The Neglected Clinical Problem of Adult Separation Anxiety: Maladaptive Personality Traits, Parenting Behaviors, Children's Clinical Outcomes, and Scale Psychometrics

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Abstract of the Dissertation

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The significance and prevalence of the clinical problem of adult separation anxiety (ASA) has only recently been established. To date, little is known about its associations with personality traits, parenting behaviors, and children's psychiatric outcomes. In addition, the psychometric properties of the most widely-used measure of ASA are underexamined. The current study was part of a prospective study of a large community sample of parents and their children. Data are drawn from the first through fourth waves of the study, which were approximately 3 years apart, and include diagnostic interviews and questionnaires. ASA data from women at the second wave and from both women and men at the third wave are included. First, I evaluated the concurrent and prospective relationships between ASA and personality traits using two measures of personality and both self- and informant-report. ASA is characterized by negative emotionality and its facet stress reaction, as well as to somewhat lesser degrees by aggression, alienation and absorption. These relationships are not due to co-occurring psychopathology, overlap with other traits, or mood-state biases, and they are verified by

informants. Moreover, negative emotionality predicts greater ASA 3 years later, adjusting for baseline ASA. Next, I examined the relationships between ASA and parenting behaviors among mothers using variable- and person-centered approaches. ASA was correlated with the maladaptive parenting behaviors authoritarianism, permissiveness, and overprotectiveness. The relationships with overprotectiveness and permissiveness were present even when other parenting behaviors were taken into account. Next, three parenting classes were identified through finite mixture modeling and related to ASA. ASA was associated with two of them, both of which were characterized by overprotectiveness. One class was also characterized by authoritarianism while the other was additionally characterized by permissiveness. I also evaluated whether the effects of mothers' recalled parenting experiences of maternal and paternal care and overprotectiveness on their own parenting behaviors were mediated by ASA. Only the indirect effect from recalled maternal overprotection to one's own control/autonomy parenting via ASA was significant. Next, I evaluated the concurrent and prospective relationships between mothers' and fathers' psychopathology, including ASA, and children's separation anxiety, other anxiety, and depression in structural equation models. Maternal and paternal ASA significantly predicted children's psychopathology, including separation anxiety, in both models beyond the effects of other common parental mental disorders. The effects of ASA were non-specific for mothers but somewhat more specific for fathers. Lastly, I evaluated the psychometric properties and invariance of the most widely-used self-report measure of ASA using item response theory and confirmatory factor analysis models. The measure most reliably assessed ASA at higher than average levels and showed partial invariance at the unique factor level across gender and time. Findings highlight that ASA is a significant clinical problem and advances knowledge about ASA in four important domains.

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Chapter 1

Adult separation anxiety: Personality characteristics of a neglected clinical syndrome

Over the last two decades, there has been a resurgence in efforts to join the fields of psychopathology and personality research —fields which, prior to this point, had developed largely independently of one another (Clark, 2005; Kotov, Gamez, Schmidt, & Watson, 2010; Krueger, Caspi, Moffitt, Silva, & Mcgee, 1996). This work posited a number of models for linking personality and psychopathology and demonstrated how the two can be mutually informative. One common mental disorder that was excluded almost entirely from research in this area was adult separation anxiety (ASA). A recent meta-analysis, for example, which included 175 studies and described relationships between "Big" Three and Five personality traits and 11 disorders, including individual anxiety disorders, did not mention ASA (Kotov et al., 2010). The exclusion of ASA from this body of research is not reflective of its clinical significance or prevalence—neither of which are ignorable—but rather of the disorder's age-of-onset criterion, which historically required that it be diagnosed for the first time in childhood. In part due to evidence that a substantial proportion of patients, and the vast majority of adults in the community, with ASA report first experiencing symptoms in adulthood (Shear, Jin, Ruscio, Walters, & Kessler, 2006; Silove, Marnane, Wagner, Manicavasagar, & Rees, 2010), this criterion was lifted in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013).

Describing the personality correlates of ASA remains an important area of research for several reasons. First, ASA has a surprisingly high lifetime prevalence rate ranging from 7% in the community (Shear, Jin, Ruscio, Walters, & Kessler, 2006) to 23% (Silove, Marnane, Wagner, Manicavasagar, & Rees, 2010) or 42% in clinical samples (Pini et al., 2010). Moreover, ASA is impairing; a substantial proportion of adults with ASA report severe impairment in at least one psychosocial functioning domain (Shear et al., 2006), and it negatively affects

treatment outcomes (Aaronson et al., 2008; Kirsten, Grenyer, Wagner, & Manicavasagar, 2008; Miniati et al., 2012). In addition, ASA is impairing in its own right, beyond comorbid disorders (Shear et al., 2006) and more so than other anxiety and mood disorders (Pini et al., 2010; Silove et al., 2010), suggesting that ASA may represent a clinical problem that is not captured by other disorders and that may have unique personality correlates. This paper seeks to "paint a picture" of individuals with ASA to assist clinicians who may not otherwise recognize these patients due to the historical conceptualization of separation anxiety as a childhood disorder (e.g., Bowlby, 1973) and also aims to generate hypotheses regarding the mechanisms that underlie ASA and identify potential novel treatment targets.

Past Work on ASA and Personality

The limited work on personality and ASA to date can be grouped into three categories: studies with clinical samples, studies on the distinct but related construct of parental separation anxiety, and clinical descriptions of prototypical cases. Prior work in clinical samples suggests that adults with separation anxiety disorder have higher levels of neuroticism than patients with other anxiety disorders (Manicavasagar, Silove, Curtis, & Wagner, 2000; Silove et al., 2010). Another study, which used Cloninger's model of personality, shows that the personality profiles of patients with ASA (comorbid with panic disorder or on its own) are similar to those of patients with panic disorder alone, except that ASA patients score higher on harm avoidance and lower on self-directedness. In comparison to healthy controls, both ASA and panic disorder patients score higher on reward dependence and self-transcendence (Mertol & Alk, 2012). Together, these studies paint a picture of patients with ASA as being more prone to negative emotions than patients with other anxiety disorders and as exhibiting lower self-confidence, resourcefulness, and goal-orientedness than patients with panic disorder. While these studies lay

the groundwork for understanding ASA and personality, clinical samples are prone to bias as they include treatment-seeking individuals who tend to have high levels of disorder severity and comorbidity (Goodman, Lahey, & Fielding, 1997). Consequently, it is still an open question whether ASA is linked to maladaptive personality traits in non-treatment-seeking community populations.

A handful of studies using non-clinical samples have examined links between maladaptive personality traits and *parental* separation anxiety, which is confined to parents' separation anxiety from their children. These studies show that parental separation anxiety is linked to dependency and self-criticism (Hock & Lutz, 1998), low self-esteem (McBride & Belsky, 1988) and negative self-representations (Hock & Schirtzinger, 1992). However, the empirical overlap between parental separation anxiety and ASA has not been tested, and the constructs differ conceptually and in their associations; for example, moderate levels of parental separation anxiety reflect healthy concerns about separation (Hock, Eberly, Bartle-Haring, Ellwanger, & Widaman, 2001) and are linked to secure attachment styles (McBride & Belsky, 1988), whereas ASA according to the DSM is pathological by definition and linked to attachment problems (Manicavasagar, Silove, Marnane, & Wagner, 2009). We thus expand this work to DSM-defined ASA.

Finally, clinical descriptions of prototypical cases (e.g., Bögels, Knappe, & Anna, 2013; Milrod et al., 2014), which highlight how individuals with ASA are "separation-sensitive" across social contexts, provide descriptions of behavioral expressions of ASA which may be suggestive of certain personality traits. For example, the tendency to become upset after learning that an attachment figure will be out longer than expected may indicate high levels of stress reactivity, a facet of neuroticism, while temper outbursts in a romantic relationship when a partner leaves the

house could suggest a tendency toward aggression. The present study goes beyond clinical descriptions to examine empirical associations between personality traits and ASA.

Value in Lower-Order Facets

Higher-order traits like negative emotionality/neuroticism, positive emotionality/extraversion, and disinhibition vs. conscientiousness are relatively crude measures of personality which are limited in their ability to distinguish between the defining personality features of psychiatric disorders. For example, all forms of psychopathology are positively related to negative emotionality/neuroticism (Kotov et al., 2010), including ASA (Manicavasagar, Silove, Curtis, & Wagner, 2000; Silove et al., 2010). The indiscriminate nature of this psychopathology–personality link, in turn, cannot tell us anything about what makes one disorder presentation unique from others. In contrast, examining the relationships between lower-order facets and ASA may yield more precise information about the nature of personality in ASA and, when considered in combination, may hint at maladaptive processes (Krueger et al., 1996).

Parsing Unique Relationships

There are two types of "unique" relationships that are important to consider in the context of personality–psychopathology research. First, because higher- and lower-order personality traits are correlated to varying degrees, an apparent association between ASA and a personality trait may be due in fact to its overlapping variance with another trait. Second, because psychiatric disorders are highly comorbid, a putative link between ASA and personality may, in the same way, be due to the overlapping variance between the trait and a comorbid disorder. Thus, it is important to examine the relationships between ASA and personality after partialing

out the effects of other traits and between ASA and maladaptive personality traits beyond the effects of other lifetime depressive, anxiety, and substance use disorders.

Longitudinal Relationships

Many theories of the links between personality traits and psychopathology go beyond positing cross-sectional associations and hypothesize that particular traits are precursors of, or predispose to, subsequent psychopathology. Longitudinal models of personality–psychopathology relationships can contribute to the development and evaluation of theoretical models of the etiology and development of ASA and explore the utility of trait vulnerabilities for early-identification and intervention. To evaluate whether the relationship between personality and ASA is consistent with the vulnerability model and fill a gap in the existing literature on how ASA and personality relate over time, we test whether maladaptive personality traits increase risk for ASA beyond the effects of continuing ASA across a three-year interval.

Measurement Issues

One issue that plagues self-report personality research is systematic error due to mood state of participants, social desirability, and tendencies to respond consistently across measures (the consistency motif), which can falsely inflate covariance between the constructs of interest (Organ, 1986; Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). In other words, observed relationships may be due to shared measurement error, as opposed to true relationships between the constructs themselves. Previous studies on ASA and personality have failed to take into account the impact of potential measurement biases. To address this issue, we use data from different reporters for personality traits, adjust for mood state in concurrent analyses, and utilize multi-occasion data. The latter also addresses whether individuals currently experiencing a psychiatric disorder respond systematically differently than those with a prior history of the

disorder and tests how consistent ASA–personality relationships are across time. In addition, because men and women differ in levels of ASA (Aaronson et al., 2008; Silove, Marnane, Wagner, & Manicavasagar, 2010; Silove, Marnane, Wagner, Manicavasagar, et al., 2010), and in levels of maladaptive personality traits (Feingold, 1994), we test for interactions with gender in all analyses; in cases where the interaction is not significant, we instead adjust for gender. Finally, while most research on ASA has treated it as a categorical diagnosis, there is considerable evidence that categorical approaches to classifying psychopathology are less reliable and have lower power than dimensional approaches (Markon, Quilty, Bagby, & Krueger, 2013), so we utilize a dimensional assessment of ASA, the Adult Separation Anxiety Questionnaire (ASA-27; Manicavasagar, Silove, Wagner, & Drobny, 2003), for the current study.

The Current Study

This is the first study to characterize the personality traits of adults with separation anxiety using a community sample. We use the Big Three personality framework (Tellegen, 1985; Watson & Clark, 1992), which consists of three higher order traits: negative emotionality (similar to the Big Five construct of neuroticism), positive emotionality (similar to extraversion), and constraint vs. disinhibition (similar to conscientiousness). We conducted multiple replications with linked samples via concurrent and prospective analyses, data from three time points across nine years, and self- and informant-report on two different measures of personality.

In line with findings in clinical samples and descriptions and past work on personality and other anxiety disorders (Kotov et al., 2010), we expected that ASA would be associated with negative emotionality and its lower-order facets, particularly stress reaction. We also hypothesized that the associations with negative emotionality and stress reaction would be robust

across time, personality inventories, and informants, and over and above associations with other psychiatric disorders and current mood state. Since evidence regarding positive emotionality and anxiety disorders is more mixed (i.e., a meta-analysis reports negative relationships for nearly all individual anxiety disorders [Kotov et al., 2010] whereas earlier work proposes that positive emotionality is depression-specific [Clark, Watson, & Mineka, 1994]), and because past studies of ASA and personality do not include positive emotionality, we refrained from hypothesizing about ASA-positive emotionality relationships. In addition, we expected that relationships with constraint and its lower-order facets would be weak or non-existent, given that anxiety disorders are not generally linked with constraint or disinhibition (Kotov et al., 2010). We also hypothesized a positive relationship between ASA and absorption, a trait that falls under openness in some variants of the Big Five, because of a specific interpersonal "state-like manifestation" of the trait described by Tellegen and Atkinson (1974), who developed the original scale. In this manifestation, an individual identifies with another person's activities and experience so wholly via attentional and "enactive" processes (which may now be considered mirror-neuron mediated process) that they experience an "equivalence of the attentional object [another person] and one's self" (*p*. 275). These processes have not been explored in relation to separation anxiety, but may hint at an important part of the phenomenological experience of ASA. Finally, we did not hypothesize gender differences in the relationships between personality and ASA and expected that ASA would be stable over a three-year period.

Method

Participants

The participants are from 609 families in an ongoing longitudinal study of children's temperament and psychopathology. Of these families in the larger study, 559 families were

recruited at the first wave of the study when children were 3 years old, and 50 additional minority families were recruited at the second wave three years later to increase racial/ethnic diversity (see Bufferd, Dougherty, Carlson, Rose, & Klein, 2012 for recruitment details). Parents provided written informed consent after receiving a description of the study. The study was approved by the human subjects review committee at Stony Brook University, and families were compensated. The current study includes reports from three waves (waves 1, 2, and 3), which were approximately three years apart.

The sample for the current study includes 1125 adults (565 women and 560 men) who had self- or informant reports of personality at waves 1 or 2. Only the primary caretaker completed the measure of ASA at wave 2; for the current sample, this included 378 women. Due to the small number of male primary caretakers with personality reports who completed the ASA-27 at this wave (n=39), their ASA data are not included in this report. Both caretakers completed the ASA-27 at the third wave. Two men had total ASA-27 scores which were over 8 *SD* above the mean (i.e., 79 and 81; range for remainder of sample=0-59). After these cases were removed, this included 467 women and 395 men (n=862). Four-hundred and ninety-two women completed the ASA-27 at wave 2 and/or wave 3; of these, 351 (71.3%) completed the ASA at both assessments, 26 (5.3%) at wave 2 only, and 115 (23.3%) at wave 3 only.

Due to ASA data only being available for women at wave 2, demographic statistics are presented separately for waves 2 and 3. The majority of women were married or living with their child's biological parent at wave 2 (85.8%), as were the majority of men and women at wave 3 (88.3%). At wave 2, women were 39.0 years old on average (*SD*=4.9; range: 22.8-51.8). At wave 3, participants were 42.9 years old on average (*SD*=5.4, range: 25.9-61.1). At wave 2, approximately half of the women had at least a 4-year college degree (54.8%), as did about half

of participants at wave 3 (52.56%). The larger study's main focus is on children's psychopathology. Thus, parents' race and ethnicity were not collected and participating children's race and ethnicity are used instead as proxies; 88.9% of adults had children who were White and 12.8% had children who were Hispanic or Latino. Missing data on demographic variables were due to failure to respond (valid cases range=96.0-100.0%).

Missingness Analysis

Participants included versus excluded from the study sample were compared on demographic variables, ASA-27, and lifetime diagnosis variables. Participants in the sample differed only in that they were more likely to be married and/or living with their child's biological parent at wave 3 (802/949 [84.5%] versus 24/35 [68.6%]; $\chi^2(1, N=973)=5.23, p=02$). All models include relationship status and the other demographic variables (White [child], Hispanic [child], college graduate, and age) as auxiliary variables, which recapture missing information on the outcome variables during model estimation.

Measures

ASA. The ASA-27 is a 27-item self-report measure of separation anxiety symptoms experienced as an adult (over age 18) (Manicavasagar et al., 2003). It was administered to primary caretakers at wave 2 and both caretakers at wave 3. Items are rated on a four-point scale (1=*This happens very often;* 4=*This has never happened).* Items were reverse coded and subtracted by 1 so that response categories were 0-3. The questionnaire was based on an interview using the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1997) format developed by the same group. The interview included items derived from a content analysis of responses to a semi-structured assessment of patients suffering from high levels of adult SA. The ASA-27 shows excellent concordance with this semi-structured

interview and good test-retest reliability over approximately three weeks (r=0.86, p<.001) (Manicavasagar et al., 2003). Case scores (>=16) were also derived as recommended for screening community samples aiming to capture all cases; they have a sensitivity of 97%, specificity of 66%, misclassification rate of 25%, positive predictive power of 62%, and negative predictive power of 97% for a diagnosis of ASA disorder using clinical interview-based diagnoses as the criterion (Manicavasagar et al., 2003). In our sample, Cronbach's α for this measure was .89 at wave 2 (women only) and .92 at wave 3 (mixed gender sample).

Personality. The brief form of the Multidimensional Personality Questionnaire (MPQ-BF; Patrick & Curtin, 2002) is a 155-item self-report inventory. It was administered to men and women at wave 1. Items are rated using a dichotomous response format. The MPQ assesses the broad trait of negative emotionality, with facets of stress reaction (15 items), alienation (13 items), and aggression (12 items); positive emotionality, which includes the primary trait facets of well-being (14 items), social potency (14 items), social closeness (12 items), and achievement (12 items); and constraint, with facets of control (13 items), harm avoidance (12 items), and traditionalism (12 items). Additionally, it assesses the primary trait of absorption (12 items), which does not load onto any of the higher order factors. In fathers, Cronbach's α was .90 for negative emotionality, .90 for positive emotionality, .81 for constraint, .77 for absorption, and ranged from .77 to .86 for the primary negative emotionality facets, from .80 to .86 for the primary positive emotionality facets, and from .66 to .72 for the primary constraint facets. In mothers, Cronbach's α was .85 for negative emotionality, .87 for positive emotionality, .69 for constraint, .76 for absorption, and ranged from .62 to .84 for the primary negative emotionality facets, from .78 to .81 for the primary positive emotionality facets, and from .70 to .78 for the primary constraint facets.

Informant-reports using the MPQ were collected at wave 2 from the other member of the couple regarding the target participant. That is, husbands served as the informant on their wives' personalities and vice versa. To reduce burden while assessing content domains across the three broad domains, informants were only asked to complete a subset of the narrow-band scales. Consistent with other informant report measures of personality, questions were reworded in the third person for informants (e.g., Bagby et al., 1998; Markon, Quilty, Bagby, & Krueger, 2013). The informant questionnaire included the well-being (14 items), social closeness (12 items), stress reaction (15 items), and harm avoidance (12 items) scales. These four scales were selected so that there was at least one scale for each superfactor, providing coverage of the three higher-order domains, and because these scales were deemed to be most relevant to the broader project goals of relating personality and temperament to risk for internalizing psychopathology. For informant-report on fathers, Cronbach's α was .87 for well-being, .88 for social closeness, .85 for stress reaction, and .82 for harm avoidance. For informant-report on mothers, Cronbach's α .86 for well-being, .84 for social closeness, .84 for stress reaction, and .71 for harm avoidance.

The Schedule of Nonadaptive and Adaptive Personality (SNAP; Clark, 1993), which was administered at wave 3, includes three temperament scales covering negative emotionality (14 items), positive emotionality (13 items), and disinhibition (16 items). Items are rated using a dichotomous response format. These scales were derived originally from the General Temperament Survey (Watson & Clark, 1992) and later used as the adaptive personality scales in the SNAP. In mothers, Cronbach's α was .81 for negative temperament, .82 for positive temperament, and .63 for disinhibition. In fathers, Cronbach's α was .87 for negative temperament, .81 for positive temperament, and .67 for disinhibition.

As with the MPQ, informant-reports of personality were collected using an informant analog to the SNAP at wave 3. The SNAP-Other Description Rating Form (SNAP-ORDF; Harlan & Clark, 1999) assesses negative emotionality (14 items), positive emotionality (9 items), and disinhibition (9 items) using pairs of vignettes that describe the high and low end of each trait. Items are rated on 6-point Likert scales. For informant-report of mothers, Cronbach's α was .78 for negative temperament, .58 for positive temperament, and .61 for disinhibition. For informant-report of fathers, Cronbach's α was .79 for negative temperament, .59 for positive temperament, and .61 for disinhibition.

Depression Symptoms. The Diagnostic Inventory for Depression (DID; Zimmerman, Sheeran, & Young, 2004) is a 38-item self-report measure designed to assess depressive symptom severity and frequency in accordance with the DSM-IV criteria for major depressive disorder (MDD) over the past week. Only women's scores at wave 2, when both personality and ASA were assessed, are used in the current paper. Items consist of five statements that increase in severity or frequency, and participants are instructed to select the one that best describes how they have been feeling. The DID has high test-retest reliability ($r = 0.91$) (Zimmerman et al. 2004). In our sample, Cronbach's α was .87.

Psychiatric Diagnoses. Participants were interviewed at waves 1 and 3 using the Structured Clinical Interview for DSM-IV, Non-Patient Version (SCID-NP; First, Spitzer, Gibbon, & Williams, 1996). Masters-level clinicians and advanced clinical psychology graduate students conducted the interviews by telephone, which yield similar results as face-to-face interviews (Rohde, Lewinsohn, & Seeley, 1997). The wave 1 interview assessed lifetime diagnoses and the wave 3 interview assessed the interval between the two assessments. Results from both interviews were combined to create lifetime diagnosis variables through the wave 3

assessment. When participants were unavailable, family history interviews were conducted with their partners. Based on audiotapes of 30 SCID interviews from wave 1, kappas for inter-rater reliability of lifetime diagnoses were .93 for depressive disorders, .91 for anxiety disorders, and 1.00 for substance abuse/dependence disorders, and based on audiotapes of 45 SCID interviews from wave 3, kappas for inter-rater reliability of lifetime diagnoses were .91 for depressive disorders, 0.73 for anxiety disorders, and 0.90 for substance abuse/dependence disorders at wave 3.

Data Analysis

All regression models were estimated in Mplus 8 (version 1.6; Muthen & Muthen, 2012-2018) using full-information maximum likelihood. Although the correlation between ASA-27 total scores within dyads was relatively small (r=0.09, n=388, p=0.08), for the models including both men and women, standard errors were adjusted for potential non-independence of observations (i.e., clustering within families) using a sandwich estimator (Muthen & Muthen, 2012-2018). For the models including women only, robust standard errors were specified. We also included demographic variables as auxiliaries using a saturated correlates approach (Graham, 2003) in order to recapture information in the outcome variable and reduce bias (Enders, 2010). The R package *MplusAutomation* was used to extract model fit statistics and parameters (Hallquist & Wiley, 2018) and descriptive statistics were computed in R Studio (version 1.2.1335; R Core Team, 2016).

Results

Descriptive statistics for ASA, personality, and other clinical variables can be found in Table 1.

Relationships Between Personality and ASA. We first estimated a set of linear regression models testing the relationships between personality and ASA. ASA was predicted by a single trait in each model. These models are not intended as predictive analyses (we test longitudinal predictive models adjusting for prior levels of the DV later); rather, we used linear regressions as opposed to (partial) correlations in order to incorporate the demographic variables as auxiliary variables.

In models predicting ASA at wave 2 using self-reported personality (women only), wave 1 negative emotionality, each of its lower order facets (stress reaction, alienation, and aggression), and absorption predicted wave 2 ASA, as did wave 2 negative temperament and disinhibition (Table 2). In addition, wave 1 well-being, constraint, and its lower order facet of control, and wave 2 positive temperament predicted lower levels of ASA. When mood state was included as a covariate in the models testing concurrent relationships between wave 2 personality and ASA in women, negative temperament was related to higher levels of ASA (β=.303, SE=.049, p<.001) and disinhibition (β=.142, SE=.057, p=.01), but not significantly related to positive temperament (β=-.012, SE=.056, p=83). Turning now to the models using informant-reported personality, we found that wave 1 stress reaction and wave 2 negative temperament predicted ASA, which replicates the self-reported findings, whereas, in contrast to the self-reported findings, informant-reported well-being, positive temperament, and disinhibition did not predict ASA.

The second set of models predicted ASA at wave 3 in men and women (Table 2). For these models, we additionally tested whether the interaction between gender and personality predicted ASA. When the interaction was not significant, gender was included as a covariate. On the whole, the pattern of significance and magnitude of the relationships between personality and

ASA in men and women were highly similar to what we found in the models including women only. Specifically, replicating the findings in women only, wave 3 ASA was predicted by negative emotionality, its lower order facets, and absorption at wave 1, and negative temperament and disinhibition at wave 2. Wave 1 constraint and its lower order facet, control, also predicted lower wave 3 ASA, as did wave 2 positive temperament. In contrast to the finding for wave 1 social closeness in women only, social closeness predicted lower ASA among men and women.

In addition, while the majority of personality by gender interaction coefficients were non-significant, there were three exceptions: gender significantly interacted with wave 2 well-being (β=-.095, *SE*=.049, *p*=.016), wave 3 negative temperament (β=.082, *SE*=.037, *p*=.025), and wave 3 positive temperament (β=-.072, *SE*=.035, *p*=.039). We probed the relationship between these traits and ASA for men versus women using simple slopes analysis (Aiken & West, 1991). Well-being predicted lower ASA in both women (β=-.216 [95% confidence interval (CI)=-.335 to -.097], *SE*=.061, *p*<.001) and men (β=-.121 [95% CI=-.200 to -.043], *SE*=.040, *p*=.003); negative temperament predicted ASA in both women (β=.413 [95% CI=.320 to .542], *SE*=.057, *p*<.001) and men (β=.349 [95% CI=.274 to .424], *SE*=.038, *p*<.001), and positive temperament predicted lower ASA in both women (*B*=-.170 [95% CI=-.284 to -.055], *SE*=.058, *p*=.004) and men (*B*=-.097 [95% CI=-.170 to -.024], *SE*=.037, *p*=.009). In all three cases, the relationships were slightly stronger in women than men, but the CIs around the slope coefficients overlapped, indicating that the relationships do not differ significantly by gender. This suggests that the relationship between gender and ASA may differ across levels of the personality traits, which is beyond the scope of this paper.

Finally, turning to the associations between informant-reports of personality and ASA at wave 3 among men and women, we found that wave 1 stress reaction and wave 2 negative temperament, and disinhibition predicted ASA; wave 1 well-being and wave 2 positive temperament predicted lower levels of ASA; and wave 1 harm avoidance did not predict ASA. These results replicate the self-report models, except that well-being and positive and negative temperament did not interact with gender to predict ASA. In addition, wave 1 social closeness—which was related to lower ASA using self-report—was not significantly associated with ASA using informant-report. These results replicate the relationships with stress reaction, negative temperament, and disinhibition in the models using informant-report in the smaller wave 2 sample of women only, but not the null relationships for well-being or positive temperament.

Unique Relationships Between Personality Traits and ASA. Next, we tested for unique relationships between personality and ASA by simultaneously entering the personality traits which significantly predicted ASA in the single-trait models in Table 2 into a series of multi-trait models: one included the wave 1 higher-order traits as predictors, another included the wave 1 lower-order traits as predictors, and a third included the wave 2 higher-order traits as predictors. These three models were estimated in women predicting wave 2 ASA and in men and women predicting wave 3 ASA.

Of the wave 1 higher-order traits, negative emotionality predicted wave 2 ASA, which was assessed only in women (Table 3), and wave 3 ASA, which was assessed in both genders (Table 4), whereas constraint did not predict ASA in at either wave. Of the wave 1 lower-order traits, stress reaction significantly predicted ASA in both models. In addition, aggression and absorption predicted women's wave 2 ASA, whereas alienation (and absorption at a trend-level

only) predicted men's and women's wave 3 ASA.[1]

Unique Relationships Between ASA and Personality Beyond Other Disorders. Next, to determine whether the relationships between personality traits and ASA were better accounted for by co-occurring disorders, a series of hierarchical regression models were estimated. In the first step, depressive, other anxiety, and substance use disorders and gender were entered as predictors of each of the personality traits which significantly predicted wave 3 ASA in the single-trait models in men and women. Personality traits at wave 1 or 2 were the DVs for analytic convenience, despite the fact that they preceded the second portion of the psychopathology assessment. Wave 3 ASA was then added as a predictor in step 2. We tested only wave 3 ASA in order to be consistent with the timing of the assessment of the other diagnoses, which were also measured at wave 3, and to circumvent the possibility that any significant relationships between ASA and personality were due to the personality and ASA assessments being concurrent or closer together.

Step 1 and 2 R^2 and the results of the Wald's test for the path from ASA to personality are reported in Table 5. ASA accounted for incremental variance beyond depression, other anxiety, and substance use disorders in negative emotionality, its lower order scales, negative temperament, and absorption. In contrast, ASA did not account for incremental variance in either of the lower-order positive emotionality scales (well-being or social closeness) or positive temperament. Similarly, ASA did not account for incremental variance in constraint, but it did in its lower order facet of control and in disinhibition.

[1] To determine whether the results differed for women versus men and women because of the differences in the set of predictors (social closeness was included solely in latter model as it was only significant in the single-trait model for men and women), the model predicting ASA in men and women was re-estimated excluding social closeness; the same coefficients were significant/non-significant.

In order to match the dichotomous nature of the SCID diagnosis variables, we re-estimated the models using the dichotomous ASA-27 case, as opposed to continuous, score at Step 2; the significant Wald's tests were replicated in all cases (Table 6). These models rule out the possibility that the incremental variance explained by ASA is due to the greater information inherent to dimensional variables.

Auto-Regressive Models of Personality and ASA. In three separate models, we tested whether wave 2 negative temperament, positive temperament, and disinhibition predicted ASA at wave 3 in women beyond the effects of baseline ASA. Negative temperament predicted significantly higher levels of ASA at wave 3 than would be predicted given wave 2 ASA scores, whereas positive temperament and disinhibition did not (Table 7).

Discussion

The interest in the relationship between personality and psychopathology has resurged over the past several decades, but ASA has mostly been left out of this work due to the DSM age-of-onset criteria which prohibited first-onset diagnoses in adulthood. We aimed to fill this gap for ASA by testing relationships between ASA and higher- and lower-order personality traits in a community sample using a multi-informant, multi-wave design.

ASA and Negative Emotionality: Substantial and Unique Relationships at Higher- and Lower-Order Levels

On the whole, our results demonstrate that, like other psychiatric disorders (e.g., Kotov et al., 2010), ASA is strongly related to negative emotionality in men and women. We tested this relationship concurrently in women, and across three and six years in both genders, and the magnitude of the associations were similar, which suggests that the relationship is stable across time and that ASA may be more trait- than state-like in nature. In addition, these relationships

were robust to the effects of measurement bias. That is, ASA was related to negative temperament when using informant-reports of personality and beyond the effects of mood state, although the relationships were substantially reduced in both cases. Since our measure of mood state assessed depressive symptoms, the latter is also compatible with the notion that the relationship between ASA and negative temperament is due in part but not completely to substantive overlap between depressive symptom, ASA, and negative temperament. In addition, models which tested whether ASA predicted incremental variance in negative emotionality beyond lifetime depressive, other anxiety, and substance use disorders in men and women revealed that ASA does indeed contribute substantially to negative emotionality. Specifically, ASA accounted for an additional 9% of the variance in negative emotionality beyond the 16% accounted for by other disorders, and an additional 6% of the variance in negative temperament beyond the 14% accounted for by other disorders. These findings are consistent with previous work in clinical samples that showed that patients with ASA have higher levels of neuroticism than patients with other anxiety disorders (Silove, Marnane, Wagner, Manicavasagar, et al., 2010). Moreover, negative emotionality/negative temperament were unique predictors of ASA when higher-order traits were entered as simultaneous predictors. Finally, negative temperament predicted higher levels of ASA than expected given baseline levels over three years, consistent with a vulnerability model of psychopathology-personality relationships. In sum, the relationship between ASA and negative emotionality/temperament is substantial, robust to the effects of time, mood state, informant, and personality measure, and independent of comorbid disorders and other personality traits.

A finer-grained analysis revealed a similar pattern for the lower-order facets of negative emotionality of stress reaction, alienation, and aggression. All three were positively related to

ASA in the single-trait models and beyond the effects of comorbid disorders. Stress reaction appears to be a particularly important feature of ASA. It reached almost the same magnitude as the association with the higher-order trait in the single-trait model, the relationship was replicated with informant-reported stress reaction, and, when adjusting for other lower-order personality traits, it continued to be strongly predictive across three and six years. Aspects of stress reaction, like proneness toward worrying, map onto aspects of separation anxiety, such as fears that harm will befall the loved one, and the tendency to feel vulnerable fits with a core cognitive dysfunction proposed for children with separation anxiety disorder of overestimating the danger of being left and underestimating one's capacity for independent functioning (Bögels, Snieder, & Kindt, 2003; Bögels & Zigterman, 2000), which may be at play in adults with separation anxiety as well. At the same time, past work in a large young-adult birth cohort suggests that stress reaction non-differentially relates to affective and other anxiety disorders, as well as to substance use and conduct disorder (Krueger et al., 1996). It will be important to explore in greater detail how stress reaction is manifested in ASA in particular.

This study is the first to report a link between aggression and ASA, regardless of sample type. In the multi-trait model in women only, aggression was also uniquely linked to ASA. Features of aggression, like being physically aggressive, victimizing others, and enjoying upsetting and frightening others, are also absent in the accounts of prototypical ASA cases in the literature to date (Bögels, Knappe, & Anna, 2013; Milrod et al., 2014). According to Bowlby's attachment behavioral system, aggression in ASA may be "anger born of fear" (*p*. 247; Bowlby, 1973)—a desperate effort to coerce attachment figures to stay when other means have failed and separation is too difficult to bear due to unmet attachment needs (Dutton & White, 2012). Indeed, some theorize a link between ASA and domestic violence perpetration (Dutton & White,

2012). Angry or aggressive behavior can also be seen in children with separation anxiety when facing separation, and the DSM-5 describes these behaviors as characteristic of the disorder in youth but does not mention in regards to adults (American Psychiatric Association, 2013). Notably, in past research, aggression was not associated with other anxiety disorders (Krueger et al., 1996). Because aggression may contribute to the interpersonal impairment experienced by adults with separation anxiety (Shear et al., 2006), it may be a novel treatment target and area of future research for this population.

This study is also the first to report that adults with separation anxiety report higher levels of alienation. Tendencies to believe that others wish one harm or that one is prone to bad luck map onto fears in ASA that harm will befall one's self or a loved one, while other interpersonal aspects of alienation, like often feeling betrayed or used by friends, are absent from accounts of ASA (Bögels, Knappe, & Anna, 2013; Milrod et al., 2014). Research on the distinct but related construct of parental separation anxiety, however, suggests that parents with separation anxiety from their adolescents tend to feel rejected or betrayed when their teens engage in developmentally normative independence-seeking behaviors (e.g., accepting an invitation to stay overnight with a friend; Hock, Eberly, Bartle-Haring, Ellwanger, & Widaman, 2001). Expanding the conceptualization of ASA to include a propensity for hostile attributions or a suspicious interpersonal style may elucidate cognitive and behavioral mechanisms that underlie separation-sensitivity and separation-prevention behaviors, and their associated interpersonal impairment. Tendencies to experience alienation may also have a role in aggression in ASA, given that, more than other facets of negative emotionality, alienation predicts violence across both normal and abnormal ranges of personality variation (Blonigen & Krueger, 2007). However, like stress reaction, this trait is associated with a range of other forms of psychopathology, including other

anxiety disorders, so how it plays out in ASA in particular will be an important area of future research.

The Relative Unimportance of Positive Temperament and Disinhibition

In the single-trait models, disinhibition, constraint, and constraint's lower order facet of control were significantly related to ASA. However, in the models testing unique relationship, results were mixed. The relationships with constraint and control did not persist in the multi-trait models, suggesting that their associations with ASA are due to overlap with other traits like negative emotionality and stress reaction, nor did they significantly account for incremental variance in the models beyond comorbid disorders, whereas disinhibition did show unique significant relationships in both models. Neither positive emotionality nor temperament, nor its lower-order scales, were uniquely related to ASA in the multi-trait or other psychopathology models. Future work should aim to determine whether disinhibition has some role in ASA, but on the whole, these personality traits appear to be less important for characterizing ASA compared to negative emotionality/temperament.

Absorption: Blurring Separation Between Self and Other?

Absorption related to ASA in the single-trait models, beyond comorbid disorders, and beyond other traits in the women only sample (and at a trend level in the mixed gender sample). These findings are consistent with Mertol and Alk's (2012) findings that patients with ASA had higher levels of self-transcendence compared to healthy controls as measured via the Temperament and Character Inventory, which is strongly correlated with MPQ absorption (r=0.64; Laidlaw, Dwivedi, Naito, & Gruzelier, 2005). Like aggression and alienation, an association between attachment (in this case, unresolved/disorganized) and absorption has been

reported (Granqvist, Fransson, & Hagekull, 2009), suggesting that attachment problems may underlie the associations between separation anxiety and these maladaptive personality traits.

Tellegen and Atkinson (1974) describe absorption as allocentric in that all perceptual, motoric, and cognitive resources are committed to experiencing an attentional object, which in the case of ASA may be another person, rather than to representing the self, such that the other "…acquire[s] an importance and intimacy that are normally reserved for the self and may, therefore, acquire a temporary self-like quality" (p. 274). The complete engagement of these representational resources in turn precludes meta-cognitions like, "This is only my imagination," as well as distractions by external events, which may otherwise temper or qualify the absorptive experience. While empirical tests of this conceptualization of absorption in the context of ASA are needed, the description is generative for conceptualizing the "separation-sensitive social schema" that characterizes separation anxiety (Milrod et al., 2016). It suggests that separation events may be particularly threatening and painful for those with separation anxiety due to over-identification with another person via attentional processes that obscure boundaries between self and other and impair meta-cognitive functioning. For someone with separation anxiety, when an attachment figure leaves, it may feel like a part of the "self" is leaving, and cognitive resources for combatting this sensation may be limited. Absorption as it relates to attention on and identification with the attachment figure may be a key target for successful psychotherapy for separation anxiety.

Personality, ASA, and Gender

To rule out the possibility that significant associations with ASA were artifacts of gender differences in personality and psychopathology, we included gender as a covariate in all models. We also tested whether the strength or direction of personality–ASA links differed across men

and women. The vast majority of the personality by gender interaction effects were non-significant**,** which suggests that the strength and direction of the relationships between ASA and personality are, in general, similar in men and women. In the three cases where personality did interact with gender to predict ASA (well-being, negative temperament, and positive temperament), a follow-up simple slopes analysis showed that the traits were in fact significantly related to ASA in both men and women, and the overlapping CIs around the slopes meant that, despite slightly larger effects in women, there were no significant gender differences. The significant gender by trait interaction effects may instead indicate that the strength of the relationships between ASA and gender differ across levels of the personality traits, which is beyond the scope of this paper.

Study Strengths and Limitations

The results of this study contribute to understanding personality traits in ASA in several important ways. It is the first to describe personality associations with ASA in a community sample. Additionally, unlike past studies with clinical populations, it uses a dimensional measure of ASA, accounts for method biases such as mood-state biases, social desirability, and the consistency motif, and uses both higher- and lower-order facets of personality. However, the study's results must also be considered in light of its limitations. Specifically, although we suggest several ways in which maladaptive personality traits may act mechanistically in separation anxiety disorder, the nature of the data and study design preclude direct tests of these ideas, so they should be viewed cautiously. In addition, the sample is primarily White and middle class and limited to people in their late 30s and early 40s with young children, which limits the generalizability of the findings, particularly because having young children may exacerbate

ASA. Finally, we administered a self-report measure of ASA; interview and informant reports of ASA would be useful.

Conclusion

In sum, ASA is characterized by negative emotionality and its facet stress reaction, as well as to somewhat lesser degrees by aggression, alienation and absorption. These relationships are not due to co-occurring psychopathology, overlap with other traits, or mood-state biases, and they are verified by informants. Moreover, negative emotionality predicts greater ASA 3 years later, adjusting for baseline ASA, raising the possibility that NE is a precursor of, or predisposes to, ASA. This work may help clinicians anticipate personality traits that are associated with ASA in order to tailor treatments to patients' personalities. It also lays the groundwork for future research testing the mechanisms and causal links between these personality traits and ASA.

Chapter 2

Parenting types, antecedents, and consequences of adult separation anxiety in mothers: A study of person-centered associations and intergenerational transmission

Attachment theory and the interpersonal nature of separation-related anxieties suggest that adults who experience separation anxiety may engage in maladaptive parenting behaviors. Specifically, a parent with separation concerns may try to keep a child close by controlling the child's behavior or through emotional manipulation or guilt-induction. Several past studies on separation anxiety as it manifests specifically in the parent-child relationship during critical periods of children's individuation (i.e., infancy, adolescence, and emerging adulthood) support this notion. Parents with higher levels of separation anxiety are more intrusive (i.e., overcontrolling, ignoring baby's cues; Stifter, Coulehan, & Fish, 1993), have poorer self-rated communication and adolescent-rated attachment (Hock et al., 2001), and exhibit higher levels of dependency-oriented psychological control (Kins, Soenens, & Beyers, 2011; Soenens, Vansteenkiste, Duriez, & Goossens, 2006). These behaviors have been construed as a form of parental insensitivity in that they insist on a certain type of response from the child (e.g., emotional closeness or affectionate physical contact) regardless of the child's needs, in the same way that parental neglect ignores a child's needs (Bowlby, 1988; Hock & Schirtzinger, 1992). They are theorized to arise out of problems with self-other individuation in the parent and may stifle the child's normative development toward independence (Hock & Schirtzinger, 1992).

These past studies have utilized the construct "maternal [parental] separation anxiety," which is defined as an adverse emotional state involving sadness, guilt, or apprehension that occurs when the parent is to be separated from their child (Hock, McBride, & Cnezda, 1989). Research over the last three decades has suggested that adults may experience separation anxiety from loved ones more generally, even outside of parent-child relationships (e.g., Manicavasagar, Silove, & Curtis, 1997; Shear, Jin, Ruscio, Walters, & Kessler, 2006). This clinical problem was formalized recently when the fifth edition of the Diagnostic and Statistical Manual of Mental

Disorders (DSM) lifted the age of onset criterion for separation anxiety; previously, it required that the disorder first onset in childhood, whereas now the disorder may be diagnosed at any time, regardless of age (American Psychiatric Association, 2013). However, the relationship between adult separation anxiety (ASA) and parenting has not yet been examined in any type of study or sample to our knowledge. Part of the aim of this study was to examine the parenting correlates of ASA, building on what is known from the parental separation anxiety literature.

Parenting Types in ASA

Parental separation anxiety is necessarily contextualized within a specific and unique relationship (i.e., parent-child) and has been measured with items that refer specifically to young children, whereas ASA may be a more generalized psychopathology which could manifest in a number of relationships (e.g., with spouses, parents, children, friends) irrespective of age. Because ASA, in this way, is more distally related to parenting compared to parental separation anxiety, we posited that the parenting behaviors associated with ASA may be heterogenous at the individual level. Consequently, we examined associations between ASA and parenting using both variable- and person-centered approaches, two types of analyses which can be seen as complementary and may yield somewhat different results and insights (Masyn, 2013).

For person-centered analyses, we utilized finite mixture modeling, a type of modeling which includes latent class/profile analysis, to determine whether a potentially heterogenous population of mothers can be separated into classes which are in turn associated with ASA. The mothers in each of these classes (also referred to as types or groups throughout) are not identical to one another with respect to parenting, but they are meaningfully more similar to one another than to the mothers in other groups, and the classes may be meaningfully distinct without being entirely non-overlapping or starkly separated in every way (Masyn, 2013). Moreover, in

recognizing that psychological constructs are rarely best represented by categories as opposed to continuums, we do not view the classes as "carving nature at its joints" but rather hope that they are useful in summarizing potentially complex patterning across multiple variables in a digestible and meaningful way.

On the basis of the extant literature on parental separation anxiety, we hypothesized that classes which include high levels of overprotective parenting would also exhibit the highest levels of ASA relative to other groups. The literature on ASA and case descriptions of individuals with the disorder led us to additionally hypothesize that parenting types with high levels of authoritarianism may be linked with ASA. That is, case descriptions portray individuals with ASA as behaving somewhat erratically, reactively, or in an otherwise emotionally dysregulated manner in interpersonal relationships in response to separation or other potential disruptions to interpersonal relationships with loved ones (Bögels et al., 2013; Milrod et al., 2014). We venture that this may manifest in the parent-child relationship as emotionally-driven and sometimes irrational disciplining and relating.

Intergenerational Transmission of Parenting via ASA

According to attachment theory, parents' (and other individuals') reactions to separation events are shaped by their inner working representations of attachment relationships, which are constructed in early experiences with parents (Bowlby, 1973; Hock et al., 2001). While previous studies have not yet examined how parenting relates to ASA, these kinds of parenting antecedents of ASA have been explored. Parents with ASA report high levels of recalled maternal overprotectiveness in childhood (Manicavasagar, Silove, Wagner, & Hadzi-Pavlovic, 1999) and high levels of parental separation anxiety have similarly been linked to early experiences with parents discouraging independence (Lutz & Hock, 1995) and exerting over-

control (Kohlhoff, Barnett, & Eapen, 2015), as well as to rejection (Lutz & Hock, 1995), parental abuse, and indifference (Kohlhoff et al., 2015). In the current study, we aim to replicate the finding that recalled overprotection is associated with ASA in mothers.

Parenting behaviors are likely transmitted across generations (e.g., Conger, Belsky, & Capaldi, 2009). We hypothesize that one mechanism by which overprotective or controlling parenting behaviors are transmitted intergenerationally may be through ASA. Overprotective parenting may teach a child that the world is a dangerous place which requires the presence and assistance of a loved one, which in turn may limit the degree to which a child is able to form an individuated, efficacious sense of self. In some, this may manifest as higher levels of ASA when they reach parenthood. That is, given that parental separation anxiety is associated with higher levels of dependency (Hock & Lutz, 1998), and conceptually related to a lower sense of control and self-efficacy and a heightened sense of threat, parents with ASA may engage in parenting behaviors, like dependency-oriented psychological control and intrusiveness, which in turn limit children's autonomy and interfere with their individuation (Hock et al., 2001; Kohlhoff et al., 2015; Soenens et al., 2006; Stifter et al., 1993).

Versions of this parenting construct are included widely in measures of parenting, for example, as restrictiveness (Deković, Janssens, & Gerris, 1991), hostile coercion (Lovejoy, Weis, Hare, & Rubin, 1999), and overprotectiveness (Robinson, Mandleco, Olsen, & Hart, 2001), and index parents' tendencies to use guilt, coercion, threats, and punishment to control children's behaviors or emotional states and reactions. Schaefer (1965) captures these parenting behaviors in his autonomy-versus-control scales and describes them as "covert, psychological methods of controlling the child's activities and behaviors that would not permit the child to develop as an individual apart from the parent" (p. 555). In the original study, the subscales

control through guilt, intrusiveness, and parental direction loaded highly on the control/autonomy scale, as did possessiveness and protectiveness, which cross-loaded on other scales as well (Schaefer, 1965). Given the existing literature on dependency-oriented psychological control, intrusiveness, and parental separation anxiety, and on experiences of overprotective parenting and one's own ASA, we hypothesize that links between one's childhood experiences of parental overprotectiveness and one's own tendency toward psychological control as a parent may be mediated by ASA.

The Current Study

We describe the concurrent relationships between parenting behaviors and ASA in a sample of 470 mothers with young children using variable- and person-centered approaches. For these analyses, we utilize a measure of parenting designed for parents of preschoolers, the Parenting Styles and Dimensions Questionnaire (PSDQ; Robinson, Mandleco, Olsen, & Hart, 2001), which consists of four subscales: authoritative, authoritarian, permissive, and overprotective parenting. We then test whether ASA mediates the intergenerational transmission of parenting behaviors using mothers' recalled parenting experiences of care and overprotectiveness and their own parenting behaviors as measured by the parent version of the Children's Report of Parent Behavior Inventory (CRPBI-30; (Schludermann & Schludermann, 1988), which was designed for parents of children and adolescents. Specifically, the CRPBI subscales are control/autonomy, acceptance/rejection, and firm control/lax control. We used two different measures of parenting to match the developmental stage of the children.

Method

Participants

The study participants are from 609 families from the community participating in an ongoing longitudinal study of children's temperament and psychopathology. Of these families, 559 were recruited at the first wave of the study using commercial mailing lists when children were 3 years old. Fifty additional minority families were recruited at the second wave three years later to increase racial/ethnic diversity (see Bufferd, Dougherty, Carlson, Rose, & Klein, 2012 for recruitment details). Parents provided written informed consent after receiving a description of the study. The study was approved by the human subjects review committee at Stony Brook University, and families were compensated.

Mothers were included in the study sample if they completed the measure of own-parenting and the measure of recalled-parenting at wave 2 (n=470). We included only women in the current sample because only the primary caretaker, who were mostly women, completed the measure of ASA, the mediator/outcome of interest. Due to the small number of male primary caretakers who completed the ASA (n=39), their data are not included in this report. Of women included in the sample, 378 (80.4%) completed the ASA and 434 (92.3%) completed the wave 3 measure of parenting.

The majority of women were married or living with their child's biological father at wave 2 (86.2%). Mothers were 39.0 years old on average (SD=4.9; range: 22.8-51.8) and approximately half (56.9%) had at least a 4-year college degree. The study's main focus is on children's psychopathology; thus, parents' race and ethnicity were not collected, and children's race and ethnicity are used instead as proxies. The majority (87.7%) of mothers had White children participating in the study and 12.3% had children who were Hispanic or Latino. Missing data on demographic variables were due to failure to respond (valid cases: range=95.7-100.0%).

Mothers included in versus excluded from the sample were compared on all demographic variables and the measures of parenting and ASA at wave 2. No significant differences were found.

Measures

Adult separation anxiety. The Adult Separation Anxiety Questionnaire (ASA-27) is a 27-item self-report measure of separation anxiety symptoms experienced as an adult (over age 18; Manicavasagar et al., 2003). Items are rated on a four-point scale (1=*This happens very often;* 4=*This has never happened).* Items were reverse coded and subtracted by 1 so that response categories were 0-3. The questionnaire was based on an interview based on the SCID format developed by the same group which included items derived from a content analysis of responses to a semi-structured assessment of patients suffering from high levels of ASA. The ASA-27 shows excellent concordance with this semi-structured interview and, in past work, has high internal consistency (Cronbach's alpha=0.95) and good test-retest reliability (r=0.86, p<.001) (Manicavasagar et al., 2003). This measure was administered at wave 2. In our sample, Cronbach's α was .89.

Parenting. The PSDQ (Robinson, Mandleco, Olsen, & Hart, 2001) is a 37-item self-report questionnaire designed for parents of preschool-aged children that assesses four parenting styles: authoritative (15 items), authoritarian (12 items), permissive (5 items), and overprotective (5 items). Items are rated from 1 (*Never*) to 5 (*Always*). It was administered at wave 2, when children in the study were approximately 6 years old. In our sample, Cronbach's α was .84 for authoritative parenting, .74 for authoritarian parenting, .74 for permissive parenting, and .70 for overprotective parenting.

The parent version of the Children's Report of Parent Behavior Inventory (CRPBI-30; (Schludermann & Schludermann, 1988) is a 30-item questionnaire developed for parents of children and adolescents that assesses three parenting styles: acceptance/rejection (10 items), psychological control/autonomy (10 items), and firm control/lax control (10 items). Items are rated on a 3-point scale (0=*Statement is not like self*, 2=*Statement is a lot like self*). Acceptance/rejection assesses the extent to which parents are warm and nurturing and express affection. Control/autonomy assesses how much parents psychologically pressure children via guilt-induction and manipulation and parent-centered rearing behavior. Finally, the firm control/lax control scale assesses the extent of parents' strict discipline and punishment. This measure was administered at wave 3, when children in the study were approximately 9 years old. Cronbach's α was .79 for acceptance/rejection, .70 for control/autonomy, and .60 for firm control/lax control.

To distinguish these parenting measures from the recalled parenting experiences with the mothers' parents, we will refer to these scales as "own parenting" at wave 2 (PSDQ) and wave 3 (CRPBI).

Recalled parenting experiences. The Parental Bonding Inventory (PBI; Neale et al., 1994; Parker, Tupling, & Brown, 1979) is a 7-item self-report measure of recalled parenting experiences during the first 16 years of life, specifically, care (3 items) and overprotection (4 items). Items are rated on a scale ranging from 1 (*None*) to 4 (*A lot*). Care reflects the degree of warmth, affection, and emotional support and sensitivity parents displayed, as well as a lack of emotional coldness and neglect. Overprotection reflects parents' tendencies to be invasive, foster dependency, and be psychologically controlling, as well as tendencies to not promote independence and give the child freedom. The PBI correlates well with other measures of

reported parenting and with interviewers' judgments of the parent-child relationship as well as observers' ratings based on observation of their interactions (Parker, 1981; Parker et al., 1979). This measure was administered at wave 2. Cronbach's α was .73 for maternal care, .62 for maternal overprotection, .67 for paternal care, and .58 for paternal overprotection.

Data Analysis

Concurrent descriptions of parenting and ASA. *Variable-centered analyses.* First, we estimated Pearson's correlations between parenting behaviors as measured by the PSDQ and ASA. Next, because the parenting scales are inter-correlated, we entered the scales with significant relationships into a regression model as simultaneous predictors of ASA to determine whether significant relationships at the bivariate level can be explained by the relationship between ASA and another scale.

Person-centered analyses. Finite mixture modeling was used to identify latent classes of parenting using the PSDQ variables and following the procedure recommended by Masyn (2013). Four sets of models with different within-class covariance-variance structure specifications were fit, all of which allowed the indicator means to vary across classes. A full covariance-variance matrix was specified for two sets of models such that the indicators were permitted to covary within classes. This specification relaxes the assumption of local independence; that is, the latent class variable is not the only means by which the indicators can relate to the class. In the first set, variances and covariances were free to differ across classes (*full-free models*), and in the second set, variances and covariances were constrained to equality across classes (*full-equal models*). The third and fourth sets of models assumed local independence among indicators after accounting for the latent class variable by specifying a within-class diagonal covariance-variance structure (i.e., variances on the diagonal and zeroes on

the off-diagonal). Again, variances and covariances were free to differ across classes in the third set (*diagonal-free models*), and in the fourth set, variances and covariances were constrained to equality across classes (*diagonal-equal models*).

Class enumeration was conducted for each set of models starting with one class and stopping when there were problems with convergence or estimation. Specifically, because finite mixture models are prone to obtain local as opposed to global log-likelihood solutions, we required that the log-likelihood value was replicated at least 5% of the time. We also required that all classes include at least 5% of the sample according to the model estimated posterior probabilities, since smaller classes can indicate over-extraction of classes and are less likely to be recovered in small samples (Masyn, 2013; Nylund-Gibson & Young Choi, 2018). Cut-offs for these metrics have not been established, but Nylund-Gibson and Young Choi (2018) suggest at least 3-10% log-likelihood replications and class sizes of 5-8% are sufficient. In addition to utilizing these cut-offs, we also monitored the condition number of the information matrix, as values less than 10E-6 may indicate non- or empirical under identification, and the proportion of random starts that converged on a solution, since low levels of convergence can indicate weak identification (Masyn, 2013).

There is no single fit index that can be used to identify the optimal solution in finite mixture modeling (Nylund, Asparouhov, & Muthén, 2007). However, class solutions should be plausible, meaningful, and useful. We therefore utilized a range of fit statistics along with the substantive interpretability of the solutions to guide final model selection. In accordance with Masyn (2013), we first examined several fit statistics to identify one or two candidate models from each set for further exploration, including the log-likelihood value, information criteria (i.e., Bayesian Information Criterion [BIC; Schwartz, 1978]; Consistent Akaike's Information

Criteria [CAIC; Bozdogan, 1987]; Approximate Weight of Evidence Criterion [AWE; Banfield & Raftery, 1993]), and, for nested models (k v. k + 1 classes), relative fit indices (i.e., Lo-Mendell-Rubin likelihood ratio test [LMR-LRT; Lo, Mendell, & Rubin, 2001]; McLachlan and Peel's bootstrapped likelihood ratio test [BLRT; McLachlan & Peel, 2000], cmPk, and BF). The one-class model with a full covariance-variance structure specification acted as the benchmark model; only models with smaller log-likelihood values were considered (Masyn, 2013). We also required that the average posterior class probability, a classification diagnostic, be at least .70 (Masyn, 2013). In accordance with Maysn (2013), we selected candidate models from each set for further evaluation. We compared full and diagonal models with the same number of classes and across-class constraints using likelihood ratio tests, since the diagonal models are more restricted versions of the full models (i.e., the covariances are constrained to 0). The interpretability of these candidate models was judged by the degree of class separation based on 90% confidence intervals around the indicator means and the plausibility of the solutions were. We report key model estimation information and fit statistics from all models that met convergence/estimation criteria. For the selected model, we report standardized parameter estimates and average posterior probabilities and class sizes based on these values.

All models were estimated in Mplus 8 (version 1.6; Muthen & Muthen, 1998-2017) using random start values, the EMA optimization algorithm, which is the default for finite mixture modeling, and a maximum likelihood estimator with robust standard errors to handle the non-normality of some indicators.

Intergenerational transmission of parenting behaviors. First, we estimated Pearson correlations between recalled parenting experiences, own parenting behaviors, and ASA. Next, to evaluate the direct and indirect pathways by which recalled parenting experiences (maternal

overprotection and care, and paternal overprotection and care) related to own parenting behaviors (acceptance/rejection, control/autonomy, and firm control/lax control), we estimated two longitudinal path models. In the first, the three own parenting variables were regressed on the two maternal recalled parenting variables, and in the second, the own-parenting variables were regressed on the two paternal recalled parenting variables. In both models, we also specified indirect effects via ASA for any paths consisting of variables which were significantly interrelated (i.e., recalled parenting with ASA, ASA with own parenting, and recalled parenting with own parenting). We also included demographic covariates (White [child], Hispanic [child], college graduate, living with/married to child's biological parent, and age). We report standardized parameter estimates.

Descriptive statistics and correlations were computed in R Studio (version 1.2.1335; R Core Team, 2016). Path models were estimated in Mplus 8 (version 1.6; Muthen & Muthen, 2012-2018) using full-information maximum likelihood. We used non-parametric bootstrapping (5,000 draws) to obtain empirically derived bootstrapped standard errors and confidence intervals for the indirect effects and to circumvent any asymmetry in the indirect effect sampling distribution (Preacher & Hayes, 2004). The R package *MplusAutomation* was used to write input files and extract model output (Hallquist & Wiley, 2018).

Results

Concurrent variable-centered associations with parenting. ASA was positively associated with authoritarian, permissive, and overprotective parenting concurrently (Table 8). It was not associated with authoritative parenting. Overprotective and permissive parenting were uniquely related to ASA in the multivariate model (Table 9).

Concurrent associations with parenting classes. *Estimation.* Fit statistics for all models that converged and were well-identified are available in Table 10. For these models, the log-likelihood replicated more than 5% of the time (*M*=79.3%; *SD*=26.3%, range=22.5-100.0%), the smallest classes included at least 5% of the sample (*M*=41.4%, *SD*=41.6%, range=5.0-100.0%), and nearly all start values converged (*M*=99.9%, *SD*=.3%, range=99.8%-100.0%). The smallest average posterior probability was also greater than .70 for all models (*M*=.91, *SD*=.07, range=.81-1.00). Finally, all models had condition numbers >10E-6, suggesting they were well-identified.

Class enumeration stopped at the 4-class full-equal and diagonal-equal models due to class sizes less than 5% and at the 3-class full-free and diagonal-equal models due to convergence problems (e.g., non-positive definite first-order derivative product matrix). The condition numbers for the latter models were also <10E-6, suggesting they were weakly or under identified.

Model selection. Since fit statistics can increase marginally but not necessarily meaningfully as additional classes are added, scree-type plots can be used to identify the "elbow" at which substantial gains begin to flatten out; the log-likelihood, BIC, CAIC, and AWE are depicted in this manner in Figure 1 for all models that met estimation criteria. The benchmark model fit statistics are also plotted. All models except the 1-class models with within-class diagonal covariance-variance structures (diagonal-free and diagonal-equal) exceeded the benchmark thresholds. Of the full-free set, we selected the 2-class model as the candidate because it was favored unequivocally by all fit statistics (Table 10). In the full-equal set, the LMR-LRT indicated that the 3-class model only marginally (*p*=.06) improved upon the 2-class model, but since all other fit indices favored the former, we selected it as the candidate model.

From the diagonal-free model set, we selected the 2-class model because it was favored by all fit statistics. Finally, we selected the 3-class diagonal-equal model because it had the best fit according to the information criteria and $cm\hat{P}_K$, although the LMR-LRT suggested it did not improve significantly upon the 2-class model.

Of these candidate models, we were able to compare the pairs of models with the same number of classes but different variance-covariance matrix structures using likelihood ratio tests because they are nested. Both models with within-class full, unrestricted covariance-variance structures fit better than the models with diagonal, restricted covariance-variance structures (2-class comparison: $\chi^2(12)=67.09$, $p<.001$; 3-class comparison: $\chi^2(6)=52.33$, $p<.001$). Of these two models, we selected the 3-class full-equal model as the final model because it had the highest degree of class separation as indicated by non-overlapping 90% CIs for two indicators and marginally overlapping CIs for a third, whereas the CIs for two indicators in the 2-class full-free model were non-overlapping and the other two overlapped substantially. Moreover, the 3-class full-model was substantively interpretable, showed separation on the two parenting scales that we hypothesized to relate to ASA (authoritarian, overprotective), and was not a "severity solution" (i.e., classes were not low, medium, and high on good/bad parenting scales). The entropy for this solution was .85.

Selected model. The indicator means for each class and the class proportions based on estimated posterior probabilities for the 3-class full-free model are presented in Figure 2. Class 1, the largest class, was characterized by being low on authoritarian, overprotective, and permissive parenting; we refer to this as the "optimal parenting" class. Class 2 was characterized by being low on authoritarian parenting, very high on overprotective parenting, and somewhat high on permissive parenting; we refer to this as the "overprotective/enmeshed" class. Finally, class 3

was characterized by being very high on authoritarian parenting, moderately high on overprotective parenting, and somewhat low on permissive parenting; we refer to this as the "emotionally-volatile/enmeshed" class. All three classes were similar on authoritative parenting. For class 1, the average posterior probability was .95; for class 2, it was .85; and for class 3, it was .89.

Nearly all indicators were locally dependent, or intercorrelated beyond what was accounted for by the latent class variable. Specifically, there was a residual correlation between authoritative and authoritarian parenting (B=-.24, SE=.06, p<.001), authoritative and permissive parenting (B=-.17 SE=.05, p<.001), authoritarian and permissive parenting (B=.41, SE=.08, p<.001), and permissive and overprotective parenting (B=.23, SE=.08, p=.003). Only the relationship between authoritative and overprotective parenting was fully explained by the latent class variable (B=-.05, SE=.06, p=.388).

ASA differences by class. The mean level of ASA was 10.24 (SE=.47) in the optimal parenting class, 20.15 (SE=2.54) in the emotionally-volatile/enmeshed class, and 23.78 (SE=4.27) in the overprotective/enmeshed class. The omnibus test comparing ASA means across classes was significant ($\chi^2(2) = 23.48$, p<.001). Pairwise tests indicated that the emotionally-volatile/enmeshed class had significantly higher levels of ASA than the optimal parenting class ($\chi^2(1) = 14.07$, p<.001), as did the overprotective/enmeshed class ($\chi^2(2) = 9.67$, p=.002), while the emotionally-volatile/enmeshed and overprotective/enmeshed classes did not differ ($\chi^2(1) = .51$, p=.47).

Intergenerational transmission of parenting. Recalled maternal and paternal care at wave 2 were positively related to own acceptance/rejection and negatively related to own control/autonomy at wave 3 (Table 11). In addition, recalled maternal and paternal

overprotection were positively related to own control/autonomy at wave 3. Recalled maternal and paternal care were also negatively related to ASA and recalled maternal and paternal overprotectiveness were positively related to ASA. In addition, ASA was positively related to own control/autonomy three years later.

Next, because of the intercorrelations between recalled maternal and paternal care and overprotectiveness, own control/autonomy, and ASA, we tested the indirect pathways between these recalled and own parenting scales via ASA. We tested one path model with both maternal recalled variables (care and overprotective) as predictors and one path model with both paternal recalled parenting variables as predictors and included demographic variables as covariates of the mediator and outcome variable.

In the model using maternal parenting variables, the indirect effect from recalled maternal overprotection to control/autonomy via ASA was significant (Figure 3; see Table 12 for full model output), whereas the indirect effect of maternal care was not. In addition, maternal care positively predicted acceptance/rejection. In the model using paternal parenting variables, neither indirect effect from the paternal parenting variables to control/autonomy via ASA were significant. However, paternal care negatively predicted ASA, which positively predicted control/autonomy. Paternal overprotection also positively predicted control/autonomy.

Discussion

Previous research demonstrates that parental separation anxiety, or mothers' and fathers' tendencies to experience guilt, anxiety, and apprehension when faced with separation from their children, is related to parenting behaviors that limit children's autonomy and interfere with their individuation, like dependency-oriented psychological control and intrusiveness (Hock et al., 2001; Kohlhoff et al., 2015; Soenens et al., 2006; Stifter et al., 1993). This study was the first to

examine how parenting relates to ASA, a more generalized form of separation anxiety which subsumes the parent-child relationship but may go beyond it to include other relationships (e.g., the adult's partner and/or parents).

Concurrent Descriptions of Parenting and ASA

By using both variable- and person-centered analytic approaches, we were able to identify first which parenting behaviors are linked with ASA across mothers and second how specific constellations of parenting behaviors in smaller, more homogenous groups relate to ASA. In several ways, results from the two approaches converged. We found that overprotective parenting was positively related to ASA, above and beyond the effects of other parenting dimensions, and that it was elevated in both classes with higher mean levels of ASA. A closer inspection of the items that make up this PSDQ overprotective scale reveals that they may be indexing, in part, problems in self-other boundaries or individuation in the parent-child relationship. Two items fit more typical notions of overprotectiveness—they query parents' tendencies to restrict children's actions and overly-manage difficult situations ("I readily intervene if there is a chance that our child will fail at something" and "I try to control much of what our child does")—but the other three items query parents' emotional reactions to aspects of the child or his/her experience, specifically, to the child's apparent failures ("I feel guilty when our child does not measure up to his/her potential"), to other people's perceptions of the child ("I am fearful that others will not think well of my child"), and to situations in which the child is challenged ("I get anxious when our child tries to do something new or difficult for him/her").

The person-centered analysis suggests two distinct ways groups of mothers may express this overprotectiveness. The class characterized by the highest levels of overprotection, which we called overprotective/enmeshed, was additionally characterized by higher levels of permissive

parenting, a scale which was related bivariately and uniquely to ASA at the variable level as well. Mothers in this class may have a difficult time following through with disciplinary actions (e.g., "I give into my child when the child causes a commotion about something") and tend towards indulgence ("I spoil my child"), perhaps because they are overly enmeshed with their children. When her child experiences a negative emotion, a mother in this class may experience the emotion in tandem, and respond by acting in a manner that reduces the negative emotion (i.e., by giving into the child's demands). Permissive parenting was also uniquely related to ASA in the variable-level analysis.

An additional class, which we called emotionally-volatile/enmeshed, that was also related to ASA was characterized primarily by very high levels of authoritarian and moderately high levels of overprotective parenting. In addition to capturing a tendency toward punitiveness, items that make up the authoritarian parenting scale describe a parent who is emotionally volatile (e.g., "I explode in anger towards my child," "I grab my child when being disobedient"). This type of behavior resembles one pole of "erratic emotional behavior," a part of psychological control as defined by Barber (1996), with the other being expressions of care. This volatility may be an alternative expression of, or reaction to, the lack of emotional individuation captured by the overprotective scale, whereas the other class of parents may react to the lack of individuation by being more indulgent and equivocating. Authoritarian parenting was also positively bivariately related to ASA in the variable-centered analysis, but not when accounting for the relationships between ASA and the other parenting scales.

Parenting Behaviors Across Generations

Attachment theory suggests that early experiences with parents shape children's reactions to separation events (Bowlby, 1973). What are the particular parenting experiences that

predispose individuals to experience separation anxiety as adults, and how does ASA in turn shape parents' own parenting behaviors? To answer these questions, we used a different measure of own parenting appropriate for parents of older children, the CRPBI, which assessed control/autonomy, acceptance/rejection, and firm control/lax control. Correlations between the PBI and CRPBI scales suggested that there are multiple parenting antecedents of ASA and one primary parenting consequence. All four types of recalled parenting—maternal and paternal lack of care and overprotectiveness—were related to ASA, whereas ASA predicted only future control/autonomy.

The specificity of the ASA–control/autonomy relationship replicates both theoretical and empirical work suggesting a particular relationship between parental separation anxiety and dependency-oriented psychological control (Kins et al., 2011; Soenens et al., 2006). Past work also found that having an anxiety disorder was associated with all four PBI recalled parenting scales and that maternal overprotection was uniquely related to ASA when adjusting for the other recalled parenting scales (Manicavasagar et al., 1999). In the longitudinal path model in the current study, maternal overprotection, but not care, similarly significantly predicted ASA. In both models using recalled maternal and paternal variables as predictors, recalled overprotection also predicted control/autonomy and ASA exerted an effect on control/autonomy beyond the effects of the recalled parenting variables, but the indirect effect via ASA was only present from maternal, not paternal, overprotection. We note here that the direct path in the model including both maternal recalled parenting scales and all covariates was not significant; consequently, the effect via ASA should not be interpreted as mediation but rather as an indirect effect, which does not require that the direct path be present initially (Holmbeck, 2002; Preacher & Hayes, 2004). We also extended past work by identifying a unique concurrent relationship between ASA and

one's own overprotective parenting as measured by the PSDQ. In sum, ASA appears to be a notable link in the passing down of parenting behaviors that aim to control or limit children's behaviors, experiences, or environments.

Study Strengths and Limitations

Our study has several notable strengths. To start, it fills a significant gap in the literature. To date, no studies have examined how ASA is associated with parenting. In filling this gap, we were also able to link our work to past work on parenting and the related but distinct construct of parental separation anxiety, which is a relatively more developed domain of research. In addition, we described parenting correlates of ASA using both variable- and person-centered approaches; the latter is particularly generative for hypotheses about the mechanisms that underlie links between ASA and maladaptive parenting techniques within individuals. Finally, we considered in a single model how ASA may be both a consequence and an antecedent of parenting behaviors across generations—links which past works have only examined in isolation or discussed in theory.

We must also note the study's limitations. First, we include only women in our sample who have school-aged children and, in most cases, are married. The sample is also primarily White and non-Hispanic. Whether these results generalize to men, parents of children of other ages, single parents, or parents of different races or ethnicities will need to be pursued in future studies. Second, we use a different measure of parenting for examining concurrent correlates of ASA at wave 2 compared to testing outcomes of ASA at wave 3. We chose to use two different measures in order to match the developmental stage of the children—the PSDQ would not have been appropriate for use with parents of nine-year-old children—but in turn we could not directly relate the results of the wave 2 analysis to the wave 3 analysis. We also used a self-report

measure of recalled parenting experiences; however, the negative impact of this is mitigated by the fact that the PBI is not affected by mood state, has very good long-term stability, and does not differ substantially from observer reports (Lizardi & Klein, 2005; Parker, 1983; Parker et al., 1979). We also do not take into account other factors, like child temperament, which may moderate the associations between ASA and parenting. Finally, some of the effects that we ascribe to environmental causes may actually be due to shared genetic influences. Studies with genetically informative-designs are needed to address this issue.

Conclusion

This study is the first to demonstrate that ASA is associated concurrently with maladaptive parenting behaviors, like authoritarianism, permissiveness, and overprotectiveness, and suggests, based on person-centered analyses, that these parenting behaviors may be present differentially within groups of parents who exhibit high levels of ASA. In addition, early negative parenting experiences appear to predispose individuals to experience separation anxiety in adulthood, particularly maternal overprotection and paternal care. ASA in turn is related to mothers' controlling parenting behavior three years later. In conjunction with theoretical work on attachment theory, these findings suggest that ASA is important for understanding maladaptive parenting behaviors.

Chapter 3

Chapter 3: Is adult separation anxiety associated with offspring risk for psychiatric problems?

Awareness of the clinical problem of separation anxiety in adulthood (ASA) has been slowly increasing in recent years. Research over the past two decades suggests a surprisingly high lifetime prevalence rate in community samples of 7% (Shear, Jin, Ruscio, Walters, & Kessler, 2006) and substantially higher rates in clinical samples ranging from 23% (Silove, Marnane, Wagner, Manicavasagar, & Rees, 2010) to 42% (Pini et al., 2010). ASA also predicts poorer treatment outcomes (Aaronson et al., 2008; Kirsten et al., 2008; Miniati et al., 2012) and is associated with functional impairment, even beyond the effects of comorbid disorders (Shear et al., 2006), and more so than other anxiety and mood disorders (Pini et al., 2010; Silove et al., 2010).

Historically, separation anxiety was conceptualized as a clinical problem which children might experience in relation to their parents or primary caregivers (Bowlby, 1973). In accordance with this, the age of onset criterion for separation anxiety required that the disorder be diagnosed for the first time in childhood. This criterion was lifted in DSM-5 such that first onset can now occur at any point in the lifespan (American Psychiatric Association, 2013). Since the conceptualization of separation anxiety was expanded to include adults, we must now consider the possibility that parents may experience separation concerns, either in relation to their children or other loved ones, which may in turn confer risk for separation anxiety or other clinical problems in children.

To date, there is a dearth of research on the effects of ASA on offspring separation anxiety. The only study on this topic, which used a small sample of 54 parent-child dyads, reported that children of parents with ASA disorder were 11 times more likely to have CSA disorder compared to children of parents without ASA and that CSA was not statistically linked to any other parental disorders (Manicavasagar, Silove, Rapee, & Waters, 2001). This study

suggests that the transmission of separation anxiety in families is strong and highly specific. However, the generalizability of the study is limited because it used a clinical sample, which can be biased, as treatment seeking individuals tend to have more severe psychopathology and higher rates of comorbid disorders (Goodman et al., 1997). Moreover, while the researchers interviewed both parents and children about the children's psychiatric problems, they utilized just a single indicator of youth psychiatric problems in analyses (i.e., diagnoses). This approach is prone to measurement error, and as a result, reduced power, compared to latent variable approaches. Consequently, in the current study we use a large community sample and construct latent youth psychopathology factors from mother, father, and youth reports on both interview and survey instruments from multiple assessment points that capture children's psychopathology during a period spanning middle childhood and early adolescence.

Previous research suggests that disorders like depression and anxiety are better construed as specific manifestations of a higher-order internalizing factor and that familial transmission may occur at this level rather than at the level of specific disorders (Lahey, Hulle, Singh, Waldman, & Rathouz, 2011; Starr, Conway, & Brennan, 2014). In line with this, it is important to determine whether ASA specifically increases children's risk for CSA in particular, or to internalizing problems more generally. We address this by testing how ASA relates to three internalizing psychopathology factors in youth.

ASA, like all psychiatric problems, is highly comorbid with other disorders (Shear et al., 2006). However, the past study on familial transmission of separation anxiety only tested bivariate relationships, so it cannot be determined whether the effects were due to ASA or comorbid disorders (Manicavasagar et al., 2001). Therefore, in the current study, we also examine whether the effects of ASA on children's psychopathology are attributable to parents'

comorbid disorders. This will also help to determine whether ASA is a disorder that is worthy of attention and resources. If the effects are due to its comorbidity with other disorders, understanding and treating ASA may not be an important goal. If, however, ASA predicts above and beyond other psychiatric disorders, regardless of the specificity of the relationships, this will suggest that ASA is not a benign concern.

Finally, because ASA is a new clinical problem, it has not been well-validated. Linking parents' ASA to the better-established construct of CSA would increase the construct validity of ASA (Robins & Guze, 1970). We conducted a family study on the intergenerational transmission of separation anxiety in a community sample in order to understand how ASA impacts children's risk for separation anxiety in particular and psychiatric disorders more generally, and also to explicate and validate ASA.

Method

Participants

The study sample is from an ongoing longitudinal study of children's temperament and psychopathology; it includes 479 adult women and 405 adult men who completed a self-report measure of separation anxiety symptoms along with a diagnostic interview and 484 children who completed a diagnostic interview at one or two occasion. Two men had total ASA-27 scores which were over 8 *SD* above the mean (i.e., 79 and 81; range for remainder of sample=0-59), so they were excluded from analyses. Families with a 3-year-old child living within 20 miles of Stony Brook, New York, were eligible to participate in the larger study. Children with medical or developmental disorders were excluded. Participants were recruited from the community use commercial mailing lists. Of the 609 families participating in the larger study, 559 families were recruited at the first wave of the study when children were 3 years old, and 50 additional

minority families were recruited at the second wave three years later to increase racial/ethnic diversity (see Bufferd, Dougherty, Carlson, Rose, & Klein, 2012 for details). According to census data, the sample is demographically similar to the surrounding community. Parents provided written informed consent after receiving a description of the study. The study was approved by the human subjects review committee at Stony Brook University, and families were compensated. Families returned for assessments every three years. In the current study, we report on the wave 3 and wave 4 assessments.

At the wave 3 visit, children were 9.26 years old on average (*SD*=.42, range=8.41-11.04), and, at the wave 4 visit, they were 12.72 years old on average (*SD*=.44, range=11.54-14.21). About half of children were female (*n*=224, 46.3%). The majority of children were White (*n*=431, 89.0%) and non-Hispanic (*n*=424, 87.6%). At the wave 3 visit, mothers were 41.81 years old on average (*SD*=4.83, range=25.87-53.53) and fathers were 44.34 years old on average (*SD*=5.74, range=29.08-61.06). The majority of mothers (*n*=405, 84.6%) and fathers (*n*=371, 91.6%) were married to or living with the child's biological parent. About half of mothers (*n*=271, 56.6%) and fathers (*n*=192, 47.4%) had graduated from college with a 4-year degree.

Missingness Analysis

Mothers, fathers, and children included in the study sample were compared to those excluded from the sample on all demographic variables. Mothers did not differ. Fathers in the sample were more likely to be married or living with the child's biological mother (371/405 [91.6%] v. 43/88 [48.9%]; $\chi^2(1, N=493)=94.99$, $p<.001$) and to be college graduates (192/405 [47.4%] v. 26/87 [29.9%]; $\chi^2(1, N=492)=8.21$, $p=.004$). They were also older on average (sample: *M*=44.3, *SD*=5.74; non-sample: *M*=42.4, *SD*=6.21; $t(488)=-2.80$, $p=.005$). Children included in the sample were younger at the age 12 assessment (*M*=12.72, *SD*=.58) compared to

those excluded from the sample (M=13.06, SD=.44; t(39.29)=2.88, p=.006). Missing data on demographic variables were due to failure to respond. To account for attrition biases, demographic variables were included as covariates in all structural equation models.

Measures

Adult separation anxiety. The Adult Separation Anxiety Questionnaire (ASA-27) is a 27-item self-report measure of separation anxiety symptoms experienced as an adult (over age 18) (Manicavasagar et al., 2003). Items are rated on a four-point scale (0=*This has never happened*; 3=*This happens very often*). This measure was administered to parents at wave 3. The questionnaire was based on an interview using the SCID format developed by the same group. The interview included items derived from a content analysis of responses to a semi-structured assessment of patients suffering from high levels of adult SA. The ASA-27 showed excellent concordance with this semi-structured interview and had high internal consistency (Cronbach's alpha=0.95) and good test-retest reliability (r=0.86, p<.001) (Manicavasagar et al., 2003). Case scores (>=16) were also derived, with a sensitivity of 97% and specificity of 66% for a diagnosis of ASA disorder using clinical interview-based diagnoses as the criterion (Manicavasagar et al., 2003). In our sample, Cronbach's α was .91 for women and .92 for men.

Parent Psychopathology. Participants were interviewed at waves 1 and 3 using the Structured Clinical Interview for DSM-IV, Non-Patient Version (SCID-NP; First, Spitzer, Gibbon, & Williams, 1996). Masters-level clinicians and advanced clinical psychology graduate students conducted the interviews by telephone, which yield similar results as face-to-face interviews (Rohde et al., 1997). The wave 1 interview assessed lifetime diagnoses and the wave 3 interview assessed the interval between the two assessments. Results from both interviews were combined to create lifetime diagnosis variables through the wave 3 assessment. When

participants were unavailable, family history interviews were conducted with their partners. Based on audiotapes of 30 SCID interviews from wave 1, kappas for inter-rater reliability of lifetime diagnoses were .93 for depressive disorders, .91 for anxiety disorders, and 1.00 for substance abuse/dependence disorders; based on audiotapes of 45 SCID interviews from wave 3, kappas for inter-rater reliability of lifetime diagnoses were .91 for depressive disorders, 0.73 for anxiety disorders, and 0.90 for substance abuse/dependence disorders at wave 3. At both waves, depressive disorders included major depressive disorder and dysthymia, anxiety disorders included panic disorder, specific phobia, social phobia, agoraphobia without panic disorder, GAD, obsessive compulsive disorder, and post-traumatic stress disorder, and substance use disorders included alcohol, cannabis, and hard drug abuse or dependence.

Children's psychiatric diagnoses. The Kiddie Schedule for Affective Disorders and Schizophrenia Present and Lifetime Version (K-SADS-PL; Kaufman et al., 1997) was used to assess psychopathology in the children at the third and fourth waves when they were approximately 9 and 12 years old, respectively. The K-SADS was developed for children ages 6-18 as a downward extension of the Schedule for Affective Disorders and Schizophrenia (Endicott & Spitzer, 1978). Parents and children are interviewed separately, and diagnoses reflect DSM-IV criteria. The K-SADS has good-to-excellent test-retest interrater reliability for all diagnoses (Kaufman et al., 1997).

Interviews were conducted by advanced clinical psychology graduate students and a masters-level clinician and supervised by an experienced child psychiatrist and clinical psychologist. Interviewers administered the K-SADS separately to parents and children. Further information was obtained to reconcile discrepancies as needed, and the interviewer made final ratings based on the combination of reports. To assess interrater reliability, second raters

independently rated videotapes (wave 3: *n*=74, wave 4: *n*=25). Kappas for diagnoses at wave 3 ranged from .57 to 1.00 (median=0.76). Kappas for diagnoses at wave 4 ranged from .72 to 1.00 (median=.78).

The following diagnoses were assessed and used in the current study: depressive disorders (major depressive disorder, dysthymic disorder, depressive disorder NOS) and anxiety disorders (specific phobia, social phobia, separation anxiety disorder, generalized anxiety disorder, panic/agoraphobia). For the current project, the variables at wave 3 cover the child's lifetime until that point (age 9) and the variables at wave 4 reflect whether a diagnosis was present at any point during the three-year interval since the last assessment.

Children's anxiety symptoms. At waves 3 and 4, children and their parents completed the 41-item youth self-report and parent-report versions, respectively, of the Screen for Childhood Anxiety Related Disorders (SCARED; Birmaher et al., 1997, 1999). Children and their parents are asked to rate the presence of anxiety symptoms in the child over the past 3 months on a three-point scale (0=*not true or hardly ever true*; 1=*somewhat true or sometimes true*; 2=*very true or often true*). The SCARED is made up of five factor-analytically derived subscales: panic/somatic, general anxiety, separation anxiety, social phobia, and school phobia. These subscales reflect anxiety disorder symptoms as conceptualized in the DSM-IV-TR. To create the indicators for the other anxiety factors, all subscales except for the separation anxiety scale were summed. Cronbach's α was .71 at wave 3 and .66 at wave 4 for child report on the separation anxiety scale and .87 at wave 3 and .89 at wave 4 on the other anxiety scale. For mothers' and fathers' reports, the range of Cronbach's α for waves 3 and 4 was .57 to .74 (median=.65) for the separation anxiety scale and .87 to .90 (median=.89) for the other anxiety scale.

Children's depressive symptoms. At wave 3 and 4, children completed the 27-item youth self-report and parents completed the 17-item parent-report versions of the Children's Depression Inventory (CDI; Kovacs, 1992), a well-established measure of depression symptomatology. Children and their parents are asked to rate the presence of depressive symptoms in the youth on a three-point scale. Cronbach's α for child report was .74 at wave 3 and .82 for wave 4, for father report, it was .76 at wave 3 and .80 for wave 4, and for mother report it was .79 at both waves.

Data Analysis

First, descriptive statistics were calculated and the bivariate relationships between parent ASA scores at wave 3 and children's diagnoses at waves 3 and 4 were tested using point-biserial correlations. Descriptive statistics and correlations were computed in R Studio (version 1.2.1335; R Core Team, 2016).

Next, the specificity of the intergenerational transmission of separation anxiety was examined using structural equation modeling. Separate models were estimated for mothers and fathers testing concurrent parent-child psychopathology relationships (parent and child variables measured at wave 3) and prospective parent-child psychopathology relationships (parent variables measured at wave 3 and child variables at wave 4). Children's latent separation anxiety, other anxiety, and depression factors were indicated using the respective K-SADS diagnoses and mother, father, and child report of the respective symptoms. K-SADS diagnoses were specified as categorical indicators. The residual variances of indicators by the same reporter were permitted to covary, as were the K-SADS indicators. Next, parents' separation anxiety, measured by the ASA-27, and depressive, other anxiety, and substance use disorders, assessed by the SCID, were added as predictors. Models also included child ethnicity, gender, and age, and

parent education, age, and relationship as covariates (child race was not included because empty cells with diagnosis variables caused problems with model convergence). All CFA models were estimated in Mplus 8 (version 1.6; Muthen & Muthen, 2012-2018) using the robust weighted least squares estimator (WLSMV; Flora & Curran, 2004), which is suitable for categorical data. To ensure that effects of parents' ASA were not due to ASA being a continuous variable, while the other parental psychopathology variables were categorical, models were tested again using the ASA case scores (cut-off=16).

Results

Descriptive statistics for children's diagnoses are in Table 13 and descriptive statistics for children's symptoms are in Table 14. The average ASA score for mothers was 10.25 (*SD*=9.37, range=0-58) and the average for fathers was 8.11 (*SD*=8.48, range=0-54). Thirty-nine percent of mothers (186/479) and 19% of fathers (78/405) had been diagnosed with a depressive disorder in their lifetimes, 38% of mothers (184/479) and 23% of fathers (94/405) had been diagnosed with an anxiety disorder, and 23% of mothers (109/479) and 42% of fathers (172/405) had been diagnosed with a substance use disorder. We note that, in general, rates of psychiatric disorders are higher when are based on cumulative prevalence across multiple assessments (Olino et al., 2012).

Maternal ASA was positively related to children's lifetime separation anxiety assessed at wave 3 ("Up to 9"; Table 13), and both maternal and paternal ASA were positively related to children's three-year interval separation anxiety assessed at wave 4 ("9 to 12"). Maternal ASA was also related to GAD at both waves and to lifetime depression at wave 3.

A series of models were estimated to test the unique concurrent and prospective relationships between maternal and paternal ASA and depressive, other anxiety, and substance

use diagnoses with CSA, children's other anxiety, and children's depression psychopathology factors. All models fit well (Table 15) and all indicators loaded significantly on the respective factors at $p<.001$ (Figures 4 and 5). In all models, the children's latent psychopathology factors were positively intercorrelated.

Maternal ASA was a robust but non-specific risk factor for children's internalizing psychopathology (Figure 4). It related to all three child psychopathology factors beyond other maternal disorders concurrently and predicted them prospectively. Maternal depression was likewise uniquely related to all three child factors concurrently and predicted CSA and children's depression prospectively. Maternal anxiety was not related to any child factors above the effects of other disorders concurrently but predicted children's anxiety prospectively, whereas maternal substance use was not uniquely related to child psychopathology in either model. We re-estimated the model using the case score version of the ASA-27 instead of the continuous version (model fit available in Table 16); the pattern of significant results was similar except that maternal anxiety predicted CSA and children's depression and maternal depression predicted children's other anxiety in the prospective model (Figure 6).

Like maternal ASA, paternal ASA was significantly related to the child psychopathology factors in the current model, beyond the effects of other paternal disorders (Figure 5). In contrast with the maternal findings, however, none of the other paternal psychopathology variables were significantly associated with any of the child psychopathology factors. In the prospective model, paternal ASA significantly predicted both the CSA and children's other anxiety factors, whereas the other paternal disorders were not predictive. When we re-estimated the models using the ASA case score instead of the continuous score, the pattern of results was the same for the concurrent model (Figure 7; model fit available in Table 16). In the prospective model using the

ASA case score, paternal ASA only predicted CSA beyond the effects of other paternal disorders, and no other paternal disorders significantly predicted any child psychopathology factors.

Discussion

Recent evidence suggests that separation anxiety is an impairing clinical problem that can occur during adulthood. We tested how separation anxiety is transmitted within families using a large community sample. Overall, our results highlight that offspring of parents with ASA are at risk for poor psychiatric outcomes in middle childhood and early adolescence. Our findings also support the validity of ASA in that it contributes to risk in offspring, and particularly to risk for CSA, over and above other better-established forms of adult psychopathology (Robins & Guze, 1970). It also underscores the clinical significance of ASA by showing that offspring of parents with ASA are at risk for a variety of forms of psychopathology. In other words, parental ASA is not benign and should be viewed as an important clinical problem.

We first tested how ASA was linked to children's disorders in bivariate analyses without accounting for comorbid disorders in the parents. The results of these analyses suggest that maternal ASA is a somewhat non-specific risk factor. It related to separation anxiety in children regardless of the interval over which children's separation anxiety was measured (any time before age 9, or between ages 9 and 12), but showed the same pattern of relationships with GAD and was also related to depressive disorders present at any point through age 9. In contrast, the bivariate analyses for fathers suggest that paternal ASA may be unimportant for children's psychopathology in early through middle childhood, but specifically confer risk for CSA between ages 9 and 12. The results for maternal ASA contradict a study using a small clinical sample of children and their mothers and fathers which found a high degree of specificity for

ASA (Manicavasagar et al., 2001). The studies differ in terms of samples, but given the high rate of comorbid disorders in children in the clinical sample (54%), one would expect more rather than fewer associations between ASA and children's other disorders in the clinical compared to the community sample. The differences may be due to the fact that their study combined mothers and fathers; if our samples were independent (i.e., mothers and fathers were not parents of the same children), combining mothers and fathers would likely weaken the multiple relationships observed with maternal ASA. However, these differences aside, the studies differ in one important way: power to detect relationships with children's psychopathology. Our sample was substantially larger, and we also used a continuous measure of ASA. That our continuous measure of ASA showed several relationships in mothers also suggests that lower levels of ASA which would not meet a diagnostic threshold may still confer risk for children's psychopathology.

We also explored whether risk conferred by ASA is specific to CSA or generalized to other forms of internalizing disorders in structural equation models. In addition to adjusting for parents' comorbid disorders, these models have the advantage over the bivariate tests of greater precision by measuring children's psychopathology as latent variables rather than dichotomous observed variables. The models testing maternal ASA suggest that mothers' ASA confers generalized risk for internalizing problems in youth, beyond the effects of maternal depressive, other anxiety, and substance disorders. Notably, these significant paths were replicated in the prospective model, which suggests that these relationships are stable across time and developmental periods, although it is possible that the pattern of results would be different if extended to post-pubertal youth. The significant effects of ASA over and above other maternal disorders cannot be attributed to the greater information of the continuous ASA-27 scale

compared to the dichotomous interview-based diagnostic variables because the results replicated when the ASA-27 case score was used instead.

Like the maternal models, the concurrent father-to-child model showed that ASA confers generalized risk for internalizing problems in youth. The prospective model, however, suggests a higher degree of specificity for fathers' ASA; in fact, when the ASA-27 case score was used, paternal ASA predicted only CSA. Moreover, unlike the maternal models in which both depression and ASA were significant predictors of all three child psychopathology factors, both paternal models suggest that paternal ASA is a particularly potent risk factor compared to other paternal psychiatric disorders as it was the only paternal variable with significant relationships with child psychopathology factors. Given that women report higher levels of ASA compared to men (Aaronson et al., 2008; Silove, Marnane, Wagner, & Manicavasagar, 2010; Silove, Marnane, Wagner, Manicavasagar, et al., 2010) and have higher rates of ASA disorder (Shear et al., 2006), it is possible that ASA in men reflects a particularly strong liability, which would place offspring at higher risk for poor outcomes. That is, the threshold for ASA expression may be higher in men than women. In general, the impact of fathers' psychopathology on children is less well-characterized than the impact of mothers' psychopathology, and this research suggests that it may be particularly important to focus on paternal ASA.

Past research shows that specific depressive and anxiety disorders are likely manifestations of a single internalizing spectrum, and genetic transmission of psychopathology appears to occur, in large part, at the level of these higher-order psychopathology factors rather than at the level of specific disorders (Lahey et al., 2011). Based on the current study, we cannot distinguish general and specific genetic and environmental influences, and because past work omitted ASA, we also cannot determine the degree to which genetic transmission of ASA occurs

via overlap with liability for other internalizing disorders. However, our data are consistent with the possibility of broad genetic factors, and perhaps more specific factors for fathers, and environmental influences.

We propose several non-exclusionary environmental pathways by which parents' ASA may influence children's psychopathology. Parents themselves make up a significant part of their children's environments. Within this "parent-as-environment" framework there are several possible direct and circuitous routes by which separation anxiety may be transmitted intergenerationally. In the most direct behavioral link, parent's ASA symptoms may increase children's risk for separation anxiety via modeling and reinforcement learning. Parents who become outwardly distressed upon actual or anticipated separation from their children (for example, when dropping a toddler off at daycare or moving a college student into a dorm) may inadvertently teach children that they are incapable of facing challenges on their own and model temporary separations as distressing and threatening events. Indeed, Bögels & Zigterman (2000) propose that overestimating the danger of being left and underestimating independent functioning may be core cognitive dysfunctions in CSA. This type of transmission would lead to congruency in the parent-child psychopathology presentation to the degree that the parent's behaviors were manifestations of core separation anxiety symptoms and to the degree that there are developmentally-plausible child-counterpart behaviors. Alternatively, ASA may increase risk for other internalizing disorders like depression via its links with self-criticism (Hock & Lutz, 1998), low self-esteem (McBride & Belsky, 1988), and negative self-representations (Hock & Schirtzinger, 1992).

Parents may also engage in certain parenting behaviors intended to avoid separation. These parenting behaviors may in turn limit children's opportunities for social interactions and

thereby encroach on their abilities to develop a sense of themselves as connected to, but ultimately independent, from their parents. This notion has been discussed in detail in the literature on separation anxiety specifically within the context of the parent-child relationship (e.g., Bartle-Haring, Brucker, & Hock, 2002; Hock & Lutz, 1998). Parents' ASA may also confer risk for psychiatric outcomes via its consequence in parents. For example, ASA is associated with poor interpersonal functioning (Shear et al., 2006), which may lead to impaired social competency in youth and increased risk for internalizing problems broadly. The particular manner in which these environmental influences play out in the context of ASA must be delineated in future research.

Finally, given that many parent-child psychopathology links are bidirectional, it is possible that the significant relationships are not solely due to transmission from parent to child. Children with separation anxiety, other psychiatric problems, or physical or cognitive disabilities who require more support and attention, for example, may lead to increases in parents' ASA. Although these cases are largely indistinguishable from parent-to-child effects in our study, and should be tested directly in future research, the significant paths from parent ASA to child psychopathology factors in the prospective models suggest that the effects are not exclusively from child to parent. Another alternative explanation is that an external event, like the death of a family member, may lead to disorder onset in parents and children alike.

This study has several notable strengths. First, we used multiple indicators of children's psychopathology factors from multiple reporters, methods, and time points. We also controlled for other parental disorders to rule out the possibility that effects were due to comorbidity. The prospective models acted as an internal replication of the concurrent models; for mothers and fathers, ASA was a significant risk factor, and for mothers the pattern of results was similar.

Finally, we used a relatively large community sample.

The study should also be viewed in light of its limitations. Although there is evidence from retrospective reports from adults that CSA precedes ASA (Pini et al., 2010; Shear et al., 2006; Silove et al., 2010), we do not know whether ASA in our sample was a continuation of CSA or whether the symptoms onset for the first time in adulthood. We also cannot distinguish parents' fear of separation from their children from fear of separating from other attachment figures. Both factors may impact the strength of parent-child transmission (e.g., transmission may be stronger in childhood-onset cases or when parents' fear of separation relates to the child). In addition, we used a self-report measure of ASA, which may not measure ASA as accurately as a structured interview. Since it is a community sample, we also have relatively low rates of disorders in youth, though this is somewhat tempered by using measures of symptoms alongside diagnoses in structural models. Additionally, the low rates would likely lead to underestimates of the strengths of relationships. The sample is also mostly White and non-Hispanic/Latino, which limits the generalizability of the results. Finally, while we utilized latent versions of children's psychopathology, we used a single observed indicator (diagnoses) for parents, which may have decreased precision.

In summary, ASA in mothers and fathers is a significant risk factor for children's psychopathology, including CSA. It predicts poor outcomes beyond the effects of other common parental mental disorders. The effects of ASA are relatively non-specific for mothers, at least with respect to internalizing disorders in children, but somewhat more specific for fathers. Future research should delineate the mechanisms which underlie this intergenerational transmission, particularly parent and child characteristics or parenting behaviors which modify risk.

Chapter 4

Psychometric analysis of the Adult Separation Anxiety Symptom Questionnaire: Item functioning and invariance across sex and time

The Adult Separation Anxiety Symptom Questionnaire (ASA-27; Manicavasagar, Silove, Wagner, & Drobny, 2003) is the only available self-report measure of adult separation anxiety (ASA). The ASA-27 has been studied as a moderator of treatment response (Aaronson et al., 2008; Kirsten et al., 2008), linked to biological markers of psychiatric disorders (Costa et al., 2009; Eapen et al., 2014; Pini et al., 2005), used to establish convergent validity (Cyranowski et al., 2002; Shear et al., 2006), examined in relation to personality (Mertol & Alk, 2012; Pini et al., 2010; Pozzi et al., 2014; Silove, Marnane, Wagner, Manicavasagar, et al., 2010), and employed in studies of separation anxiety disorder comorbidity (Dell'Osso et al., 2011, 2012; Tasdemir, Tamam, Keskin, & Evlice, 2015), familial aggregation (Manicavasagar et al., 2001), and continuity (Manicavasagar et al., 2000). Despite its widespread use, relatively little is known about its psychometric properties. This is particularly important given the recent change to the separation anxiety disorder criteria in DSM-5 to allow the disorder to be diagnosed after age 18, which will likely lead to increased use of this measure in both research and clinical settings. This study addresses several important issues related to the psychometric functioning of the ASA-27.

The ASA-27 and the notion that separation anxiety can be diagnosed in adulthood was developed by Manicavasagar's and Silove's group over the course of several studies. The first paper presented case reports of three patients suffering from putative primary ASA (Manicavasagar & Silove, 1997) and suggested that it may be an overlooked clinical problem. Additional studies systematically examined the phenomenology, onset, and course of ASA, as well as patterns of comorbidity, in community (Manicavasagar et al., 1997) and clinical samples (Manicavasagar et al., 2000), and the familial and developmental factors uniquely associated with ASA (Manicavasagar et al., 2001, 1999). Items included in the ASA-27 were identical to those in the Adult Separation Anxiety Semi-Structured Interview (ASA-SI), which were drawn

from attachment theory, clinical impressions, and open-ended interviews conducted in a qualitative study and also included modified versions of the separation anxiety criteria for youth in DSM-IV (Manicavasagar et al., 1997, 2003). The authors reported a high degree of concordance in frequency of endorsement between the interview and the self-report measure in adults who responded to a media campaign about experiencing anxiety about separation from attachment figures (Manicavasagar et al., 1997).

In the study finalizing the self-report measure, the ASA-27 showed favorable psychometric properties with a mixed clinical and community sample (Manicavasagar et al., 2003). A principle components analysis yielded a strong first factor accounting for 45% of the variance, with all items loading positively on the factor (0.38 to 0.80), and the measure had good test-retest reliability (0.86) over an average span of three weeks and high internal consistency (Cronbach's alpha=0.95; inter-item correlations ranging from 0.10 to 0.74). Using diagnoses from the ASA-SI as the criterion, a cut-off score of 16 exhibited 97% sensitivity and 66% specificity. This self-report measure was the first, and remains the only, to focus on symptoms and phenomenology of ASA as opposed to attachment problems or specific forms of separation anxiety, like from mother to child, which had been the focus of similar measures for adults (Manicavasagar et al., 2003).

Psychometric Properties of ASA-27: Classical Test Theory Approach

Since the original study, several others have confirmed the measure's favorable psychometric properties. It shows convergent validity with interview assessments of ASA and childhood separation anxiety (Cyranowski et al., 2002) and internal consistency estimates ranging from 0.89 to 0.93 in a variety of samples, including cross-culturally with Turkish and Bangla translations of the measure (Dirioz, Alkin, Yemez, Onur, & Eminagaoglu, 2011; Islam &

Khanam, 2017; Kirsten et al., 2008; Kohlhoff et al., 2015). The original and subsequent studies, however, have largely examined the psychometric properties at the level of the total score, consistent with a classical test theory approach, which assumes that variation in sum scores is attributable to true differences in levels of ASA, systematic error affecting all reporters equally, or normally distributed random error (Magno, 2009). One partial exception compared means at the item level for patients with ASA disorder versus patients with other anxiety disorders; 16 items had higher means in the ASA disorder group (Manicavasagar et al., 2000). While this study examined how groups may answer items differently, it did not directly test whether the item properties themselves differed across groups. Consequently, it cannot be known whether the differences reflect true differences in levels of ASA or differences arising from measurement properties.

Benefits of IRT

Item response theory provides an alternative conceptualization of responses on the ASA-27, wherein an individual's probability of endorsing an item on the ASA-27 is construed as both a function of the individual's level of ASA and of the items' properties. This approach has several benefits over sum score approaches. At the test (and item) level, it allows the standard error of measurement—or, in the language of IRT, the information—to vary across levels of the latent construct (Thomas, 2011). For example, it may be empirically determined that the ASA-27 has less error of measurement, or provides more information, at the mid-level of a trait, but has more error at extreme values. This information can be readily translated for clinical and research purposes: a clinician can have more confidence in an ASA-27 assessment when an individual's score falls in a range with high reliability, and researchers can use the degree of measurement

error in the expected range of scores for a sample to determine whether the ASA-27 would be suitable for a given sample.

At the item level, IRT models also determine item discrimination parameters, which in index the strength of the relationship between the item and the latent trait (ASA) and also denote the item's ability to discriminate between people at varying levels on that trait. Discrimination parameters weight items in order to estimate a person's standing on the latent trait, such that different combinations of the same number of items can be combined to produce different factor scores, unlike sum scores which weight all items equally (Thomas, 2011). Given the relative newness of diagnosing separation anxiety disorder in adulthood, using IRT methods to identify which ASA-27 items are most closely related to the latent construct of interest may also enrich our understanding of the adult form of this disorder. This study will use IRT to determine, in particular, whether the ASA-27 items that were based on DSM criteria for youth separation anxiety disorder are more or less central than other items drawn from clinical impressions and attachment theory.

IRT models also calculate item difficulties, or the level of ASA associated with a 0.5 probability of endorsing a response category. In a clinical context, difficulty can be construed as severity (Thomas, 2011). The range of item difficulty parameters not only show which level(s) of the latent trait the measure adequately assesses, but can also order symptoms in terms of relative severity. Like the item discrimination parameters, this information can develop our understanding of separation anxiety in adulthood, particularly which symptoms can be expected to be present in more or less severe forms. Clinicians may also find it useful when locating the degree of ASA in their clients; that is, a client who describes experiencing symptoms queried by

items with high difficulty parameters is likely to have a more severe form of ASA than one who describes symptoms queried by items with low difficulty parameters.

Meeting the Assumptions of IRT

Before an IRT model can be fit to any data, however, three assumptions must be met. First, the measure must be unidimensional. In the context of the ASA-27, this means that the relationships among items should be due to levels of ASA and not to other factors (Reise, Moore, & Haviland, 2013). Second, all items must be locally independent, which means that items should not have residual relationships after ASA is taken into account (Reise et al., 2013). Items violating this assumption tend to have certain properties that make them likely to elicit identical responses (Steinberg & Thissen, 1996). These two assumptions are interrelated in that when all items are locally independent, the measure is also unidimensional. The last assumption is that all items must also be monotonic, which means that the probability of endorsing a higher response category increases as the level of ASA increases (Reeve et al., 2007; Reise et al., 2013).

The current study will evaluate these three assumptions for the ASA-27. The developers of the ASA-27 report that the measure is unidimensional (Manicavasagar et al., 2003), and this was confirmed in an independent study (Dirioz et al., 2011). However, previous studies of the ASA-27 have not examined whether items are locally independent, and the developers of the ASA-27 note that some of the DSM criteria items are redundant (Manicavasagar et al., 1997), so local dependence may be present between some items. While the assumption of monotonicity has never been tested for the ASA-27, the items were designed to be monotonic as implied by the Likert scale.

These assumptions not only optimize conditions for IRT models, however; they also have utility, regardless of whether IRT is used, for empirically supporting or refuting common and

implicit interpretations of scores on a given measure. For example, researchers and clinicians typically view sum scores derived from the ASA-27 as indicative of ASA rather than of some other factor that may be related to, but distinct from, ASA, like talkativeness. However, if the ASA has an unacknowledged multidimensional structure or pairs of locally dependent items, the researcher cannot know which of the multiple constructs is giving rise to the item responses and, in turn, the sum scores (Steinberg & Thissen, 1996). A similar problem with interpreting sum scores arises when items are not monotonic. If people with lower levels of ASA more frequently endorse the top response categories on some ASA-27 items compared to people with higher levels of the trait, the resulting differences in sum scores no longer represent meaningful true differences in the latent trait of interest. Finally, the assumptions are relevant for interpreting internal consistency statistics, which researchers would generally interpret as indexing how reliably the items assess the single general construct of ASA. That is, this interpretation may be invalid if locally dependent items consistently measure some factor besides the construct of interest, and thereby artificially inflate the internal consistency statistic (Steinberg & Thissen, 1996). Ensuring that the ASA-27 meets these assumptions therefore substantively aids interpretation of total scores and reliability in addition to laying the groundwork for IRT modeling.

In order to meet these assumptions, it may be necessary to refine the measure by omitting items (Steinberg & Thissen, 1996). In general, if a measure continues to reliably assess the construct (or does so less reliably but more precisely after eliminating artificial inflation by locally dependent items), removing items may be favorable since it reduces administration burden. Because the developers of the ASA-27 included redundant DSM criteria items in the original interview "to allow the potential for future item reduction," (p. 5; Manicavasagar et al.,

1997, 2000), and because several item pairs query the same narrow aspects of ASA (e.g., talkativeness) with similar wording, eliminating items appears to be a suitable tactic for refining the ASA-27.

ASA-27 Across Gender and Time

Several studies using the ASA-27 report that women have higher levels of ASA compared to men (Aaronson et al., 2008; Silove, Marnane, Wagner, & Manicavasagar, 2010; Silove, Marnane, Wagner, Manicavasagar, et al., 2010). However, it is unknown whether this reflects true quantitative differences of latent ASA levels. It may instead reflect qualitative differences in the construct itself as assessed by the ASA-27 or scaling differences in women versus men, which would render a quantitative comparison of means across the two groups meaningless (Liu et al., 2017). In order to parse the cause of the observed differences, measurement invariance of the ASA-27 across genders must be established.

In a similar manner, evaluating the longitudinal measurement invariance of the ASA-27 can reveal whether observed differences across assessment occasions are due to true changes in levels of ASA or to qualitative changes in the construct being measured or its scaling. Indeed, establishing longitudinal measurement invariance is a prerequisite for questions about change (e.g., Widaman & Conger, 2011). To date, no previous studies have reported on repeated administrations of the ASA-27, aside from its test-retest reliability over a few weeks (Manicavasagar et al., 2003). Because separation anxiety has only recently been recognized as a disorder of adulthood, and there is virtually no information available about its course and response to treatment, it is particularly important and timely to begin exploring the longitudinal performance of the ASA-27.

Consequently, in addition to providing detailed information about the psychometric properties of the ASA-27 using IRT methods, the current study will draw on confirmatory factor analysis (CFA) approaches to determine the degree to which the measure is invariant, or unbiased, in how it assesses ASA across gender and time. The two frameworks can be used in tandem because the specific CFA and IRT models used in this paper are formally equivalent (Millsap, 2010; Takane, Leeuw, & Angeles, 1987). We opted to use CFA methods for evaluating measurement invariance, rather than differential item functioning as is customary within the IRT framework, for two reasons. First, a formal procedure for testing measurement invariance using CFA with ordered categorical variables has been clearly delineated (Liu et al., 2017; Millsap & Yun-Tein, 2004), whereas there are a variety of differential item functioning methods in IRT which may lead to divergent conclusions (Millsap, 2006). Second, CFA measurement invariance techniques support inferences about whether mean differences across groups or time reflect bias or true differences, which has substantive implications for past and future studies using this measure. In contrast, IRT differential item functioning methods focus on single items, which may make them more suitable for measurement development. The current paper will estimate two series of four hierarchically nested multigroup and longitudinal CFAs for ordered categorical variables with an increasing number of equality constraints across gender and time.

Method

Participants

The study sample includes 509 adult women and 407 adult men from the local community who completed a self-report measure of separation anxiety symptoms on one or two occasions. These adults are from 609 families in an ongoing longitudinal study of children's temperament and psychopathology. Of the 609 families, 559 families were recruited at the first

wave of the study when children were 3 years old, and 50 additional minority families were recruited at the second wave 3 years later to increase racial/ethnic diversity (see Bufferd, Dougherty, Carlson, Rose, & Klein, 2012 for details). Parents provided written informed consent after receiving a description of the study. The study was approved by the human subjects review committee at Stony Brook University, and families were compensated.

Only the primary caretaker completed the measure of ASA at the second wave; this included 384 women. Due to the small number of male primary caretakers who completed the ASA at wave 2 (n = 39), their ASA data are not included in this report. Both caretakers completed the measure at the third wave; after two men with outlying ASA total scores over eight standard deviations above the mean (79 and 81) were removed, this included 482 women (54.2%) and 407 men (45.8%; n=889). Five hundred and nine women completed the ASA at wave 2 and/or wave 3; of these, 357 (70.1%) completed the ASA at both assessments, 27 (5.3%) at wave 2 only, and 125 (24.6%) at wave 3 only. In total, the current study includes 1273 reports on the ASA. Seven items for women at wave 2 were missing responses for one case, and one item was missing responses for five cases. There was no missing data for items at wave 3. Assessment waves were approximately three years apart.

The majority of women were married or living with their child's biological parent at wave 2 (85.9%) and wave 3 (84.4%), as were the majority of men at wave 3 (91.7%). Women were 39.1 years old on average at wave 2 (SD=4.9; range=22.8-51.8) and 41.8 years old on average at wave 3 (SD=4.8; range=25.9-53.5). At wave 3, men were 44.3 years old on average (SD=5.7, range=29.1-61.1). At both waves, approximately half of the women had at least a 4-year college degree (wave 2: 54.95%; wave 3: 56.3%), as did just under half of men at wave 3 (47.4%). The larger study's main focus is on children's psychopathology. Thus, parents' race

and ethnicity were not collected, and participating children's race and ethnicity are used instead as proxies; 88.3% of women and 92.6% of men had children who were White, and 12.4% of women and 11.3% of men had children who were Hispanic or Latino. Missing data on demographic variables were due to failure to respond (valid cases range=94.8-100.0%).

Participants included in versus excluded from the sample for the current study were compared on all demographic variables. Significant differences were found for two variables: participants included in the sample were more likely to be living with/married to the child's biological parent (109/888 [87.7%] versus 49/98 [50.0%]; $\chi^2(1, N=986)=90.56$, $p<.001$) and more likely to have graduated college (464/888 [52.3%] versus 31/96 [32.3%]; $\chi^2(1, N=984)=13.02$, $p<.001$).

Measure

ASA. The ASA-27 is a 27-item self-report measure of separation anxiety symptoms experienced as an adult (over age 18) (Manicavasagar et al., 2003). Items are rated on a four-point scale (1=*This happens very often;* 4=*This has never happened).* Items were reverse coded and subtracted by 1 so that response categories were 0-3. In our sample, Cronbach's α was .89 at wave 2 and .92 at wave 3.

Data Analysis

First, a single-factor CFA with ordered categorical indicators was fit to men's and women's ASA-27 data at wave 3. This model is equivalent to a normal ogive (probit) unidimensional graded response model (Millsap, 2010; Muthen & Muthen, 2018; Samejima, 1969; Takane et al., 1987), which is an extension of the 2-parameter logistic model for polytomous items (Thomas, 2011). The variance of the latent factor was set to 1 and the mean was set to 0 for model identification, while all other parameters were freely estimated.

Next, we evaluated whether the data met the IRT assumptions of unidimensionality, local independence, and monotonicity. Model fit of the initial single factor CFA was used as one index of unidimensionality. Comparative fit index (CFI) and Tucker-Lewis index (TLI) values greater than .95 and root mean squared error of approximation (RMSEA) values less than .06 suggest good model fit (Hu & Bentler, 2009). The polychoric correlation matrix was also subjected to principle components analysis (PCA) and the ratio of the first to second eigenvalues was examined. Larger ratios indicate greater unidimensionality. Pairs of items were reviewed for possible local dependence (LD) when residual correlations were greater than .20 (Reeve et al., 2007) and when the expected change in chi-square model fit or expected parameter change (EPC) from the modification indices were large and much higher relative to others (Hill et al., 2007). Pairs of items with relatively higher discrimination parameters were also flagged for possible local dependence (Orlando & Bryce, 2007). When local dependence was ambiguous, models were estimated with and without the potentially dependent items and local dependence was supported when item discrimination parameters changed markedly (Hill et al., 2007). When local dependence was established, the item with the lower discrimination parameter was removed. Finally, violations of monotonicity were tested using the *Mokken* package in R (Van der Ark, 2007); the program default of .03 was used as a cutoff.

The minimum number of items were removed until assumptions were met. IRT difficulty parameters were calculated by dividing item thresholds by item discrimination parameters, the latter of which are identical to factor loadings in this parameterization (Asparouhov & Muthen, 2016). Subsequently, the test information curve was plotted, along with the item characteristic and information curves, which were plotted separately for items that were derived based on DSM-criteria versus those that were not as indicated by the developers of the measure

(Manicavasagar et al., 2003). The MODEL CONSTRAINT command was then used to test whether DSM-derived items were on average more closely related to the latent construct of ASA than non-DSM items. We also used cut-offs proposed by Baker (2001) to describe the item discrimination levels: .65-1.34 for moderate discrimination and 1.35-1.69 for high discrimination,

Next, CFA models were fit separately to men's and women's data at wave 3 to ensure the single-factor model fit well in both groups (Byrne, Shavelson, & Muthén, 1989). We use CFA language when discussing these models (loadings and thresholds) as opposed to IRT language (discrimination and difficulty parameters) to be consistent with the existing literature from each framework. The conclusions that can be drawn from models with varying levels of invariance for categorical indicator models differ from those permitted for invariance models for continuous indicators, because the continuous responses for the ordered categorical models are latent and inferred based on item thresholds and distributional assumptions rather than observed (Liu et al., 2017). For example, comparisons at the level of observed categorical indicators require that unique factor, or strict, invariance is established, whereas only strong invariance is necessary for the same conclusions using continuous indicator models (see Table 17 for an overview of permissible conclusions at each level of invariance).

Measurement invariance by gender was tested by fitting a series of four hierarchically nested multiple group CFA models with increasing invariance constraints (Liu et al., 2017; Millsap & Yun-Tein, 2004; Muthén & Asparouhov, 2002). First, a baseline configural invariance model was fit. For model identification, the factor loading of one item (the marker variable) was constrained to 1 in both groups, one threshold per item and two thresholds for the marker variable were constrained to equality across groups, and the unique residuals were constrained to

1 and the factor mean to 0 in the reference group only; all other parameters were freely estimated. Item 14 was chosen as the marker variable because it loaded strongly on the factor in the separate CFAs for women at both waves and men at wave 3, and thus has a meaningful metric (Liu et al., 2017), and because its loading, threshold, and residual parameters were invariant across gender and time. For all other items, the first threshold was constrained to equality since there were the most cases in response categories 0 and 1 for all items unless modification indices suggested misfit in these threshold constraints; in these cases, an alternative threshold that exhibited invariance was constrained (Liu et al., 2017). Next, a loading or weak measurement invariance model was fit, which constrained all item loadings to equality across groups, followed by a threshold or strong measurement invariance model, which also constrained all item thresholds to equality. Finally, a unique factor or strict invariance model was fit which additionally constrained all unique factor item residuals to equality.

As each set of equality constraints were added, the degree of invariance was evaluated. Previous work has employed changes in fit statistics like the CFI (e.g., .01) and RMSEA (e.g., .015; Chen, 2007; Cheung & Rensvold, 2002); however, their performance for evaluating invariance with ordered categorical indicators estimated has not been systematically evaluated so they are not yet recommended in this context (Liu et al., 2017; Sass & Marsh, 2014). An alternative is the likelihood ratio test for comparing nested models with categorical indicators (DIFFTEST in Mplus; Asparouhov & Muthen, 2016). Despite the fact that this test may exhibit inflated Type I error rates (Sass & Marsh, 2014), we opted to take a conservative approach and deemed models invariant when the DIFFTEST was significant. CFI and RMSEA values were also used to determine whether the models continued to show good fit overall (e.g., Lin, Hirschfeld, & Margraf, 2018). Finally, a novel sensitivity analysis was employed to determine

the practical impact of the additional levels of constraints (Liu et al., 2017). In this sensitivity analysis, discrepancies between the model-estimated proportion of cases in each response category for the less versus more restrictive models were calculated, and items were flagged if the discrepancy exceeded 5% for any response category. When models failed to exhibit invariance, partial invariance was tested. Constrained parameters were freed one by one according to modification indices until the above criteria were met (Byrne et al., 1989). If at least 80% of the constrained parameters were invariant, models were deemed partially invariant.

In a similar manner, a series of longitudinal CFAs with increasing invariance constraints were fit to women's data at waves 2 and 3. Again in accordance with Liu and colleagues (2017), for the baseline model, in order to identify the variance and mean structure of the latent factor, the loading of a marker variable was constrained to 1 at both waves and the mean of the latent factor was constrained to 0 at wave 2 only. Additionally, one threshold per item plus a second for the marker variable were constrained to equality across waves, the unique residual item variances were constrained to 1 at wave 2 only, and the same items were permitted to covary across waves (e.g., item 6 at wave 2 with item 6 at wave 3), as were the latent factors. The invariance of the slope and thresholds of the marker variable and the other thresholds for each item that were necessary for identification were verified by the modification indices for the baseline model. The measurement model constrained the loading and threshold parameters to be identical across time, and the unique factor invariance model additionally constrained the unique variances at the third wave to equality by setting them to 1 to match the unique variances at wave 2.

All IRT and CFA models were estimated in Mplus 8 (version 1.6; Muthen & Muthen, 2012-2018) using a probit link, theta parameterization (so that variances for the categorical indicators could be specified, an option that is only available in Mplus using the theta

parameterization), and the robust weighted least squares estimator (WLSMV; Flora & Curran, 2004), which is suitable for ordered categorical data. Although the correlation between ASA total scores within dyads was small and non-significant (r=0.06, n=405, p=0.26), for the models including both men and women, standard errors were adjusted for potential non-independence of observations (i.e., clustering within families) using a sandwich estimator (Muthen & Muthen, 2012-2018). The R package *MplusAutomation* was used to extract model fit statistics and parameters (Hallquist & Wiley, 2018) and descriptive statistics were computed in R Studio (version 1.2.1335; R Core Team, 2016)

Results

Descriptive Statistics

The mean total ASA score for women at wave 2 was 11.94 (*SD*=9.29; range: 0-60). For men at wave 3 it was 8.10 (*SD*=8.46, range: 0-54) and for women at wave 3 it was 10.34 (*SD*=9.61; range: 0-59). The average inter-item polychoric correlation for women at wave 2 was 0.37 (*SD*=0.14; range: 0.00 to 0.90), the average for men at wave 3 was 0.50 (*SD*=0.14; range: -0.01 to 0.99), and the average for women at wave 3 was 0.46 (*SD*=0.14; range: 0.07 to 0.91).

IRT Analysis

Assumptions. An initial single-factor ordered categorical CFA model including all items from the ASA-27 was fit to men's and women's data at wave 3. The fit of this model, the residual correlations between the model estimated and observed polychoric correlations, and the modification indices were examined to determine whether the data met the IRT assumptions of unidimensionality and local independence. While the fit suggested unidimensionality (CFI=.957, TLI=.953, RMSEA=.049 [.045-.052]), two pairs of items exhibited strong local dependence (Table 18). Specifically, for the first pair (items 21 and 24), which query panic symptoms,

modification indices suggested that adding a covariance would substantially improve model fit. The second pair (items 10 and 26), which query talkativeness, had a large residual correlation. The pairs of items query narrow constructs and use similar wording, which make them likely to elicit similar responses. The item with the lower discrimination parameter in each pair was removed (items 21 and 26).

Several other pairs of items exhibited possible local dependence, so the item with the lower discrimination parameter in each pair was removed iteratively (Table 18). However, the changes in discrimination parameters and model fit were negligible in every case, which suggested that the remaining items were locally independent. The unidimensionality and local independence of these 25 items was further supported by other indices: the single-factor CFA fit the data well (CFI=.966, TLI=.963, RMSEA=.042 [90% CI=.038-.046], SRMR=.051), the 1:2 eigenvalue ratio was large (12.81:1.28 [10.04]), and the average residual correlation was low (*M*=.047, *SD*=.035; range=.000-.201). In addition, no items significantly violated the monotonicity assumption.

Test and item properties. The total information curve shows that the ASA-27 provides the most information, or assesses with the least error, at approximately 2.5 standard deviations above the mean of latent ASA and that it provides very little information below -1 standard deviations (Figure 8). The histogram depicts the number of cases at all levels of latent ASA and the impact of weighting items by the discrimination parameters was examined visually by plotting factor scores against sum scores (Figure 8). At lower levels of latent ASA (approximately 1 SD and below), the sum and factor scores are less strongly related.

Items 14, 17, 18, and 24 were highly discriminating, and all other items except item 1 were moderately discriminating (Table 19; Baker, 2001). The three sets of difficulty parameters

were quite variable (1: -2.59 to 2.00; 2: 0.00 to 3.19; 3: 1.50 to 3.85; these parameters are based on item thresholds and demarcate response categories 0 from 1, 1 from 2, and 2 from 3).

Using the MODEL CONSTRAINT command, the difference between the average discrimination parameters for the DSM-derived items and the non-DSM-derived items was tested. The DSM-derived discrimination parameters were higher on average (b = 1.11, SE=.05) than the non-DSM derived discrimination parameters (b=.98, SE=.04; b_{diff}=.13, SE=.04, p<.001). This indicates that the DSM-derived items are more strongly associated with the latent trait, ASA. The individual item information curves, separated by whether items were DSM-derived are presented in Figure 9, along with the partial total information curves for each set of items. The two sets of items provide comparable information, despite the DSM-derived set having one fewer item.

The steepness of the item characteristic curves for the first response category for the DSM-derived items indicate that these items discriminate well starting from approximately -1 SD up to 2.5 SD (Figure 10). The non-DSM derived items first response categories discriminate across approximately the same range, but several items have shallower slopes indicating poorer discrimination (i.e., 1, 3, 13, 19). Overall, neither set of items discriminate well at lower levels of ASA. Indeed, people with the lowest (-4 SD) and average (0) levels of latent ASA are equally likely to endorse the lowest response option for most items. The curves for response categories 2 and 3 for several items in the non-DSM set are relatively shallow, whereas all curves for the DSM-derived set are fairly peaked. Finally, the curves from the fourth response category are similar but both sets do not reach a probability of endorsement of 1, even at the highest levels of latent ASA. This indicates that the measure may discriminate at higher levels of ASA not

represented in the sample. As expected, the items with shallower slopes or wider peaks across response categories provided the least amount of information (i.e., 1, 3, 13, 19, 10).

Measurement Invariance

Gender. Separate single-factor CFAs for men and women at wave 3 using the same 25-item set fit the data well (men: CFI=.977, TLI=.975, RMSEA=.037 [90% CI=.030-.044], SRMR=.58; women: CFI=.965, TLI=.962, RMSEA=.044 [90% CI=.038-.050], SRMR=.059). The baseline configural invariance multiple group model fit to both genders simultaneously also fit well (Table 20). When loadings were constrained to equality across groups, the model continued to fit well but the DIFFTEST was significant; items 1, 12, and 19 were the largest source of misfit. The loading for item 1 was higher in women (*b*=.41, *SE*=.09) compared to men (*b*=.24, *SE*=.05), suggesting that feeling more secure with attachment figures when at home is more strongly related to ASA in women. Similarly, item 12, which queries difficulty sleeping alone at night, was more strongly related to ASA in women (*b*=.79, *SE*=.10) than men (*b*=.63, *SE*=.08) as was item 19 (women: *b*=.82, *SE*=.12; men: *b*=.50, *SE*=.10); this item asks about sleeping better with lights on. After releasing the loading equality constraints for these items (3/24 [12.5%] loadings freed), the model demonstrated partial loading invariance. Next, threshold constraints were added, and the model again fit well overall but the DIFFTEST was significant, meaning full threshold invariance was not established. The first thresholds for items 17 (upset when changes to routine interfere with contact) and 25 (worrying about events causing separation) were identified by modification indices. Both parameters were higher in women (item 17: *b*=1.89, *SE*=.20; item 25: *b* = 2.04, *SE*=.22) compared to men (item 17 *b* =1.12, *SE*=.16; item 25 *b* = 1.48, *SE*=.15), suggesting that women with higher levels of ASA have a similar probability of endorsing the first response categories for these items as men with lower

levels of ASA. When the first thresholds for items 17 and 25 were freed, partial threshold invariance was achieved (2/49 [4.1%] thresholds freed). Finally, when constraints were added to item residuals in the strict unique factor model, the model fit well but the DIFFTEST was again significant, so the residual for item 19 was freed (1/25 residuals; 4.0%). The model then exhibited partial unique factor invariance. This item residual was larger in women (*b*=1.64, *SE*=.33) than men (constrained to 1), suggesting less variance was explained by the ASA factor in women. In total, 6.5% (6/92) of parameters were freed.

As each new set of invariance constraints were added, the proportion of model-estimated cases in each response category was compared to the proportions estimated by the next lesser constrained partially invariant model (e.g., the partially invariant threshold model-estimated proportions were compared to the partially invariant loading model-estimated proportions). All discrepancies were smaller than 5%, which indicates that the constraints made little practical impact.

Time. Separate CFA models among women only fit the data at the two assessments three years apart (wave 2: CFI=.939, TLI=.933, RMSEA=.052 [90% CI=.045-.058]; wave 3: CFI=.965, TLI=.962, RMSEA=.044 [90% CI=.039-.050]), as did the configural baseline longitudinal CFA model (Table 20). Next, the loadings were constrained to equality. This model continued to fit the data well overall, but the DIFFTEST was significant, so full loading invariance was not achieved. Item 19 (sleeping better with lights on) was identified as contributing to misfit. When the equality constraint was released for this item (1/24 [4.2%] loadings freed), the model exhibited partial loading invariance. The loading was higher for women at wave 3 (*b*=.81, *SE*=.11) compared to wave 2 (*b*=.26, *SE*=.06). Subsequently, a threshold invariance model was fit. Again, the model fit the data well but the DIFFTEST was

significant. To achieve partial threshold invariance, the first threshold of items 1 and 18 were freed. Modification indices then suggested freeing the second threshold for item 24; however, doing so caused the item's third threshold to be lower than its second threshold at wave 3, which is problematic, so the parameter constraint with the next largest modification index was freed instead. This was threshold 2 for item 1 (3/49 [6.1%] thresholds freed). Both thresholds for item 1 (feel more secure at home with attachment figures) were lower at wave 2 (1-1 *b*=-1.07, *SE*=.09; 1-2: *b*=.05, *SE*=.07) compared to wave 3 (-1 *b*=-1.93, *SE*=.29; 1-2: *b*=-.34, *SE*=.11), which indicates that women at wave 2 with lower levels of ASA have the same probability of endorsing response categories 1 and 2 as women with higher levels at wave 3. In contrast, the first threshold for item 18 (worries about attachments leaving) was higher at wave 2 (*b*=.88, *SE*=.12) compared to wave 3 (*b*=.29, *SE*=.11). Finally, the unique factor invariance model was fit which constrains all item residuals to equality. The model fit well but the DIFFTEST was significant. The residuals for items 1 and 3 were freed and partial unique factor invariance was achieved (2/25 [8.0%] residuals freed). For both items, the residuals were over two times larger at wave 3 (item 1: *b*=2.14, *SE*=.67; item 3: *b*=2.12, *SE*=.47) compared to wave 2 (constrained to 1), suggesting less variance was explained by ASA for these items at wave 3. In total, 6.5% (6/92) of parameters were freed. The sensitivity analysis comparing each partially invariant model to its lesser constrained counterpart indicated that none of the probabilities for response categories were discrepant by 5% or more, which suggests that the constraints had little practical impact.

Discussion

We conducted a thorough psychometric analysis of the ASA-27, the most widely used self-report measure of ASA. This effort is timely, in that the disorder was recently recognized by

the DSM-5 as a clinical problem that can occur in adulthood, and researchers and clinicians alike may be increasingly interested in its assessment. Overall, the measure assessed well at ASA levels above but not below the mean and demonstrated partial unique factor (or strict) invariance across both gender and time.

Item Response Theory Assumptions: Substantive Benefits

Meeting the assumptions of unidimensionality, local independence, and monotonicity is both a prerequisite condition for IRT modeling and facilitates evaluations of whether common interpretations of sum scores and reliability estimates are permissible. We determined that the ASA-27 did not meet the assumption of local independence in our sample, and consequently removed one item from each of two locally dependent pairs (21 and 24; 10 and 26). Had we retained all items in these pairs of items, the measure's reliability estimate may have been artificially inflated, as it would reflect how these items consistently measure constructs (talkativeness and panic symptoms) besides the construct of interest per se (ASA), and the sum scores would have reflected some combination of individual differences in the construct of interest and in these unacknowledged secondary constructs.

We identified and removed the locally dependent items on statistical grounds, but the decisions aligned with past studies. Specifically, removing item 26 ("Have people close to you mentioned that you 'talk a lot'?") was consistent with work reporting that it had the lowest correlation with the ASA-27 total score in a community sample (Manicavasagar et al., 1997), did the poorest job of discriminating between anxiety disorder patients with versus without ASA disorder (Manicavasagar et al., 2000), and had the lowest loading (or tied for lowest) on the first factor in two principle components analyses (Dirioz et al., 2011; Manicavasagar et al., 2003). There was also some evidence that item pair 21 and 24 were locally dependent in a past study,

which used a Turkish translation of the measures, in that these two items loaded very strongly and more strongly than other items, an indication of possible local dependence (Dirioz et al., 2011; Orlando & Bryce, 2007). However, these two items did not load exceptionally highly in a mixed community/clinical sample using the English version (Manicavasagar, Silove, Wagner, & Drobny, 2003), so future work will need to replicate this finding.

Test & Item Functioning

After meeting the IRT assumptions, we subsequently found that the ASA-27 provided the most accurate assessment, or most information, at high levels of latent ASA. We showed this in several ways, including the test information and individual item curves which peaked near the upper end of latent ASA and the strong positive relationship between total raw scores and model-estimated factor scores starting at about two SDs above the mean depicted in a scatterplot. In the same vein, the ASA-27 did not appear to be a reliable measure of the lowest levels of ASA. This can be seen by the test information curve, which showed negligible information levels below -1 SD (this includes 142 cases, or 16.0% of our sample), the weak relationship between total and factor scores below the mean of latent ASA (in other words, the differences between individuals at these low levels is less meaningful than the differences in scores at high levels), and the item difficulties for response categories 0-1 (they are greater than the mean for all items except item 1, which discriminated poorly). The latter indicates that, on nearly all items, an individual must have higher than average levels of latent ASA in order to have a 50% chance of endorsing the second lowest response category instead of the lowest response category.

Given that we used a community sample, and the lowest levels of ASA are probably represented, it is notable that the ASA-27 items were not able to discriminate in this range, and may highlight a need for items with lower difficulty parameters. These items could either query

less severe aspects of ASA, which, given the disorder's newness, may still need to be defined, or could use alternative wording in order to lower the threshold for endorsement (e.g., change "Very upset" in item 7 to "Somewhat frustrated"). It is important to note as well that, while researchers may not be interested in discriminating among individuals with very low levels of ASA because ASA is by definition pathological, the issue of unreliability at low levels of ASA remains important for statistical reasons. That is, when a total score is used in a typical fashion (e.g., as a predictor in a regression model), one- or two-point differences between low total scores based on the items currently included in the ASA-27 are given the same weight as one- or two-point differences between high total scores even though the reliability for the former is much lower. Eliminating items with poor discrimination parameters may be another means for mitigating this problem.

Together, these findings suggest that the ASA-27 is most suitable for assessing individuals who have average to high levels of ASA relative to others in a community sample, or that it may be an acceptable measure for use with clinical populations (Thomas, 2011). Thomas (2011) notes, "Such scales [that have information functions that peak near a cutoff on the impaired end of a latent distribution] can only make reliable discriminations within narrow regions of latent distributions and are not appropriate for dimensional classifications of patients along entire continuums," (p. 296) or they could be dichotomized around the band of precision to classify cases from non-cases.

The difficulty parameters in the item-level analysis also show which items individuals with more severe ASA are more likely to endorse compared to those with lower levels. We consider here the difficulty parameters for response categories two versus three and three versus four in particular because Manicavasagar et al. (1997) considered items positive if either of these

top categories were endorsed. Specifically, items 2, 9, 19, and 27 were among the items with the top five highest difficulty parameters for these two categories. They query a range of aspects of ASA: sleeping better with the lights on, worrying about relationships being so close it causes problems, having difficulty staying away from home for several hours, and experiencing physical symptoms before leaving home for work or activity. What ties them together may be that three of the four involve behavior or anxiety-responses to behavior, compared to many other items on the scale which query emotional states like distress or worry. While the fourth does query worry, it is also the only item on the scale which also asks about potential impairment (in social relationships) in particular. Clients who present with these symptoms may be more likely to be experiencing high levels of ASA compared to clients who present with other symptoms.

Comparing DSM to Non-DSM-Derived Items

The developers of the scale based some items on adaptations of criteria for separation anxiety in youth from DSM-IV (Manicavasagar et al., 1997). Our analysis suggests that these criteria are central for understanding disorder presentation in adults. We found that the DSM-derived items were more discriminating than the non-DSM-derived items on average, which means that the former have a stronger relationship to the underlying construct measured by the ASA-27. At the same time, of the four items which were highly discriminating, two were DSM-derived (item 14: very distressed thinking about being away from attachments; item 24: panic symptoms when thinking about separation from attachments) and two were not (item 17: very upset when changes to usual daily routine interfere with contact with attachments; item 18: worries a lot about attachments leaving). This highlights the significance of some aspects of ASA that are not captured explicitly by DSM criteria.

Invariance by Gender and Over Time

Our analysis suggests that the ASA-27 shows partial unique factor invariance across gender. This is the categorical indicator counterpart to strict invariance with continuous indicators. Of 92 loading, threshold, and item residual parameters, 86 (93.5%) were constrained to equality in the final partial unique factor invariance model. The degree of invariance is particularly notable given that it was evaluated by the conservative DIFFTEST. Moreover, the sensitivity analysis revealed that there virtually no practical impact of the increasing constraints. Since partial unique factor invariance was achieved, we can conclude that, for the most part, the differences in the factor means (and variances) are attributable to true differences in latent ASA rather than to measurement bias of the ASA-27 (Liu et al., 2017). This suggests that the higher levels of ASA in women observed in the current study and past work using the ASA-27 (Aaronson et al., 2008; Silove, Marnane, Wagner, & Manicavasagar, 2010; Silove, Marnane, Wagner, Manicavasagar, et al., 2010) can tentatively be interpreted as reflecting true differences in the latent ASA, as opposed to differences in the measurement properties or structure of the ASA-27. We can additionally conclude that, for the most part, the differences in the continuous latent responses, which underlie the observed categorical responses, and the differences in the categorical indicators themselves are attributable to differences in the latent factor. The gender differences in loadings and thresholds may be due to differences in societally acceptable expressions of anxiety.

The longitudinal invariance test in women likewise suggests that the ASA-27 demonstrates partial unique factor invariance across a three-year interval. Like the gender invariance analysis, the vast majority of parameters (93.5%) were constrained to equality across time in the final unique factor model, so the differences in the means and variances of the latent factors and of the observed ordered-categorical indicators can tentatively be interpreted as

reflecting true differences in latent ASA across time. The sensitivity analysis again indicated very little practical impact of the constraints in terms of model-estimated response category proportions. While establishing longitudinal invariance is an important prerequisite for posing questions about change in ASA, whether these results hold after treatment or significant loss events needs to be tested in future research.

Since modification indices are used to identify the equality constraints that should be released, and thus models may be susceptible to overfitting to noise in a given sample, we refrain from extensive interpretation about the specific parameters that were freed in the multigroup gender and longitudinal models. We do note, however, that equality constraints for items 1 and 19 contributed to misfit in both invariance tests. This may indicate that the data from wave 3 women, which were included in both invariance tests, were anomalous in some fashion, or that these items are biased across time or gender. They may be candidates for removal if future work replicates these findings.

Study Strengths and Limitations

The current study has several notable strengths. First, the psychometric analysis goes into much greater depth than previous analyses of this widely-used measure, and it provides insight into how the test functions as a whole, as well as into how individual items function. Additionally, by framing the assumptions of IRT in terms of their practical benefits, and by testing differences in DSM- versus non-DSM derived items, the analysis had both psychometric value in terms of the ASA-27 and conceptual value in terms of advancing thinking about ASA. We also had a relatively large sample and reports from men and women and reports at two measurement occasions, which permitted us to test questions about invariance. Finally, we

employed a cutting-edge sensitivity analysis on the practical impact of adding invariance constraints (Liu et al., 2017).

Alongside these strengths, the study limitations must be acknowledged as well. Several issues regarding sampling and generalizability must be noted. The sample was made up of mostly White and non-Hispanic adults who were married and had young children, so results may not generalize to other racial or ethnic groups, singles, or people without children or with older children. In addition, there was evidence of attrition bias for the wave 3 assessment, so whether the results generalize to individuals who are not in a relationship or have not completed college is unknown (although this is somewhat tempered by the similarity with the wave 2 results, which did not exhibit attrition bias, but included women only). In the same vein, since the sample was drawn from the community, we cannot be certain that the results would generalize to a clinical sample, despite the fact that IRT parameters are theoretically sample-invariant. Finally, the longitudinal invariance testing was conducted in women only, so whether changes in latent levels of ASA or item responses over time reflect true change in men is still unknown. In addition, the substantive meaning of the partial gender and longitudinal invariance can be somewhat difficult to determine, in part, because the loading, threshold, and item residual parameters are interdependent, meaning that, for example, freeing a loading may permit that item's residual to be constrained to equality in the more restrictive model. Moreover, as in the case in all types of structural equation models, using modification indices to identify the parameters to free may be prone to fitting to idiosyncratic noise in the sample as opposed to reflecting true differences at the population level. For these two reasons, we encourage readers to focus on how, in general, the measure was invariant, rather than on the meaning of the specific non-invariant item parameters until they are replicated in an independent sample.

Conclusion

The ASA-27 is a widely-used self-report measure of the newly-recognized clinical problem, ASA. In a community sample, it assesses ASA most reliably at higher than average levels and least reliably below the mean. The ASA-27 showed partial invariance at the unique factor level across gender and time, with less than 7% of parameters freed in both cases, which implies that the means and variances of the latent factors and differences in the observed responses can be attributable to true differences in ASA. Future work should replicate these findings in a sample that includes individuals with a wider range of ASA severity and may consider removing additional items that provide little or redundant information.

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Table 1

Descriptive statistics for personality and clinical variables

			Self	*Informant*
			M(SD)	M(SD)
Personality	Wave 1 (MPQ)	Negative Emotionality	8.47 (6.07)	--
		Stress Reaction	5.26 (3.94)	4.41 (3.43)
		Alienation	1.57 (2.12)	--
		Aggression	1.64 (1.94)	--
		Positive Emotionality	32.28 (8.55)	--
		Well-being	9.33 (3.2)	7.9 (3.48)
		Social Potency	6.62 (3.4)	--
		Achievement	7.67 (3)	--
		Social Closeness	8.66 (3.06)	8.44 (3.42)
		Constraint	26.08 (5.24)	--
		Control	9.79 (2.64)	--
		Harm Avoidance	8.81 (2.68)	8.54 (3.00)
		Traditionalism	7.48 (2.4)	--
		Absorption	5.32 (3.05)	--
	Wave 2 (SNAP)	Negative Temperament	4.23 (3.69)	9.31 (3.93)
		Positive Temperament	9.03 (3.14)	8.4 (2.29)
		Disinhibition	2.97 (2.35)	7.08 (3.34)
			Self	*Self*
			M (SD)	*n* (%)
Clinical	Wave 2[†]	ASA	11.41 (9.42)	--
		ASA Case	--	106 (25.4)
		DID	4.85 (5.80)	--

Wave 3	ASA	9.34 (9.22)	--
	ASA Case	--	153 (17.8)
	Depressive Disorder	--	310 (27.8)
	Substance Use Disorder	--	324 (29.1)
	Anxiety Disorder	--	360 (32.3)

[†]Includes women only (n=378). n=819-1114 for other variables.

Table 2

Concurrent and longitudinal relationships between personality traits and adult separation anxiety

		DV: Wave 2 ASA		DV: Wave 3 ASA	
		Women Only		Women & Men	
		IV: Self-Reported Personality	*IV: Informant-Reported Personality*	*IV: Self-Reported Personality*	*IV: Informant-Reported Personality*
		B	*B*	*B*	*B*
Wave 1	**Negative Emotionality**	.441***	--	.387***	--
	Stress Reaction	.403***	.241***	.380***	.210***
	Alienation	.213***	--	.279***	--
	Aggression	.275***	--	.215***	--
	Positive Emotionality	-.097^	--	-.054	--
	Well Being	-.151*	-.048	*-.216*** / -.121***	-.100**
	Social Potency	-.008	--	.038	--
	Achievement	-.024	--	.007	--
	Social Closeness	-.106^	-.045	-.083*	-.020
	Constraint	-.116*	--	-.070*	--
	Control	-.140*	--	-.114**	--
	Harm Avoidance	-.019	.029	.004	.029
	Traditionalism	-.039	--	-.019	--

	Absorption	.260*	--	.165***	--
Wave 2	**Negative Temperament**	.438***	.127*	*.413*** / .349****	.218***
	Positive Temperament	-.161*	-.130^	*-.170*** / -.097***	-.123**
	Disinhibition	.226***	.101^	.205***	.130**

Notes: ^p<.10; *p<.05; **p<.01; ***p<.001. All models predicting wave 3 ASA include gender as a covariate. Coefficients in italics indicate that the gender by trait interaction was significant at p<.05; the coefficient on the left side of the slash is the effect of the trait on ASA in women, and the coefficient on the right side is the effect in men (see text for full description of effects). Higher-order traits bolded. Informants (partners) only reported on four of the wave 1 primary traits. Waves were approximately three years apart. For women only, wave 1 self-report n=474-475; wave 2 self-report n=469; wave 1 informant-report n=396-397; wave 2 informant-report n=362. For men and women, wave 1 self-report n=870-872; wave 2 self-report n=834; wave 1 informant-report n=864-865; wave 2 informant-report n=819-820. ASA=adult separation anxiety. DV=dependent variable.

Table 3

Linear regression models testing unique associations between personality traits and adult separation anxiety in women only

			DV: Wave 2 ASA		
			B	*SE*	*p*
Wave 1	Higher-order	**Negative Emotionality**	.436	.043	<.001
		Constraint	-.083	.045	.067
		R^2	*.21*	*.04*	*<.001*
	Lower-order	Stress Reaction	.316	.053	<.001
		Alienation	.038	.060	.533
		Aggression	.133	.066	.043
		Well Being	-.043	.072	.549
		Control	-.059	.055	.286
		Absorption	.186	.061	.002
		R^2	*.25*	*.04*	*<.001*
Wave 2	Higher-order	**Negative Temperament**	.418	.043	<.001
		Positive Temperament	.025	.057	.67
		Disinhibition	.150	.057	.008
		$\mathbf{R^2}$	*.22*	*.04*	*<.001*

Notes: Higher-order traits bolded. Personality traits in these models were significantly related to ASA in the single-trait models. Wave 3 *n*=474. Wave 2 *n*=469. ASA=adult separation anxiety. DV=dependent variable.

Table 4

Linear regression models testing unique associations between personality traits and separation anxiety

			DV: Wave 3 ASA		
			B	*SE*	*p*
Wave 1	Higher-order	**Negative Emotionality**	.385	.033	<.001
		Constraint	-.015	.033	.644
		Female	.079	.036	.029
		R^2	*.17*	*.03*	*<.001*
	Lower-order	Stress Reaction	.293	.049	<.001
		Alienation	.129	.057	.023
		Aggression	.054	.047	.247
		Well Being	-.010	.046	.823
		Social Closeness	.042	.041	.296
		Control	-.048	.037	.194
		Absorption	.071	.039	.064
		Female	.033	.043	.442
		R^2	*.18*	*.03*	*<.001*
Wave 2	Higher-order	**Negative Temperament**	.342	.035	<.001
		Positive Temperament	.055	.037	.135
		Disinhibition	.159	.044	<.001
		Female	.111	.033	.001
		R^2	*.16*	*.03*	*<.001*

Notes: Higher-order traits bolded. Personality traits in these models were significantly related to ASA in the single-trait models. Interactions between gender and each personality trait were tested simultaneously; none were

significant so they are not included. Wave 1 *n*=870. Wave 2 *n*=834. ASA=adult separation anxiety. DV=dependent variable.

Table 5

Incremental variance in personality traits accounted for by adult separation anxiety beyond depressive, anxiety, and substance use disorders in hierarchical linear regression models

		Step 1: Depressive, Anxiety, Substance	Step 2: ASA	
		R^2 (*SE*)	R^2 (*SE*)	Wald's Test
Wave 1 DV	**Negative Emotionality**	.16 (.03)	.25 (.03)	57.28, p<.001
	Stress Reaction	.23 (.03)	.29 (.03)	43.94, p<.001
	Alienation	.08 (.02)	.13 (.03)	22.26, p<.001
	Aggression	.11 (.02)	.14 (.02)	12.61, p<.001
	Well Being	.15 (.02)	.15 (.02)†	0.00, p=.99
	Social Closeness	.12 (.02)	.12 (.02)	.14, p=.705
	Constraint	.18 (.03)	.18 (.03)	.39, p=.394
	Control	.11(.02)	.12 (.02)	6.76, p=.009
	Absorption	.06 (.02)	.08 (.02)	11.94, p<.001
Wave 2 DV	**Negative Temperament**	.14 (.03)	.20 (.03)	44.60, p<.001
	Positive Temperament	.03 (.01)	.04 (.01)	1.06, p=.304
	Disinhibition	.08 (0.02)	.10 (0.02)	10.51, p=.001

Notes: Higher-order traits bolded. All models include gender as a covariate. Wald's test *df*=1 for all models. ASA and lifetime depressive, anxiety, and substance use disorders were assessed at wave 3. *n*=859. ASA=Adult separation anxiety. DV=dependent variable.

Table 6

Incremental variance in personality traits accounted for by adult separation anxiety case score beyond depressive, anxiety, and substance use disorders in hierarchical linear regression models

		Step 1: Depressive, Anxiety, Substance	Step 2: ASA Case Score	
		R^2 (*SE*)	R^2 (*SE*)	Wald's Test
Wave 1 DV	**Negative Emotionality**	.16 (.03)	.21 (.03)	26.30, p<.001
	Stress Reaction	.23 (.03)	.26 (.03)	21.73, p<.001
	Alienation	.08 (.02)	.10 (.03)	10.19, p=.001
	Aggression	.11 (.02)	.13 (.02)	10.97, p<.001
	Well Being	.15 (.02)	.15 (.02)	.00, p=.99
	Social Closeness	.12 (.02)	.12 (.02)	.14, p=.71
	Constraint	.18 (.03)	.18 (.03)	.13, p=.72
	Control	.11(.02)	.11 (.02)	.77, p=.38
	Absorption	.06 (.02)	.08 (.02)	12.00, p<.001
Wave 2 DV	**Negative Temperament**	.14 (.03)	.18 (.03)	22.53, p<.001
	Positive Temperament	.03 (.01)	.04 (.01)	.06, p=.81
	Disinhibition	0.08 (0.02)	0.09 (0.02)	6.95, p=.008

Notes: ASA=Adult separation anxiety. DV=dependent variable. Higher-order traits bolded. All models include gender as a covariate. Wald's test df=1 for all models. ASA and lifetime depressive, anxiety, and substance use disorders were assessed at wave 3. n=859.

Table 7

Longitudinal auto-regressive models testing relationship between adult separation anxiety and self-reported personality in women

		DV: Wave 3 ASA		
		B	*SE*	*p*
Wave 2	ASA	0.605	0.049	<.001
	Negative Temperament	0.112	0.050	0.025
	R^2	*0.44*	*0.05*	*<.001*
	ASA	0.643	0.040	<.001
	Positive Temperament	-0.069	0.040	0.086
	R^2	*0.43*	*0.05*	*<.001*
	ASA	0.635	0.044	<.001
	Disinhibition	0.084	0.050	0.094
	R^2	*0.43*	*0.05*	*<.001*

Notes: n=377.

Table 8

Concurrent correlations between adult separation anxiety and parenting behaviors

	1	2	3	4	5
1. Adult separation anxiety[†]					
2. Authoritative parenting	0.03				
3. Authoritarian parenting	0.24***	-0.24***			
4. Permissive parenting	0.31***	-0.14**	0.38***		
5. Overprotective parenting	0.36***	0.03	0.24***	0.34***	
M(SD)	11.88 (9.26)	61.07 (6.83)	19.81 (4.15)	10.27 (3.08)	10.32 (3.25)

Notes: [†]*n*=378. *N* for all other variables=470. Parenting behaviors measured using the Parenting Styles and Dimensions Questionnaire

Table 9

Linear regression model testing unique concurrent relationships between parenting behaviors and adult separation anxiety

	B	*SE*	*p*
Authoritarian	0.10	0.07	0.15
Overprotective	0.27	0.06	<.001
Permissive	0.20	0.06	0.001
White	-0.02	0.06	0.81
Hispanic	0.06	0.06	0.29
College graduate	0.02	0.05	0.64
Relationship status	0.00	0.05	1.00
Age	-0.07	0.05	0.18
R^2	0.07	0.03	0.04

Notes: n=378. All variables measured at wave 2.

Table 10

Parenting class model fit statistics

Σ		*k*	# par.	*LL*	BIC	CAIC	AWE	LMR-LRT *p*	$cm\hat{P}_K$	$\hat{BF}$	BLRT *p*
Full	Free	1*	14	-5233.37	10552.87	10566.87	10540.83	--	<.01	--	--
		2	29	-5154.34	**10487.12**	**10516.12**	**10480.51**	**<.01**	**>.99**	**>10**	<.01
	Equal	1*	14	-5233.37	10552.87	10566.87	10540.83	--	<.01	--	--
		2	19	-5199.88	10516.66	10535.66	10505.35	**0.04**	<.01	>10	<.01
		3	24	-5175.91	**10499.48**	**10523.48**	**10490.06**	0.06	**>.99**	**>10**	**<.01**
Diagonal	Free	1	8	-5320.53	10690.29	10698.29	10679.51	--	<.01	--	--
		2	17	-5187.89	**10480.37**	**10497.37**	**10468.61**	**<.01**	**0.83**	**>10**	<.01
		3	26	-5161.81	10483.60	10509.60	10475.20	0.12	**0.17**	<1	<.01
		4	35	-5139.40	10494.15	10529.15	10491.88	0.01	<.01	<1	**<.01**
		5	44	-5122.69	10516.10	10560.10	10522.01	0.10	<.01	<1	.15
	Equal	1	8	-5320.53	10690.29	10698.29	10679.51	--	<.01	--	--
		2	13	-5230.82	10541.63	10554.63	10529.61	**<.01**	<.01	>10	<.01
		3	18	-5202.07	**10514.89**	**10532.89**	**10503.33**	0.27	**>.99**	**>10**	**<.01**

Notes: Σ=within-class variance-covariance structure. *k*=classes. Free=No across-class variance-covariance constraints. Equal= across-class variance-covariance constrained to equality. Par=parameters. *Benchmark model. LMR-LRT and $\hat{BF}$ are for *k* v. *k* - 1 classes. Optimal (or in the case of $cm\hat{P}_K$, acceptable) fit statistics within each model set are bolded. Class numbers for candidate models are bolded and final model is boxed.

Table 11

Correlations between adult separation anxiety, recalled parenting experiences, and own parenting behaviors

	1	2	3	4	5	6	7
1. Adult separation anxiety (O)							
2. Maternal care (RP)	-0.17**						
3. Paternal care (RP)	-0.20***	0.46***					
4. Maternal overprotectiveness (RP)	0.20***	-0.36***	-0.19***				
5. Paternal overprotectiveness (RP)	0.12*	-0.19***	-0.26***	0.67***			
6. Acceptance/rejection (O)	0.03	0.18***	0.13**	-0.08	-0.06		
7. Control/autonomy (O)	0.20***	-0.10*	-0.13**	0.13**	0.19***	-0.26***	
8. Firm control/lax control (O)	-0.04	0.04	-0.01	-0.01	0.06	-0.06	0.29***
M (*SD*)	11.88 (9.26)	10.18 (2.02)	9.42 (2.17)	7.61 (2.55)	7.44 (2.44)	18.58 (2.01)	25.09 (2.33)

Notes: R=recalled parenting. O=own. Adult separation anxiety and recalled parenting measured at wave 2. Own parenting measured at wave 3 approximately three years later. *n*=434-468.

Table 12

Path models testing intergenerational transmission of parenting behaviors via adult separation anxiety

		ASA (O)			Acceptance/rejection (O)			Control/autonomy (O)			Firm control/lax control (O)		
		B	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
Maternal Model	Maternal care (RP)	-0.10	0.07	0.15	0.17	0.06	0.002	-0.06	0.05	0.26	0.03	0.05	0.61
	Indirect via ASA	--	--	--	--	--	--	-0.02	0.02	0.22	--	--	--
	Maternal overprotection (RP)	0.17	0.06	0.008	-0.03	0.06	0.59	0.04	0.06	0.53	-0.02	0.06	0.71
	Indirect via ASA	--	--	--	--	--	--	0.03	0.01	0.045	--	--	--
	ASA (O)	--	--	--	0.07	0.05	0.15	0.16	0.06	0.009	-0.05	0.07	0.43
	White	-0.02	0.07	0.79	0.08	0.07	0.20	-0.11	0.06	0.048	-0.15	0.05	0.005
	Hispanic	0.06	0.07	0.44	-0.02	0.05	0.69	0.07	0.05	0.18	0.06	0.06	0.27
	College graduate	-0.03	0.05	0.57	0.00	0.05	0.96	0.00	0.05	0.94	0.07	0.05	0.18
	Relationship status	0.02	0.05	0.65	0.05	0.06	0.41	-0.07	0.06	0.19	-0.05	0.05	0.25
	Age	-0.06	0.06	0.26	0.01	0.05	0.89	-0.01	0.05	0.89	-0.08	0.05	0.10
	R^2	0.07	0.03	0.04	0.08	0.07	0.20	0.08	0.03	0.009	0.05	0.02	0.03
Paternal Model	Paternal care (RP)	-0.17	0.07	0.01	0.11	0.06	0.09	-0.06	0.05	0.24	0.02	0.06	0.74
	Indirect via ASA	--	--	--	--	--	--	-0.02	0.01	0.13	--	--	--
	Paternal overprotection (RP)	0.08	0.06	0.19	-0.03	0.06	0.60	0.12	0.05	0.02	0.05	0.06	0.39

Indirect via ASA	--	--	--	--	--	--	0.01	0.01	0.25	--	--	--
ASA (O)	--	--	--	0.04	0.05	0.42	0.13	0.06	0.03	-0.06	0.07	0.38
White	-0.07	0.07	0.31	0.07	0.07	0.30	-0.09	0.05	0.11	-0.14	0.06	0.01
Hispanic	0.09	0.07	0.22	-0.03	0.05	0.50	0.10	0.06	0.08	0.05	0.06	0.33
College graduate	-0.03	0.05	0.63	-0.01	0.05	0.92	0.02	0.05	0.67	0.07	0.05	0.15
Relationship status	0.02	0.05	0.70	0.02	0.06	0.68	-0.04	0.05	0.51	-0.04	0.05	0.42
Age	-0.06	0.06	0.31	0.02	0.05	0.73	0.01	0.05	0.92	-0.08	0.05	0.14
R^2	0.07	0.03	0.045	0.03	0.02	0.25	0.08	0.03	0.006	0.05	0.02	0.05

Notes: RP=recalled parenting. O=own. ASA=adult separation anxiety. *B*=standardized coefficient. Recalled parenting and adult separation anxiety were assessed at wave 2; own parenting was assessed at wave 3 approximately three years later. Only indirect effects to control/autonomy were tested. For maternal model, *n*=433. For paternal model, *n*=412.

Table 13

Correlations between parents' separation anxiety and children's psychiatric disorders and descriptive statistics

	Separation anxiety		Social phobia		Generalized anxiety		Specific phobia		Depression	
	Up to 9	9 to 12	Up to 9	9 to 12	Up to 9	9 to 12	Up to 9	9 to 12	Up to 9	9 to 12
Maternal adult separation anxiety	.14**	.11*	.00	.04	.16***	.12*	.03	.01	.14**	.01
Paternal adult separation anxiety	.03	19***	.00	.01	.05	.00	.08^	.01	.02	-.03
Count (Proportion)	28 (.06)	15 (.03)	17 (.04)	20 (.05)	20 (.04)	20 (.05)	56 (.12)	42 (.09)	10 (.02)	26 (.06)

Notes: ***p<.001; **p<.01; *p<.05; ^p<.10. Up to 9=wave 3 assessment, which covered child's lifetime through age 9 (n=399). 9 to 12=wave 5 assessment, which was done when children were 12 years old and covered the period since the age 9 assessment (n=372). Parents' adult separation anxiety assessed at wave 3. Correlations with agoraphobia and panic disorder are not reported here because of low counts (<1%) but these variables are included in structural models.

Table 14

Descriptive statistics for children's anxiety and depressive symptoms from mother, father, and child report

		Wave 3 (Age 9)		Wave 4 (Age 12)	
		M (SD)	Range	*M (SD)*	Range
SCARED: Separation	Mother	1.97 (2.38)	0-13	.78 (1.36)	0-7
Anxiety	Father	1.68 (1.98)	0-10	.77 (1.25)	0-10
	Child	5.29 (3.28)	0-15	2.54 (2.24)	0-15
SCARED: Total	Mother	5.94 (6.37)	0-43	7.04 (6.91)	0-40
Excluding Separation	Father	6.76 (6.55)	0-36	6.18 (5.99)	0-39
Anxiety	Child	14.42 (9.03)	0-53	14.11 (9.02)	0-52
CDI	Mother	7.29 (4.88)	0-29	7.08 (4.98)	0-26
	Father	7.33 (4.42)	0-23	7.51 (5.05)	0-24
	Child	4.86 (4.19)	0-22	4.86 (5.40)	0-33

Notes: For age 9, n=417-479. For age 12, n=358-440. SCARED=Screen for Child Anxiety Related Disorders. CDI=Children's Depression Inventory.

Table 15

Model fit statistics for models using continuous version of adult separation anxiety variable

		CFI	TLI	RMSEA (90% CI)	χ^2	*df*	*p*	*n*
Maternal	Concurrent	.992	.988	.012 (.000-.026)	138.62	129	.27	478
	Prospective	.982	.974	.021 (.000-.032)	153.47	129	.07	439
Paternal	Concurrent	.985	.978	.019 (.000-.032)	147.92	129	.12	404
	Prospective	.978	.968	.024 (.004-.036)	157.43	129	.05	377

Table 16

Model fit statistics for models using case score version of adult separation anxiety variable

		CFI	TLI	RMSEA (90% CI)	χ^2	*df*	*p*	*n*
Maternal	Concurrent	.993	.990	.012 (.000-.026)	137.42	129	.29	478
	Prospective	.984	.977	.020 (.000-.032)	150.62	129	.09	439
Paternal	Concurrent	.996	.994	.010 (.000-.027)	134.04	129	.36	404
	Prospective	.981	.972	.023 (.000-.035)	154.26	129	.06	377

Table 17

Invariance models for continuous versus ordered categorical variables

Continuous			**Ordered Categorical**		
Name	Specification	Conclusions	Name	Specification	Conclusions
1. Configural	Same items load on same factors	- Factor loading pattern the same across groups/time	1. Baseline	Same items load on same factors	- Factor loading pattern the same across groups/time
2. Metric	+ Equal factor loadings	- Variances and covariances of latent factors can be compared	2. Loading	+ Equal factor loadings	- Differences in means of continuous latent responses due to differences in latent factor
3. Scalar	+ Equal intercepts	- Differences in means, variances, and covariances of latent factors can be compared - Differences in means of measured continuous indicators due to differences in the latent factor means	3. Threshold	+ Equal thresholds	- Differences in means, variances, and covariances of latent factors can be compared - Differences in means of observed indicators CANNOT be attributed to latent factors
4. Strict	+ Equal unique variances	- Differences in means, variances, and covariances of the measured	4. Unique Factor	+ Equal unique variances	- Differences in the means and variances of the continuous latent responses due to

	continuous indicators due to differences in the latent factor	changes/differences in the latent factors - Differences in the measured ordered-categorical indicators due to differences in the latent factor

Notes: Equality constraints are cumulative. If the fit of a model with more equality constraints does not differ from the model directly preceding it in the hierarchy, the level of measurement invariance of the more restrictive model is established. Drawn from Liu et al. (2017), Millsap (2011), and Millsap & Yun-Tein (2004).

Table 18

Item selection based on local dependence

	Item deleted (*a*)	Retained item (*a*)	MI: EPC	MI: $\Delta\chi^2$	Residual correlation	Mean |*a*| change (*SD*)	Max. |*a*| change	CFI	TLI	RMSEA
1	21 (2.29)	24 (2.73)	2.15	180.36	.08	.12 (.33)	1.29	.959	.956	.045
2	26 (.46)	10 (.80)	.52	98.14	.34	.08 (.17)	.68	.966	.963	.042
--	19 (.77)	20 (1.19)	.45	25.91	.20	.01 (.01)	.05	.969	.966	.042
--	4 (1.02)	6 (1.30)	.43	41.36	.14	.01 (.02)	.09	.969	.966	.041
--	15 (1.27)	5 (1.00)	.50	32.06	.19	.01 (.02)	.10	.968	.965	.042
--	7 (.94)	17 (1.43)	.33	18.41	.12	.01 (.01)	.06	.967	.964	.042
--	8 (1.13)	18 (1.53)	.37	22.50	.10	.01 (.02)	.09	.967	.964	.042
--	23 (1.13)	18 (1.53)	.37	19.99	-.11	.01 (.02)	.08	.966	.962	.043
--	9 (.82)	18 (1.53)	NA	NA	-.15	.01 (.01)	.03	.967	.964	.043
--	13 (.63)	19 (.77)	NA	NA	.16	.01 (.01)	.03	.967	.964	.043
--	12 (.88)	27 (1.06)	NA	NA	-.15	.01 (.01)	.03	.969	.966	.043

Notes: a=discrimination parameter. MI=modification index. EPC=expected parameter change. Initial model fit including all items: CFI=.957; TLI=.953; RMSEA=.049. Item pairs with '--' in 'Item deleted' column were flagged for local independence but ultimately kept due to negligible change in fit and parameters.

Table 19

Graded response model item parameters in men and women

Item		*a*	*SE*	*b-1*	*b-2*	*b-3*	DSM-IV
1[b]	More secure at home with attachments	0.42	0.05	-2.59	0.00	1.50	--
2[ab]	Difficulty staying away from home for hours	0.84	0.08	1.53	2.97	3.61	A-4
3	Carries around object for security/comfort	0.58	0.06	1.56	2.77	3.28	--
4[a]	Extreme stress when leaving home for trip	1.02	0.08	0.58	2.19	2.86	A-1
5[ab]	Nightmares about separation from attachments	1.00	0.07	0.94	2.68	3.18	A-7
6[a]	Extreme stress before leaving someone close for trip	1.30	0.09	0.77	2.24	2.84	A-1
7	Very upset when usual daily routine is disrupted	0.94	0.06	0.20	2.26	3.28	--
8[b]	Worries about relationship intensity with attachments	1.13	0.08	0.74	2.05	2.84	--
9[a]	Physical symptoms before leaving home for work/activity	0.82	0.07	1.51	3.11	3.74	A-8^
10[b]	Talks a lot to keep attachments around	0.76	0.06	1.15	2.68	3.85	--
11	Concerned about where attachments are going when separated	1.09	0.08	0.78	2.32	3.00	--
12[ab]	Difficulty sleeping alone at night	0.88	0.07	0.53	2.07	2.84	A-6
13[b]	Falls asleep better with voices or TV	0.63	0.05	0.61	2.06	2.92	--
14[ab]	Very distressed thinking about being away from attachments	1.43	0.11	0.81	2.11	2.70	A-1
15[a]	Nightmares about separation from home	1.27	0.17	1.91	2.82	3.07	A-7
16[a]	Worries about attachments coming to serious harm	1.00	0.07	0.07	2.18	2.87	A-2

17[b]	Very upset when changes to usual daily routine interfere with contact with attachments	1.43	0.11	0.82	2.20	3.02	--
18[b]	Worries a lot about attachments leaving	1.53	0.11	0.68	1.98	2.57	--
19	Sleeps better with lights on in home/bedroom	0.77	0.09	2.00	3.19	3.63	--
20[ab]	Avoids being home alone when attachments are out	1.19	0.12	1.68	2.59	3.15	A-5
21[ab]	**Panic symptoms when thinking about separation from attachments*	--	--	--	--	--	A-8
22[b]	Anxious about not speaking to close attachments on phone regularly	1.26	0.11	1.05	2.35	3.15	--
23[b]	Afraid would not be able to cope if attachments left	1.13	0.08	0.88	2.28	3.16	--
24[ab]	Panic symptoms when separated from attachments	1.43	0.17	1.72	2.74	3.19	A-8
25[ab]	Worrying about events causing separation from attachments	1.15	0.10	1.40	2.54	3.36	A-3
26	**Attachments mention he/she talks a lot*	--	--	--	--	--	--
27	Worries relationship so close it causes others problems	1.06	0.12	1.87	3.09	3.73	--

Notes: N=889. *a*=discrimination parameter. *b-1*=difficulty parameter between response categories 0 and 1. *b-2*=difficulty parameter between response categories 1 and 2. *b-3*=difficulty parameter between response categories 2 and 3. All items loaded significantly on the factor at $p<.001$. *Excluded based on local dependence. [a] Items based on DSM-IV criteria (Manicavasagar et al., 2000); the particular DSM-IV criteria was determined by authors of current study. [b] Items significantly discriminate at $p<.05$ between ASA and other anxiety disorder patients (Manicavasagar et al., 2000). ^A-8 does not include physical symptoms when separation from home occurs/is anticipated, only separation from major attachment figures.

Table 20

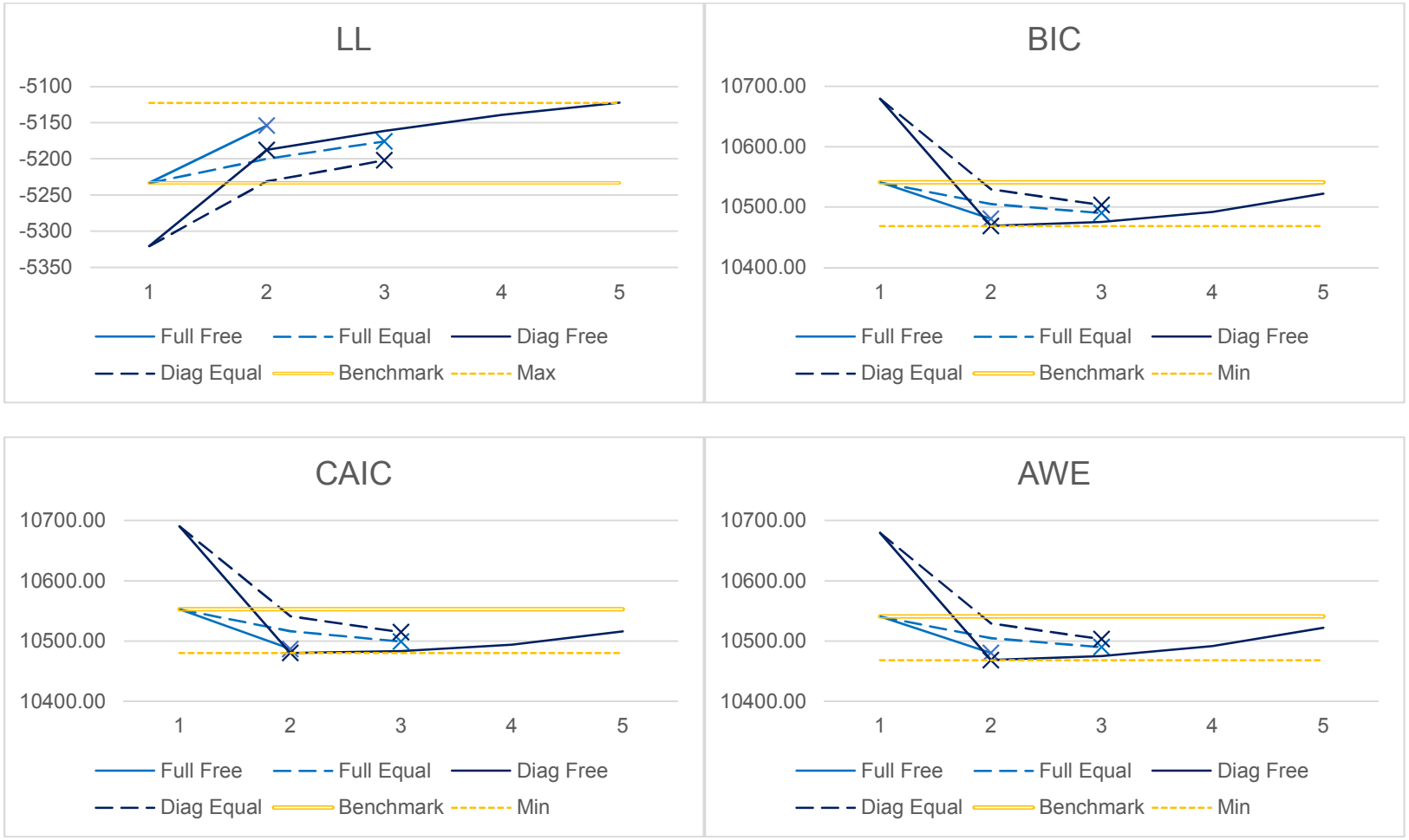
Invariance of ASA-27 across gender and time

	Model	Invariance	*df*	CFI	TLI	RMSEA	$\Delta\chi^{2\,a}$	Δdf	*p*	Freed parameters
Gender	Baseline	Full	550	.971	.969	.041	--	--	--	--
	Loading	Partial	571	.972	.971	.039	31.09	21	.07	λ: 1, 12, 19
	Threshold	Partial	618	.975	.976	.036	63.36	47	.06	λ: 1, 12, 19; τ: 17-1, 25-1
	Unique Factor	Partial	642	.979	.981	.032	32.73	24	.11	λ: 1, 12, 19; τ: 17-1, 25-1; δ: 19
Time	Baseline	Full	1149	.962	.960	.026	--	--	--	--
	Loading	Partial	1172	.962	.960	.026	33.87	23	.07	λ: 19
	Threshold	Partial	1218	.963	.963	.025	60.81	46	.07	λ: 19 τ: 1-1, 1-2, 18-1
	Unique Factor	Partial	1241	.965	.965	.024	35.17	23	.05	λ: 19; τ: 1-1, 1-2, 18-1; δ: 1, 3

Notes: [a] DIFFTEST. λ (lambda)=loading. τ (tau)=threshold. δ (delta)=residual. Analysis excludes items 21 and 26 due to local dependence with other items.

Figure 1

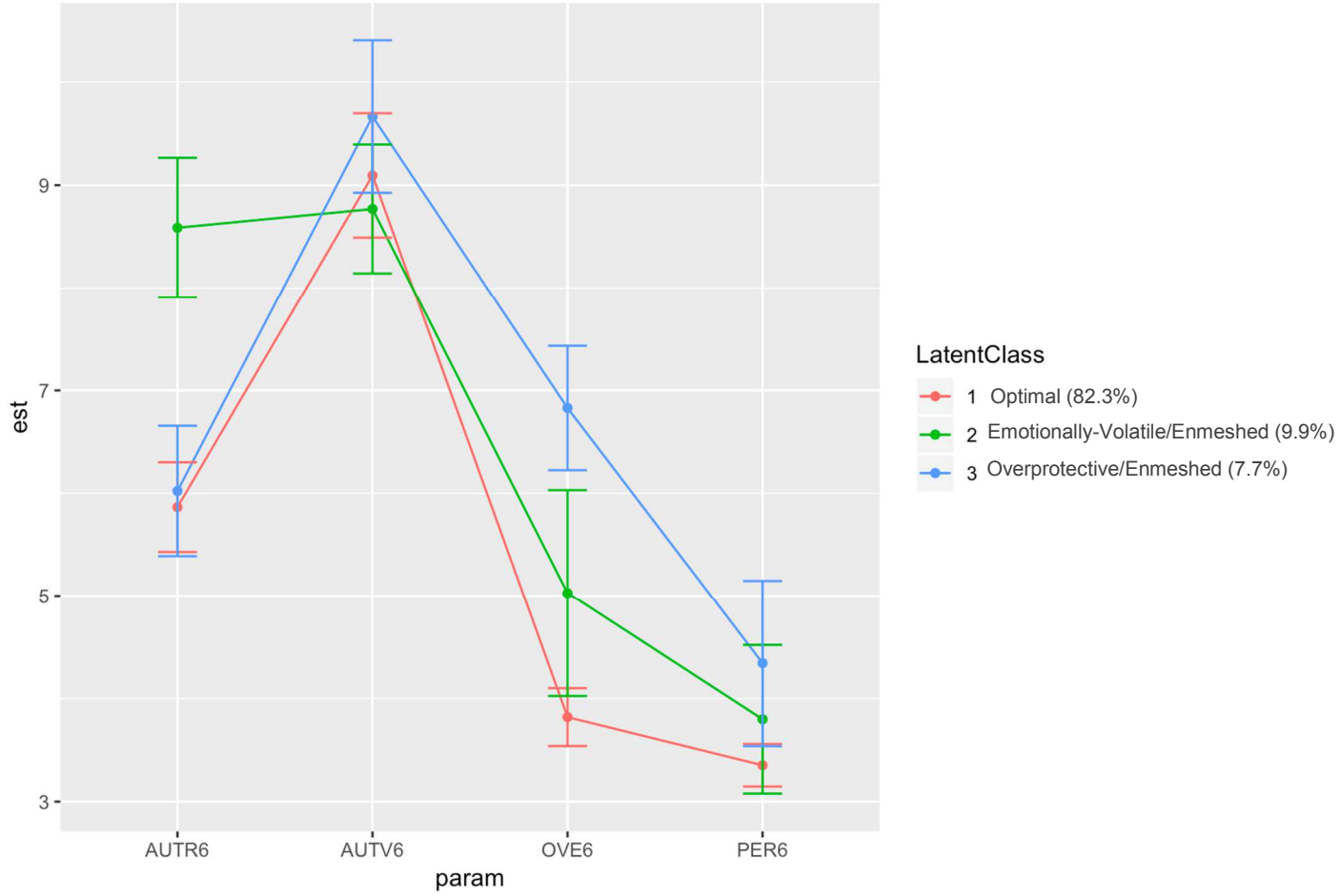
Fit statistics for finite mixture models with different within-class covariance-variance structure specifications



Notes: LL=log-likelihood. BIC=Bayesian information criteria. CAIC=Consistent Akaike's Information Criteria. AWE= Approximate Weight of Evidence Criterion. Diag=Diagonal. X=candidate model.

Figure 2

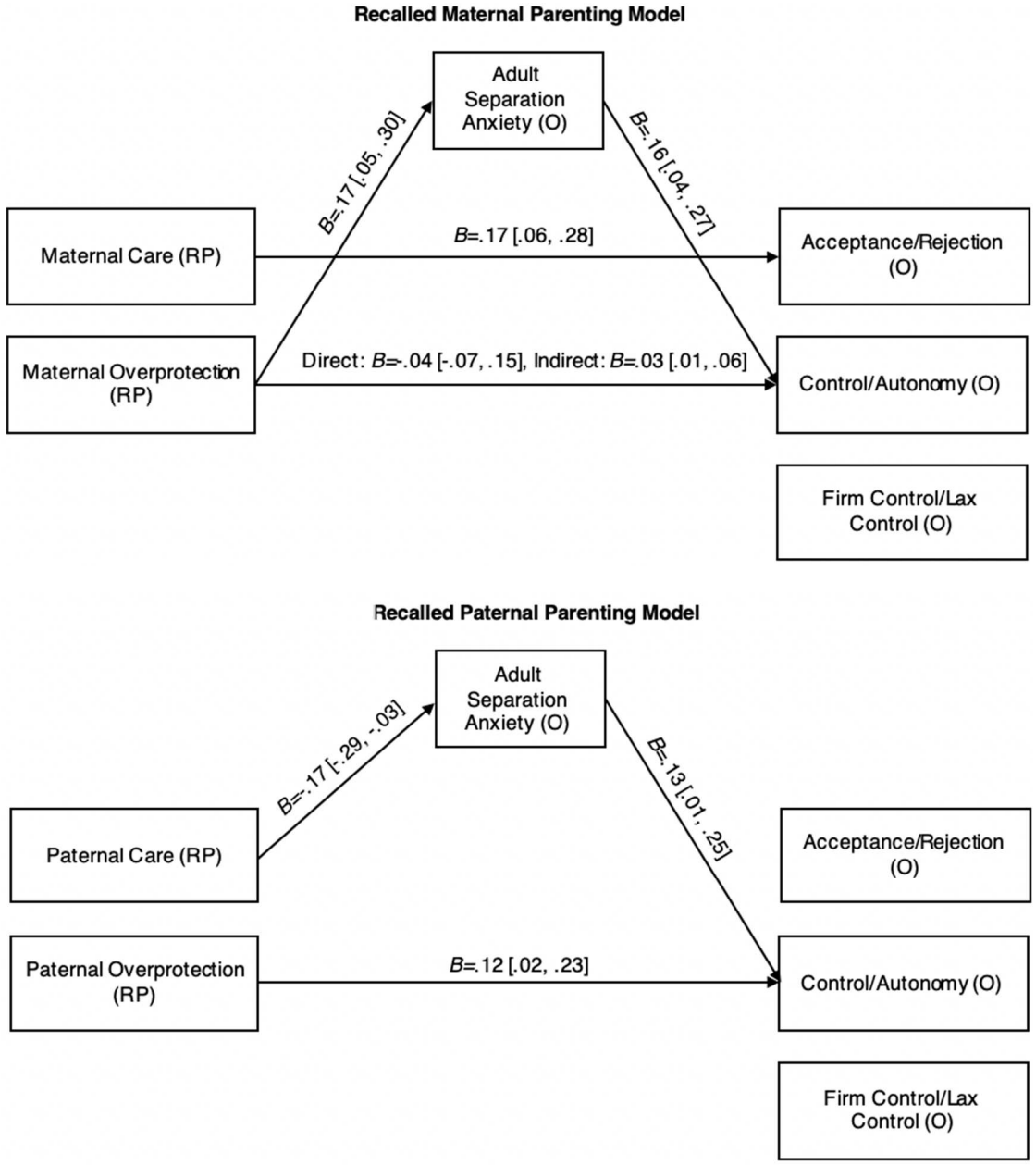
Mean plot for 3-class diagonal-free model



Notes: AUTR6=authoritarian. AUTV6=authoritative. OVE6=overprotective. PER6=permissive. Error bars reflect 90% confidence intervals. *N*=470.

Figure 3

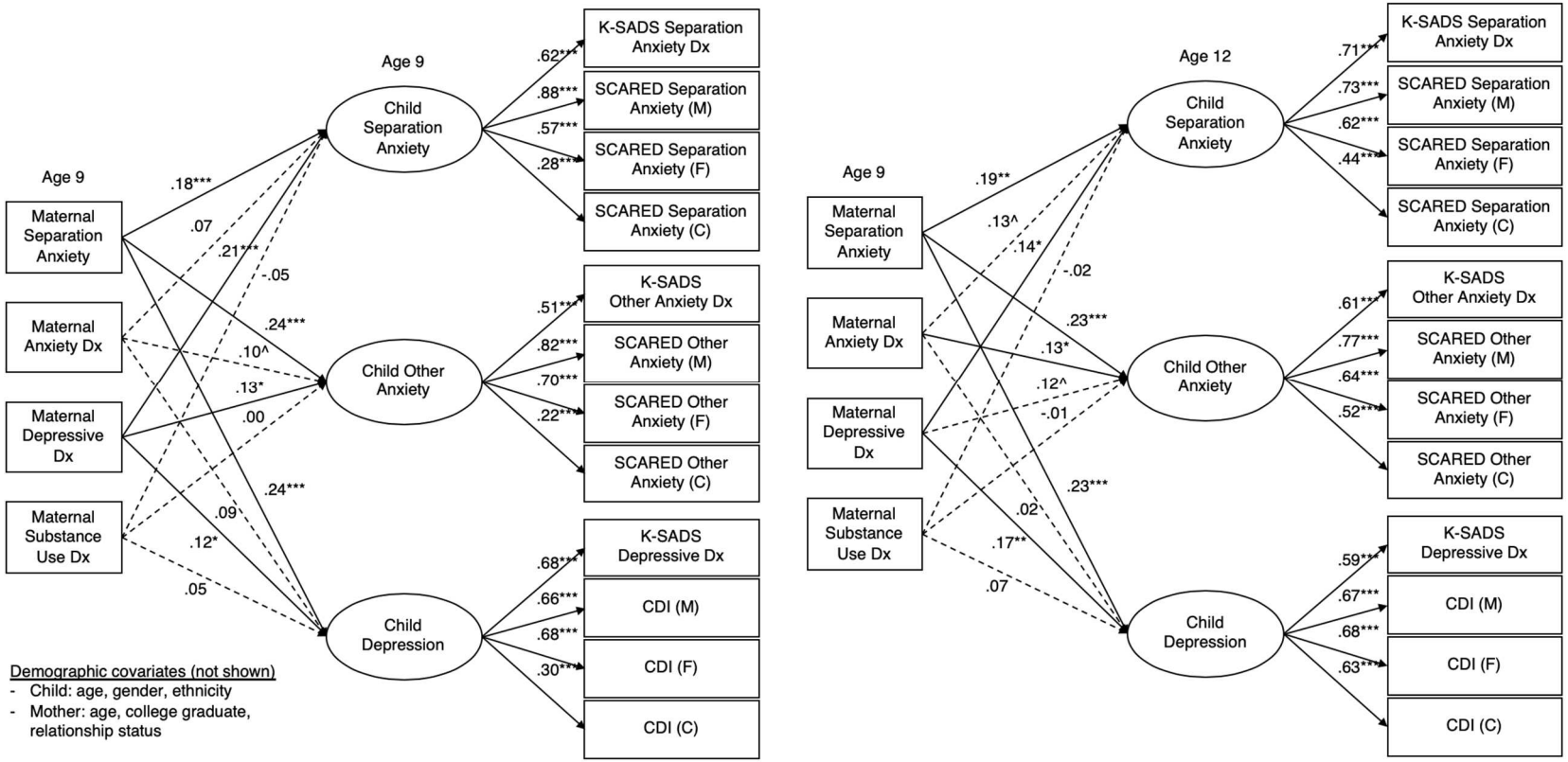
Indirect effect of recalled parenting experiences on own parenting behaviors via adult separation anxiety



Notes: RP=recalled parenting. O=own. *B*=standardized coefficient. 95% confidence intervals in brackets. Each path between recalled and own parenting scales was estimated; non-significant paths are not shown to simplify figure (all path coefficients are available in Table 4). Finally, demographic variables were included as covariates on the mediator and outcomes in both models (White [child], Hispanic [child], college graduate, living with/married to child's biological parent, age); some were significant predictors but are not shown here (see Table 4 for full output). The indirect paths from maternal care, paternal care, and paternal overprotection via adult separation anxiety were not significant. Recalled parenting and adult separation anxiety were assessed at wave 2; own parenting was assessed at wave 3 approximately three years later. For maternal model, *n*=433. For paternal model, *n*=412.

Figure 4

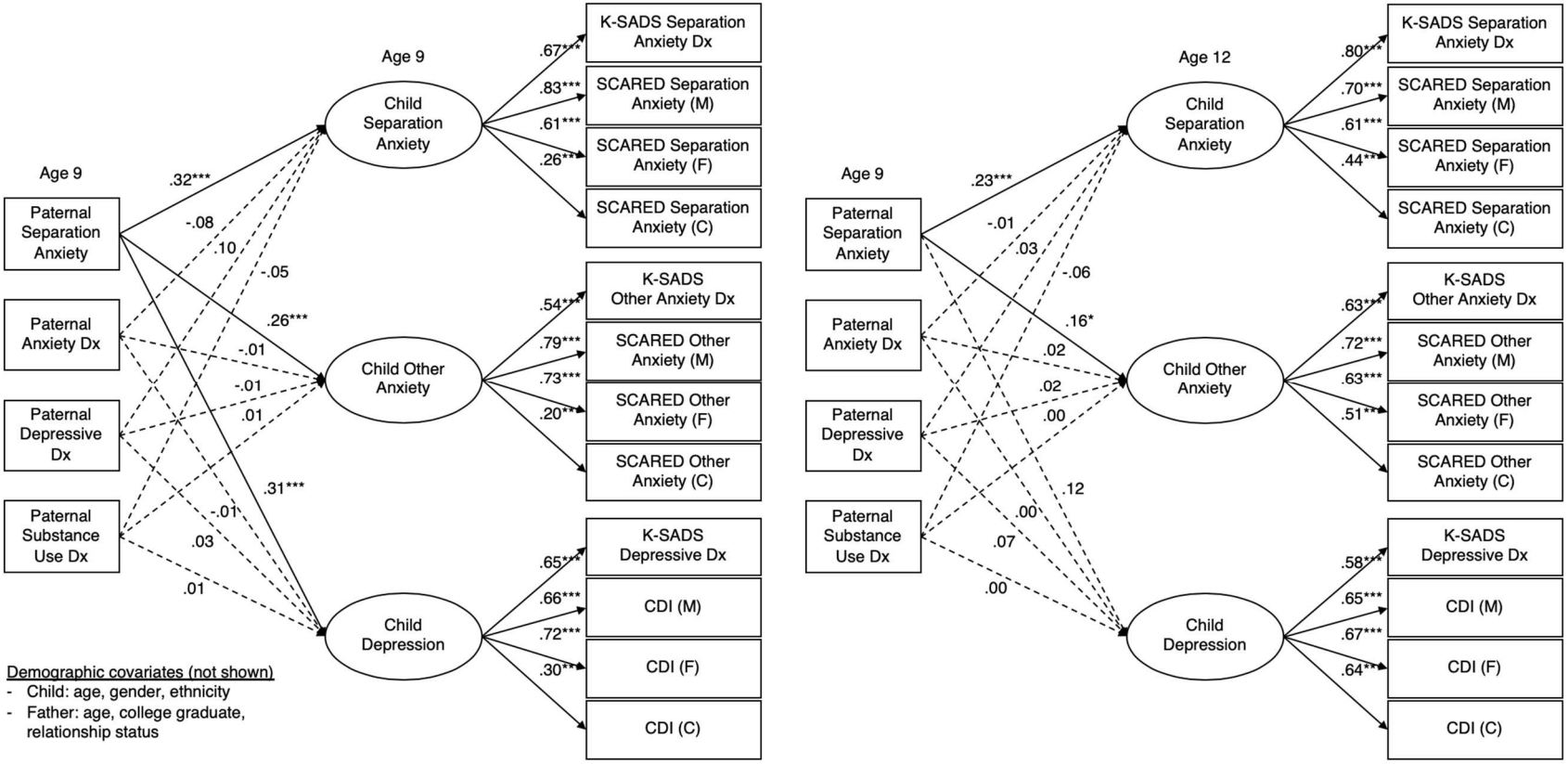
Concurrent and prospective relationships between maternal psychopathology and children's separation anxiety, other anxiety, and depression factors



Notes: Solid lines indicate significant paths at $p<.05$. ***$p<.001$; **$p<.01$; *$p<.05$; ^$p<.10$. Dx=diagnosis. M=mother report. F=father report. C=child report. SCARED=Screen for Child Anxiety Related Disorders. CDI=Children's Depression Inventory. Maternal and child diagnoses at age 9 are from lifetime assessments. Child diagnoses at age 12 cover the interval since the last assessment. Covariances between independent variables not shown, nor are covariances between children's psychopathology factors, which were all significant at $p<001$ (separation anxiety with other anxiety, concurrent model: β=.61; prospective model: β=.59; separation anxiety with depression, concurrent model: β=.27; prospective model: β=.28; other anxiety with depression, concurrent model: β=.56; prospective: β=0.63). The residual variances of indicators by the same reporter were permitted to covary, as were the K-SADS indicators.

Figure 5

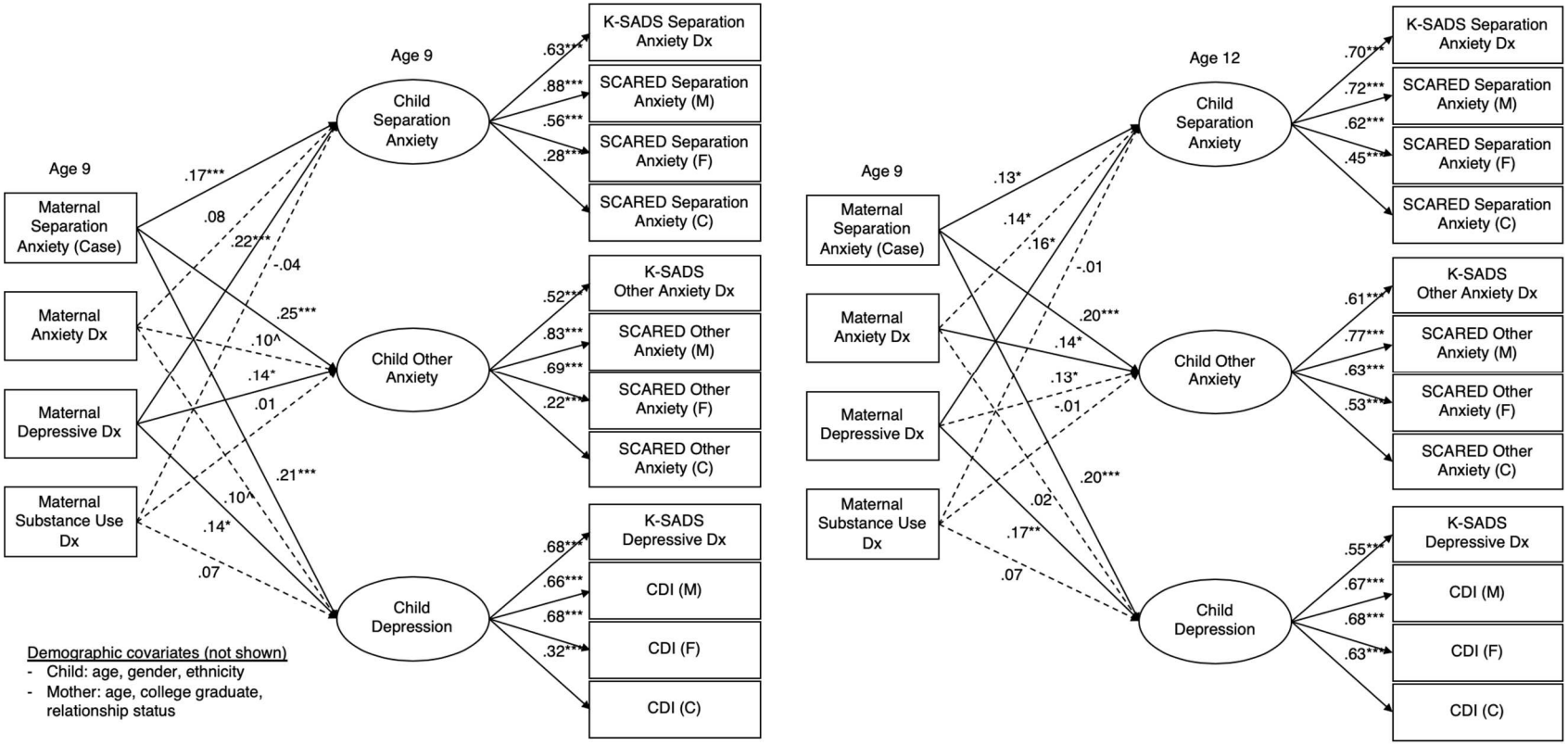
Concurrent and prospective relationships between paternal psychopathology and children's separation anxiety, other anxiety, and depression factors



Notes: Solid lines indicate significant paths at $p<.05$. ***$p<.001$; **$p<.01$; *$p<.05$; ^$p<.10$. Dx=diagnosis. M=mother report. F=father report. C=child report. SCARED=Screen for Child Anxiety Related Disorders. CDI=Children's Depression Inventory. ASA-27=Adult Separation Anxiety Symptom Questionnaire. Paternal and child diagnoses at age 9 are from lifetime assessments. Child diagnoses at age 12 cover the interval since the last assessment. Covariances between independent variables not shown, nor are covariances between children's psychopathology factors, which were all significant at $p<001$ (separation anxiety with other anxiety, concurrent model: β=.61; prospective model: β=.62; separation anxiety with depression, concurrent model: β=.29; prospective model: β=.32; other anxiety with depression, concurrent model: β=.57; prospective: β=.66). The residual variances of indicators by the same reporter were permitted to covary, as were the K-SADS indicators.

Figure 6

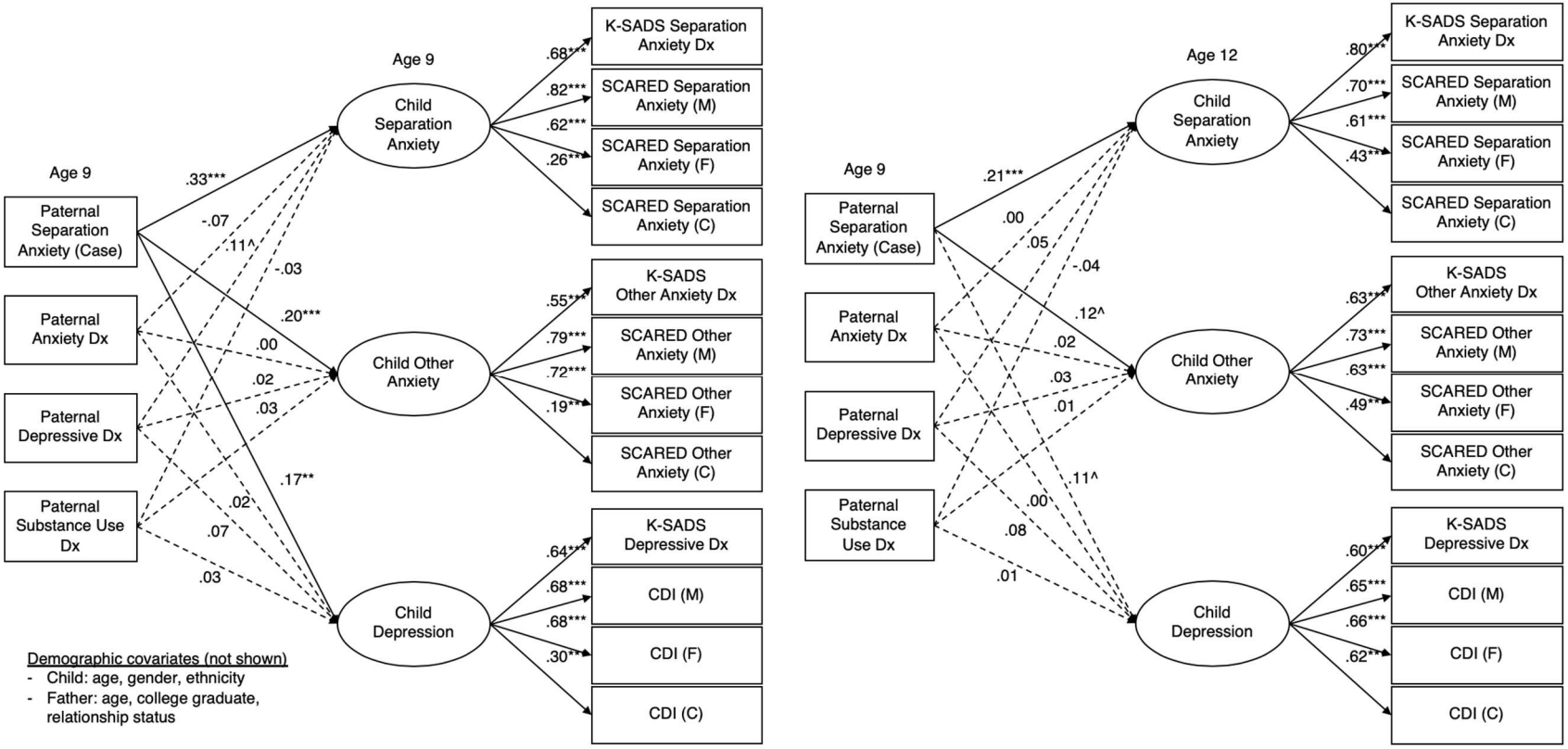
Concurrent and prospective relationships between maternal psychopathology using adult separation anxiety case score and children's separation anxiety, other anxiety, and depression factors



Notes: Solid lines indicate significant paths at $p<.05$. ***$p<.001$; **$p<.01$; *$p<.05$; ^$p<.10$. Dx=diagnosis. M=mother report. F=father report. C=child report. SCARED=Screen for Child Anxiety Related Disorders. CDI=Children's Depression Inventory. Maternal and child diagnoses at age 9 are from lifetime assessments. Child diagnoses at age 12 cover the interval since the last assessment. Covariances between independent variables not shown, nor are covariances between children's psychopathology factors, which were all significant at $p<.001$ (separation anxiety with other anxiety, concurrent model: β=.61; prospective model: β=.59; separation anxiety with depression, concurrent model: β=.27; prospective model: β=.28; other anxiety with depression, concurrent model: β=.56; prospective: β=0.63). The residual variances of indicators by the same reporter were permitted to covary, as were the K-SADS indicators.

Figure 7

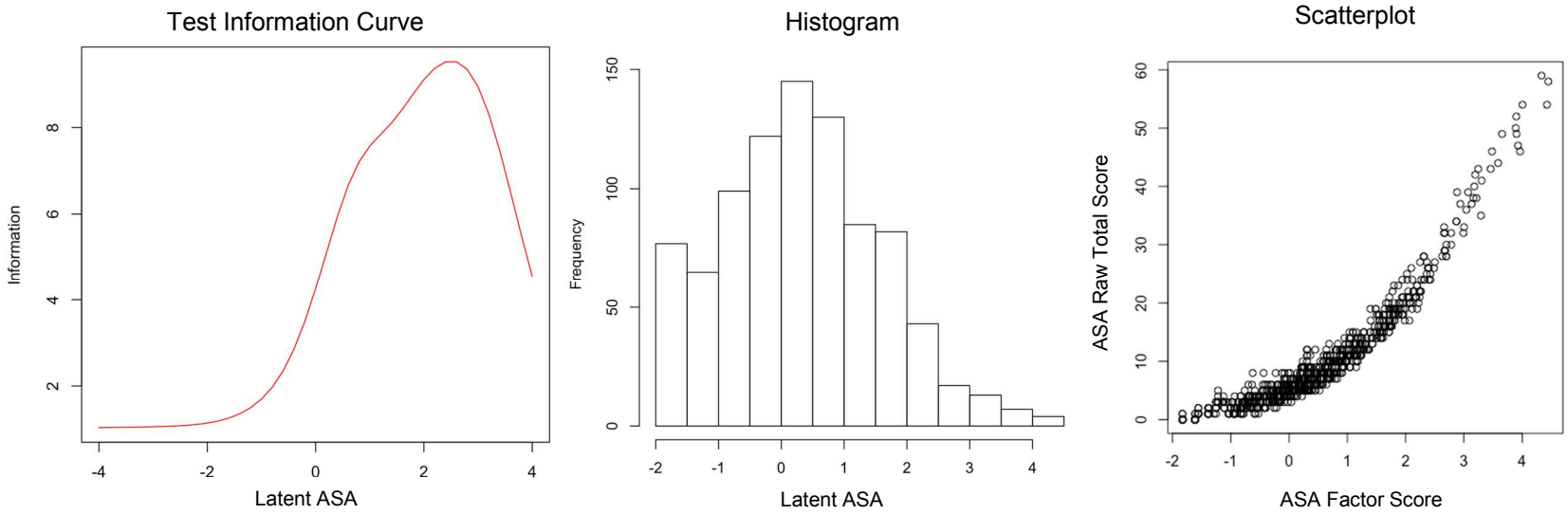
Concurrent and prospective relationships between maternal psychopathology using adult separation anxiety case score and children's separation anxiety, other anxiety, and depression factors



Notes: Solid lines indicate significant paths at $p<.05$. ***$p<.001$; **$p<.01$; *$p<.05$; ^$p<.10$. Dx=diagnosis. M=mother report. F=father report. C=child report. SCARED=Screen for Child Anxiety Related Disorders. CDI=Children's Depression Inventory. Paternal and child diagnoses at age 9 are from lifetime assessments. Child diagnoses at age 12 cover the interval since the last assessment. Covariances between independent variables not shown, nor are covariances between children's psychopathology factors, which were all significant at $p<.001$ (separation anxiety with other anxiety, concurrent model: β=.62; prospective model: β=.63; separation anxiety with depression, concurrent model: β=.32; prospective model: β=.31; other anxiety with depression, concurrent model: β=.59; prospective: β=.67). The residual variances of indicators by the same reporter were permitted to covary, as were the K-SADS indicators.

Figure 8

Test information curve for the ASA-27, histogram of ASA factor scores, and scatterplot of raw v. factor scores for men and women at wave 3



Notes: N=889. ASA=Adult separation anxiety. ASA-27=Adult Separation Anxiety Questionnaire.

Figure 9

Individual and partial information curves for DSM- vs non-DSM-derived items

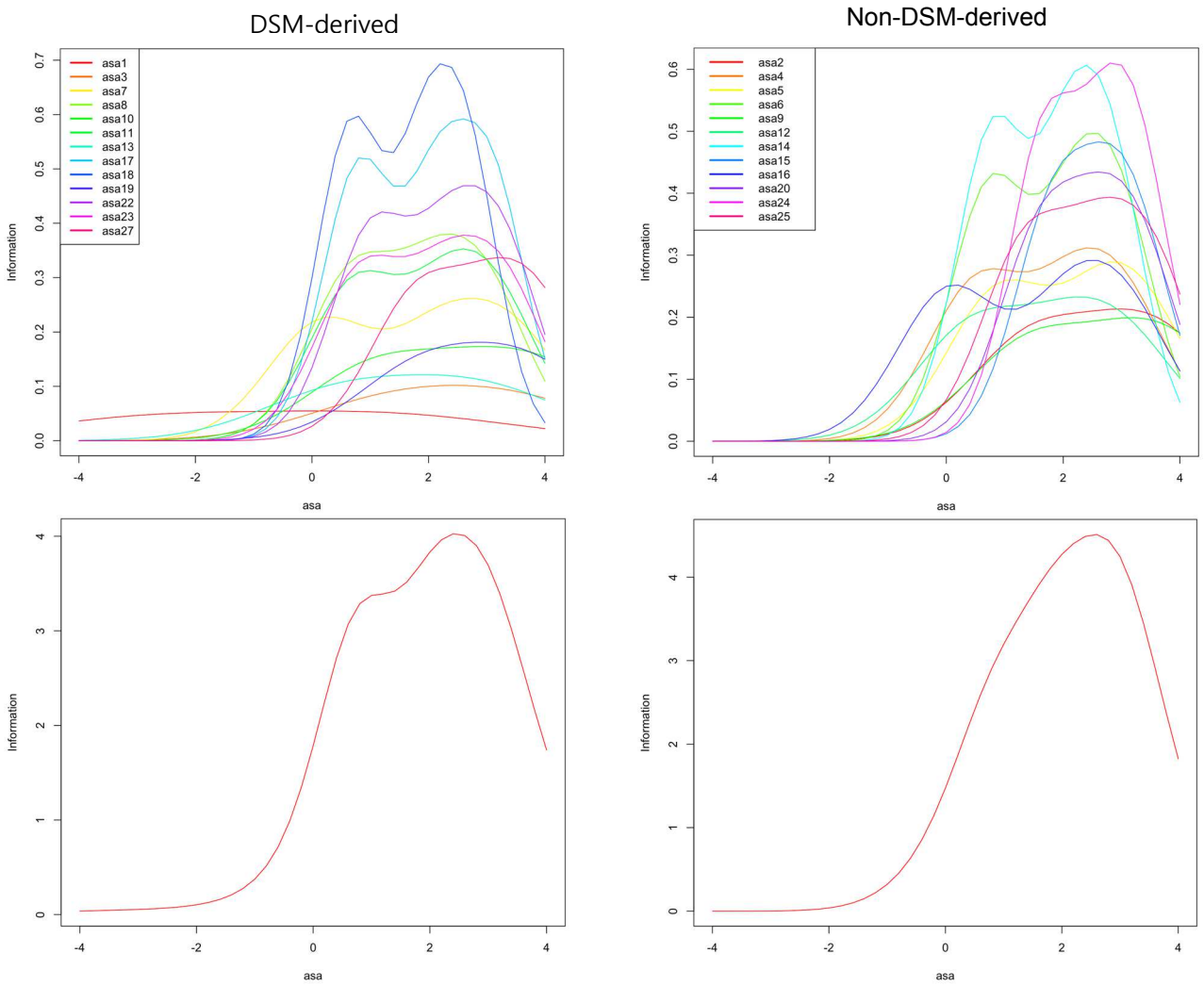


Figure 10

Item characteristic curves for categories 1-4 for DSM-derived items (top row) and non-DSM derived items (bottom row)