, and his/her wishes will be respected.

Please carefully read the entire document. You can ask any questions you may have before deciding if you agree for you and your child to participate.

You and your child are being invited to participate in a research study. This form tells you about the study including its purpose, what you and your child will be asked to do if you decide to take part, and the risks and benefits of being in the study. Please read the information below and ask us any questions you may have before you decide whether or not you want you and your child to participate.

PURPOSE OF THE STUDY

The purpose of this study is to learn more about teens' experiences, thoughts, feelings, and behaviors surrounding bullying, peer pressure, and self-esteem, both overall and on a day-by-day basis. We are also interested in how teens' bodies react when they are excluded by peers, experience frustration, or face peer pressure. The data from this study will be used for two graduate students' dissertations and one graduate student's thesis.

WHO IS BEING ASKED TO PARTICIPATE?

You and your child will be one of approximately 200 parent/teen pairs participating in this study. You and your child are being asked to participate because your child is 14- to 16-years-old, both you and your child are fluent in English, and your child does not have a sensitivity or allergy to adhesives (used to place the sensors described below).

PROCEDURES: WHAT WILL MY CHILD BE ASKED TO DO?

If you and your child participate, the first part of the study will be a two-hour visit here in our lab today.

Here's what will happen during your visit:

- We will begin by measuring your child's height and weight.
- Then, you and your child will answer questions about these topics: how much your child is bullied; your child's thoughts, feelings, and behaviors, including feelings like being sad or worried or angry and behaviors like fighting or breaking rules; your child's eating and exercise; how your child is doing in school; and family demographic information. You and your child will each work with a different staff member in different rooms to complete your questions so that they remain private. We will be here to answer any questions you may have or to read the questions to you if you prefer.
- Following the questions, your child will complete three tasks. You will observe all three tasks from behind a one-way mirror, with a project staff member explaining events to you as they unfold. You may stop the tasks at any point if you become concerned for any reason. Your child will not be aware that you are observing him/her, but we will debrief him/her about your observation at the end of the lab visit.

- In the Chatroom Task, your child will prepare to enter an online chatroom with two same-age, same-sex peers. Your child will be told that these peers are real teens participating in studies at other universities, but in truth, they are computer-simulated, or what we call "virtual peers." The task will begin by uploading your child's photo and responses to a few questions about his/her activities and interests. He/she will then select two peers with whom he/she would like to chat. The task itself will consist of trials in which one of the three peers chooses which of the other two peers he/she would like to chat with about a variety of topics; this will last for 7 minutes. When your child is one of the two peers to be chosen, he/she will only be selected 20% of the time. At the end of the task, to explain why he/she was not selected more often, we will tell your child that we mistakenly uploaded his/her profile incorrectly and so the peers could not see it. At the end of the lab visit, we will debrief your child about the fact that these peers and the chatroom were not real.
- In the Star Task, your child will use a computer mouse to trace a star on a computer screen for 4.5 minutes. The mouse will be programmed to move in the opposite direction of that which is expected. We will ask your child to complete the task as quickly as possible without making a mistake or pausing for more than two seconds; if he/she does, a buzzer will sound, and the cursor will return to the starting position. This task is very difficult, and your child will likely not complete it successfully.
- In the Token Task, your child will play an online game with three same-sex peers for 5 minutes. Again, your child will be told that these peers are real individuals participating in studies at other universities, but in truth, they are virtual peers. In each round of the game, each player will receive 5 tokens worth 5 cents and must decide how many tokens to keep for him/herself and how many to put into a "public goods pot." In ten rounds of the game, your child will be told that five "spectator peers" (also virtual) are watching online and that they will provide feedback (a thumbs-up icon) when they like the choices your child makes. Half of the 200 participants will receive more thumbs-up icons when they donate tokens to the pot, and half of the 200 participants will receive more thumbs-up icons when they keep tokens for themselves. The purpose of these spectator peers is to mimic the experience of peer pressure.
- Throughout the tasks, your child will be videotaped. We will tell him/her about the video recording at the start of the visit today.
- After each task, your child will answer a few questions about his/her feelings.
- Throughout the three tasks, we will record how fast your child's heart beats, how fast he/she breathes, and how much his/her hand sweats. We will collect these measurements by placing nine sensors on your child's hand, chest, stomach, and back. If your child is female, a female staff member will place these sensors on your child. You will be in the room with your child while the staff member places the sensors on him/her and removes them at the end of the visit. The only exception is if your child is a female and you are her father; in that case, we will ask your child if she prefers you

to remain in or out of the room while we place the sensors, and we will follow her wishes. The sensors will be applied to your child's skin with an adhesive material; thus, their removal may irritate your child's skin slightly, as would a bandaid.

In the second part of the study, we will ask your child to complete an online questionnaire each evening for 14 evenings. This questionnaire will ask your child about that particular day, and the questions will be similar to those we complete today. It will take about ten minutes each evening. Thus, the total time commitment for you is two hours, and the total time commitment for your child is approximately four hours (two hours today, plus ten minutes each evening for two weeks).

WHAT ARE POSSIBLE RISKS AND DISCOMFORTS?

The first risk of participating in this study is that answering our questions may make you or your child feel uncomfortable, sad, worried, embarrassed, or more aware of concerns than you were previously. We have worked with hundreds of parents and teens to answer these questions, and most do not report negative feelings. However, both you and your child are free to skip any question that you do not wish to answer.

The second risk is that your child may feel uncomfortable about wearing the sensors. If your child is uncomfortable, he/she will be allowed to proceed with the lab visit without the sensors. However, our experience is that most teens get used to the sensors in a few minutes and wear them without difficulty. In fact, in a prior study in our lab, only two out of 274 children were uncomfortable with the sensors, and these children were much younger (8 years old).

The third risk is that the tasks will cause your child to experience negative emotions such as frustration, worry, or sadness. However, please remember that you will observe your child throughout the tasks, and if you become concerned that he/she is upset, you may stop the tasks at any point. We will also tell your child that he/she is free to stop the tasks at any point. Although it is important to warn you that your child may become upset, we consider it unlikely that this will happen for several reasons. First, the experiences that these tasks mimic (being excluded by peers, being frustrated, facing peer pressure) are ones that teens encounter in their everyday lives. Second, the tasks are quite brief. Third, we will provide your child with a positive explanation for each task as soon as it ends. Finally, other research labs have used these tasks with much younger children and do not report concerns.

WHAT ARE POTENTIAL BENEFITS FROM THE STUDY?

You and your child will not benefit directly from taking part in this research. However, the knowledge gained from this study may assist our research team and other research teams in the development of three types of interventions: a) interventions that help teens cope with bullying, b) interventions that help teens resist negative peer pressure, and c) interventions that help decrease problems with self-esteem, depression, and anxiety among teens.

CONFIDENTIALITY: WHO MAY KNOW THAT YOUR CHILD PARTICIPATED IN THIS RESEARCH?

All of your data and your child's data will be entirely confidential. Although identifying information (e.g., names) will be gathered, this information will be replaced by arbitrary

identification numbers, and all identifying information will be deleted. One copy of a key list matching participant names and identification numbers will be kept in a locked file cabinet in the PI's office, which is in a separate building from the one in which the data will be kept; this list will be destroyed once the study is complete. Video recordings of your child will be made, and although these recordings will be labeled by identification number, they will include your child's face. Video recordings will be viewed only by project staff for the purposes of data coding; they will never by viewed by others for any reason.

All information will be stored in locked offices, locked file cabinets, and/or on password-protected computers at the University of Delaware, accessible only to our staff. Reports of the project results will never include names, and the results will be based on information gathered from groups of participants rather than individuals. Because the data (including video recordings) will be stored only under identification numbers, we plan to keep the data indefinitely.

There is one exception to our rule that everything is entirely confidential. If we are concerned that your child will seriously hurt him/herself or others, or that your child is being seriously hurt by others, we will tell people who can help, including you and appropriate officials (possibly your child's school or the police). Also, if we are concerned that your child is depressed, we will tell you and your child and offer referrals for psychological services.

The confidentiality of your and your child's records will be protected to the extent permitted by law. Your and your child's research records may be viewed by the University of Delaware Institutional Review Board, which is a committee formally designated to approve, monitor, and review biomedical and behavioral research involving humans. Records relating to this research will be kept for at least three years after the research study has been completed.

COSTS AND COMPENSATION

There are no costs associated with participating in the study to either you or your child. At the end of our 2-hour visit today, we will compensate you $10 for answering our questions and your child $20 for answering our questions and participating in our tasks while wearing the sensors. In addition, your child will earn $5 when completing the Token Task. Also, we will compensate your child $2 for each evening that he/she completes the online questions (possible total of $28) in the form of an Amazon gift card; if your child prefers cash to an Amazon gift card, we will come to your home in about two weeks to deliver the cash compensation. In addition, each evening your child completes the online questions, we will enter your child's name into three separate lotteries; the prize for each lottery is a $100 Amazon gift card. If your child completes the online questions all 14 evenings, we will double your child's entries into each lottery. Three teens out of 200 teens will win a $100 Amazon gift card.

DOES MY CHILD HAVE TO TAKE PART IN THIS STUDY?

Taking part in this research study is your and your child's decision; you and your child do not have to participate. If you choose to participate, you have the right to stop your and your child's participation at any time, and your child also has the right to stop his/her participation at any time. In addition, you and your child have the right to skip any question or task. If you decide not to participate, to stop participation, or to skip questions or tasks, there will be no

penalty or loss of benefits to which you and your child are otherwise entitled. Your decision about participation, stopping participation, and skipping questions or tasks will not influence current or future relationships with the University of Delaware. Even if you agree for your child to participate, we will ask him/her if he/she wants to participate, and his/her wishes will be respected. If you or your child stops participation, we will ask whether you and your child prefer that we keep or destroy any data collected to that point, and we will respect your wishes.

INSTITUTIONAL REVIEW BOARD

This research study has been reviewed and approved by the University of Delaware Institutional Review Board (UD IRB). If you have any questions or concerns about your or your child's rights as a research participant, you may contact the UD IRB at hsrb-research@udel.edu or (302) 831-2137.

CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues related to this research study, you may contact the Principal Investigator, Julie Hubbard, at 302-831-0355 or jhubbard@psych.udel.edu.

I have read and understood the information in this parental permission form. I agree to, and allow, my child to participate in the study. I understand that I will be given a copy of this form for my records.

_____ _____

Printed Name of Parent/Guardian Signature of Parent/Guardian

Date

_____ _____

Printed Name of Person Obtaining Consent Signature of Person Obtaining Consent

Date

<u>OPTIONAL</u> CONSENT TO BE CONTACTED FOR FUTURE STUDIES:

Do we have your permission to contact you regarding your child's participation in future studies? If you agree to being contacted in the future, we will keep your contact information. Please write your initials next to your preferred choice.

_____ YES _____ NO

Appendix D

ADOLESCENT ASSENT FORM

ASSENT TO PARTICIPATE IN RESEARCH

Title of Study: Bullying, Peer Pressure, and Self-Esteem Among Adolescents
Principal Investigator(s): Julie A. Hubbard, Ph.D.

I am asking if you want to be part of a research study. This form tells you what the study is about, what you will do, and the possible bad and good things about this study.

WHAT IS THIS RESEARCH ABOUT?

The purpose of this study is to learn more about teens' experiences, thoughts, feelings, and behaviors surrounding bullying, peer pressure, and self-esteem, both overall and on a day-by-day basis. We are also interested in how fast teens' hearts beat, how fast they breathe, and how much their hands sweat when they interact with peers; these reactions help us understand teens' feelings. You will be one of approximately 200 teens participating in this study.

WHAT WILL YOU BE ASKED TO DO?

If you decide to participate, the first part of the study will be a two-hour visit here in our lab today. Here's what will happen during your visit:

- We will begin by measuring your height and weight.
- Then, you will answer questions about these topics: how much you are bullied; your thoughts, feelings, and behaviors, including feelings like being sad or worried or angry and behaviors like fighting or breaking rules; your eating and exercise; and how you are doing in school. We will be here to answer any questions you may have or to read the questions to you if you prefer.
- Following the questions, you will complete three tasks. In the Chatroom Task, you and two same-sex teens participating in studies at other universities will take turns choosing whom you would like to chat with about a variety of topics.
- In the Star Task, you will use a computer mouse to trace a star on a computer screen. The thing that is hard about this task is that the mouse will move in the opposite direction than you would expect.
- In the Token Task, you will play an online game with three different same-sex teens also participating in studies at other universities, and sometimes, other teens will watch while you play. In each round of the game, you have to decide how many tokens to keep and how many to donate to a "public goods pot."
- After each task, you will answer questions about your feelings.

- Throughout the tasks, we will record how fast your heart beats, how fast you breathe, and how much your hand sweats. To do this, we will place nine sensors on your hand, chest, stomach, and back. If you are female, a female staff member will place these sensors on you. Your parent will be in the room with you while the staff member places the sensors on you and removes them at the end of the visit. If you are female and your father brought you here today, we will ask you if you prefer that your father remains in or out of the room while we place the sensors on you. Removing the sensors may feel like taking off a bandaid.

In the second part of the study, we will ask you to complete online questions each evening for 14 evenings. These questions will ask about that particular day, and the questions will be similar to those we complete today in the lab. It will take about ten minutes each evening. In total, this study will take you about four hours – about two hours today plus about ten minutes each evening for two weeks.

WHAT ARE THE POSSIBLE BAD THINGS ABOUT THIS RESEARCH?

It is possible that you may feel negative emotions such as sadness, worry, embarrassment, or frustration while answering our questions or completing our tasks. It's also possible that you will feel uncomfortable wearing the sensors, although most teens get used to them in a few minutes. Please know that you can skip any question or part of the study here today just by telling us. You are also free to skip any question online over the next 14 evenings.

WHAT ARE THE POSSIBLE GOOD THINGS ABOUT IT?

You will not directly benefit from being in this study. However, you will be helping us understand more about teens, bullying, peer pressure, and self-esteem. This will help us develop programs for teens who struggle in these areas.

WHO WILL KNOW THAT YOU PARTICIPATED IN THIS RESEARCH?

No one other than the researchers and your parents will know that you were in the study. If we tell other people about the research, we will not use your name. We will video record you when you complete the tasks. These videos will only ever be viewed by project staff; they will never be seen by anyone else for any reason.

There is one exception to this rule. If we are concerned that you will seriously hurt yourself or others, or that you are being seriously hurt by someone, we will tell people who can help. These people might include your parents, staff at your school, or possibly even the police. Also, if we are concerned that you are depressed, we will tell you and give you information about therapists who could help.

WILL YOU GET ANYTHING FOR PARTICIPATING?

At the end of the visit today, we will compensate you $20 for answering our questions and completing the tasks while wearing the sensors. Also, we will compensate you $2 for each evening that you complete the online questions; you will get this second compensation in the form of an Amazon gift card, unless you'd prefer that we come to your house and compensate you in cash. Each evening you complete the online questions, we will also enter your name into three separate lotteries; the prize for each lottery is a $100 Amazon gift card. If you

complete the online questions all 14 evenings, we will double your entries into each lottery. Three teens out of 200 teens will win a $100 Amazon gift card.

YOU CAN CHANGE YOUR MIND ABOUT BEING IN THE STUDY

You do not have to say yes. Taking part in this research study is up to you. If you choose to take part, you can change your mind and stop at any time. If you decide to stop or skip a part of the study, just tell one of the people working here. If you decide not to participate, or to stop, or to skip something, nothing bad will happen to you and no one will be upset with you. All of these things are true for the online questions you will complete for 14 evenings as well. If you don't want to complete the online questions, you don't have to, and no one will be upset with you. However, I do want to remind you that you will only earn $2 on those evenings that you complete the online questions. Also, if you do not want to answer certain questions online, you can skip those questions.

INSTITUTIONAL REVIEW BOARD

This research study has been reviewed and approved by the University of Delaware Institutional Review Board (UD IRB). If you have any questions or concerns about your rights as a research participant, you may contact the UD IRB at hsrb-research@udel.edu or (302) 831-2137.

CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues related to this research study, you may contact the Principal Investigator, Julie Hubbard, at 302-831-0355 or jhubbard@psych.udel.edu.

If you want to participate, and we have answered all of your questions about it, please write your name below.

_____ _____

Printed Name of Participant Signature of Participant

Date

_____ _____

Printed Name of Person Obtaining Consent Signature of Person Obtaining Consent

Date

Appendix E

HOME VISIT AND LAB VISIT MEASURES

Self Report of Depression
Children's Depression Inventory 2 Self-Report Short Version
(Kovacs, 2011)

Kids sometimes have different feelings and ideas. This form lists the feelings and ideas in groups. From each group of three sentences, pick **one** sentence that describes you best for the **past two weeks**. Click the box next to the sentence that you pick. After you pick a sentence from the first group, go on to the next group.

1.	□ I am sad once in a while. □ I am sad many times. □ I am sad all the time.
2.	□ Nothing will ever work out for me. □ I am not sure if things will work out for me. □ Things will work out for me O.K.
3.	□ I do most things O.K. □ I do many things wrong. □ I do everything wrong.
4.	□ I have fun in many things. □ I have fun in some things. □ Nothing is fun at all.
5.	□ I am important to my family. □ I am not sure if I am important to my family. □ My family is better off without me.
6.	□ I hate myself. □ I do not like myself. □ I like myself.
7.	□ I feel cranky all the time. □ I feel cranky many times. □ I am almost never cranky.
8.	□ I cannot make up my mind about things. □ It is hard to make up my mind about things. □ I make up my mind about things easily.
9.	□ I have to push myself all the time to do my schoolwork.

	□ I have to push myself many times to do my schoolwork. □ Doing schoolwork is not a big problem.
10.	□ I am tired once in a while. □ I am tired many days. □ I am tired all the time.
11.	□ Most days I do not feel like eating. □ Many days I do not feel like eating. □ I eat pretty well.
12.	□ I do not feel alone. □ I feel alone many times. □ I feel alone all the time.

Self Report of Anxiety
Multidimensional Anxiety Scale for Children
(March, 1997)

Here are some sentences about how you may think, feel, or act. For each sentence, click how true it has been for you recently.

	Never true about me	Rarely true about me	Sometimes true about me	Often true about me
1. I feel tense or uptight.	1	2	3	4
2. I usually ask permission.	1	2	3	4
3. I worry about other people laughing at me.	1	2	3	4
4. I get scared when my parents go away.	1	2	3	4
5. I have trouble getting my breath.	1	2	3	4
6. I keep my eyes open for danger.	1	2	3	4
7. The idea of going away to camp scares me.	1	2	3	4
8. I get shaky or jittery.	1	2	3	4
9. I try to stay near my mom or dad.	1	2	3	4
10. I'm afraid that other kids will make fun of me.	1	2	3	4
11. I try hard to obey my parents and teachers.	1	2	3	4
12. I get dizzy or faint feelings.	1	2	3	4
13. I check things out first.	1	2	3	4
14. I worry about getting called on in class.	1	2	3	4
15. I'm jumpy.	1	2	3	4
16. I'm afraid other people will think I'm stupid.	1	2	3	4
17. I keep the light on at night.	1	2	3	4

18. I have pains in my chest.	**1**	**2**	**3**	**4**
19. I avoid going to places without my family.	**1**	**2**	**3**	**4**
20. I feel strange, weird, or unreal.	**1**	**2**	**3**	**4**
21. I try to do things other people will like.	**1**	**2**	**3**	**4**
22. I worry about what other people think of me.	**1**	**2**	**3**	**4**
23. I avoid watching scary movies and TV shows.	**1**	**2**	**3**	**4**
24. My heart races or skips beats.	**1**	**2**	**3**	**4**
25. I stay away from things that upset me.	**1**	**2**	**3**	**4**
26. I sleep next to someone from my family.	**1**	**2**	**3**	**4**
27. I feel restless and on edge.	**1**	**2**	**3**	**4**
28. I try to do everything exactly right.	**1**	**2**	**3**	**4**
29. I worry about doing something stupid or embarrassing.	**1**	**2**	**3**	**4**
30. I get scared riding in the car or on the bus.	**1**	**2**	**3**	**4**
31. I feel sick to my stomach.	**1**	**2**	**3**	**4**
32. If I get upset or scared, I let someone know right away.	**1**	**2**	**3**	**4**
33. I get nervous if I have to perform in public.	**1**	**2**	**3**	**4**
34. Bad weather, the dark, heights, animals, or bugs scare me.	**1**	**2**	**3**	**4**
35. My hands shake.	**1**	**2**	**3**	**4**
36. I check to make sure things are safe.	**1**	**2**	**3**	**4**
37. I have trouble asking other kids to play with me.	**1**	**2**	**3**	**4**
38. My hands feel sweaty or cold.	**1**	**2**	**3**	**4**
39. I feel shy.	**1**	**2**	**3**	**4**

Parent Report of Child and Family Demographics
Child and Family Demographics Questionnaire

We would like to learn more about your child, you, and your family. Please read all options before choosing an answer. If you are unsure of an answer, please choose the option that best describes your situation.

Questions about Your Child

1. What is your child's sex?
   - Male
   - Female

2. What is your child's race *(please check all that apply)*?
   - American Indian or Alaska native
   - Asian
   - Black or African American
   - Native Hawaiian or Pacific Islander
   - White or Caucasian

3. What is your child's ethnicity *(please check one)*?
   - Hispanic or Latino
   - Not Hispanic or Latino

4. What is your child's birth date (MM/DD/YYYY)? _____

5. What was the length of your pregnancy with your child? _____ weeks

6. What was your child's birth weight? _____ pounds _____ ounces

7. What school does your child currently attend? _____

8. How many times has your child changed schools in the last two years? _____

Questions about You

9. How are you related to your child?
   - mother
   - father
   - grandmother
   - grandfather
   - other _____

10. What is your age? _____

11. What is your race *(please check all that apply)*?
   - American Indian or Alaska native
   - Asian
   - Black or African American
   - Native Hawaiian or Pacific Islander
   - White or Caucasian

12. What is your ethnicity *(please check one)*?
   - Hispanic or Latino
   - Not Hispanic or Latino

13. What is the highest grade that you completed in school?
   - Did not complete high school
   - High school diploma
   - GED
   - Some college
   - College degree
   - Graduate degree (Master's, PhD, MD, JD)

14. What is your current relationship status?
   - living with a partner
   - single
   - married
   - separated
   - divorced
   - other _____

15. How many major changes in relationship status have you experienced over the past two years? Examples include marriage, divorce, separation, moving in with partner, moving away from partner.

    0 1 2 3 4+

16. If you work, what is your job? _____

Questions about Your Family

17. What is your address including zip code?

    _____
    __

18. How many times has your family moved in the last two years?
    _____

19. What is the primary language spoken in your home? _____

20. How many adults (18 and older) currently live in the household, including yourself?

    1 2 3 4 5+

For each additional adult, please complete the following:

Relationship to Child	Highest Grade Completed	Occupation/Job
1.		
2.		
3.		
4.		
5.		

21. How many children (under 18) currently live in the child's household, including the child?

    1 2 3 4 5+

22. Please approximate your family's total yearly income from all sources (including employment, child support, disability, social security, welfare, worker's compensation, and retirement). Include income from employment for all adults living in the home.
    - $0 - $20,000
    - $20,000 - $50,000
    - $50,000 - $100,000
    - $100,000 - $150,000
    - $150,000 or more

Appendix F

DAILY DIARY MEASURES

Self Report of Daily Self Esteem
Rosenberg Self-Esteem Scale – Daily Adaptation
(Rosenberg, 1989)

Below is a list of sentences about your feelings about yourself ***today***. Click how strongly you agree or disagree with each sentence.

	Strongly agree	**Agree**	**Disagree**	**Strongly disagree**
1. Today, on the whole, I was satisfied with myself.	**1**	**2**	**3**	**4**
2. Today, at times I thought I was no good at all.	**1**	**2**	**3**	**4**
3. Today, I felt that I had a number of good qualities.	**1**	**2**	**3**	**4**
4. Today, I was able to do things as well as most other people.	**1**	**2**	**3**	**4**
5. Today, I felt I did not have much to be proud of.	**1**	**2**	**3**	**4**
6. Today, I certainly felt useless at times.	**1**	**2**	**3**	**4**
7. Today, I felt that I was a person of worth, at least on an equal plane with others.	**1**	**2**	**3**	**4**
8. Today, I wished I could have more respect for myself.	**1**	**2**	**3**	**4**
9. Today, all in all, I was inclined to feel that I was a failure.	**1**	**2**	**3**	**4**
10. Today, I took a positive attitude toward myself.	**1**	**2**	**3**	**4**

Self Report of Daily Affect and Mood
Positive and Negative Affect Schedule for Children
(Laurent, Catanzaro, Joiner, Rudolf, Potter, & Lambert, 1999)
Profile of Mood States – Daily Adaptation
(Heuchert & McNair, 2012)

Here are some words about how you may feel. For each word, check how much you felt this way ***today***.

	Not at all	**A little**	**Moderately**	**Quite a bit**	**Extremely**
1. Interested	**1**	**2**	**3**	**4**	**5**
2. Sad	**1**	**2**	**3**	**4**	**5**
3. Frightened	**1**	**2**	**3**	**4**	**5**
4. Ashamed	**1**	**2**	**3**	**4**	**5**
5. Upset	**1**	**2**	**3**	**4**	**5**
6. Angry	**1**	**2**	**3**	**4**	**5**
7. Happy	**1**	**2**	**3**	**4**	**5**
8. Strong	**1**	**2**	**3**	**4**	**5**
9. Nervous	**1**	**2**	**3**	**4**	**5**
10. Guilty	**1**	**2**	**3**	**4**	**5**
11. Energetic	**1**	**2**	**3**	**4**	**5**
12. Annoyed	**1**	**2**	**3**	**4**	**5**
13. Scared	**1**	**2**	**3**	**4**	**5**
14. Calm	**1**	**2**	**3**	**4**	**5**
15. Miserable	**1**	**2**	**3**	**4**	**5**
16. Jittery	**1**	**2**	**3**	**4**	**5**
17. Cheerful	**1**	**2**	**3**	**4**	**5**
18. Frustrated	**1**	**2**	**3**	**4**	**5**

19. Active	**1**	**2**	**3**	**4**	**5**
20. Proud	**1**	**2**	**3**	**4**	**5**
21. Afraid	**1**	**2**	**3**	**4**	**5**
22. Joyful	**1**	**2**	**3**	**4**	**5**
23. Lonely	**1**	**2**	**3**	**4**	**5**
24. Mad	**1**	**2**	**3**	**4**	**5**
25. Disgusted	**1**	**2**	**3**	**4**	**5**
26. Blue	**1**	**2**	**3**	**4**	**5**
27. Gloomy	**1**	**2**	**3**	**4**	**5**
28. Lively	**1**	**2**	**3**	**4**	**5**
29. Delighted	**1**	**2**	**3**	**4**	**5**
30. Irritated	**1**	**2**	**3**	**4**	**5**
31. Excited	**1**	**2**	**3**	**4**	**5**
32. Depressed	**1**	**2**	**3**	**4**	**5**
33. Panicky	**1**	**2**	**3**	**4**	**5**
34. Bitter	**1**	**2**	**3**	**4**	**5**
35. Downhearted	**1**	**2**	**3**	**4**	**5**
36. Anxious	**1**	**2**	**3**	**4**	**5**
37. Bad-tempered	**1**	**2**	**3**	**4**	**5**
38. Unhappy	**1**	**2**	**3**	**4**	**5**
39. Worried	**1**	**2**	**3**	**4**	**5**

Appendix G

IRB APPROVAL

Time 1

RESEARCH OFFICE

210 Hullihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE:	May 25, 2017
TO:	Julie Hubbard
FROM:	University of Delaware IRB
STUDY TITLE:	[971639-4] The Consequences of Weight-Related Victimization for Adolescents
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVED
APPROVAL DATE:	May 25, 2017
EXPIRATION DATE:	October 18, 2017
REVIEW TYPE:	Expedited Review
REVIEW CATEGORY:	Expedited review 45 CFR 46. 110 (b)(2)

Thank you for your submission of Amendment/Modification materials for this research study. The University of Delaware IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.

Time 2

Institutional Review Board
210H Hullihen Hall
Newark, DE 19716
Phone: 302-831-2137
Fax: 302-831-2828

DATE:	May 6, 2019
TO:	Julie Hubbard, PhD
FROM:	University of Delaware IRB
STUDY TITLE:	[1422302-1] Bullying, Peer Pressure, and Self-Esteem Among Adolescents
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
APPROVAL DATE:	May 6, 2019
EXPIRATION DATE:	April 16, 2020
REVIEW TYPE:	Full Committee Review
	Research with Children- Subpart D Determination 45 CFR 46.404

Thank you for your New Project submission to the University of Delaware Institutional Review Board (UD IRB). The UD IRB has reviewed and APPROVED the proposed research and submitted documents via Full Committee Review in compliance with the pertinent federal regulations.

As the Principal Investigator for this study, you are responsible for and agree that:

- All research must be conducted in accordance with the protocol and all other study forms as approved in this submission. Any revisions to the approved study procedures or documents must be reviewed and approved by the IRB prior to their implementation. Please use the UD amendment form to request the review of any changes to approved study procedures or documents.
- Informed consent is a process that must allow prospective participants sufficient opportunity to discuss and consider whether to participate. IRB-approved and stamped consent documents must be used when enrolling participants and a written copy shall be given to the person signing the informed consent form.
- Unanticipated problems, serious adverse events involving risk to participants, and all non-compliance issues must be reported to this office in a timely fashion according with the UD requirements for reportable events. All sponsor reporting requirements must also be followed.

Oversight of this study by the UD IRB REQUIRES the submission of a CONTINUING REVIEW seeking the renewal of this IRB approval, which will expire on April 16, 2020. A continuing review/progress report form and up-to-date copies of the protocol form and all other approved study materials must be submitted to the UD IRB at least 45 days prior to the expiration date to allow for the required IRB review of that report.

If you have any questions, please contact the UD IRB Office at (302) 831-2137 or via email at hsrb-research@udel.edu. Please include the study title and reference number in all correspondence with this office.