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## Disentangling Vulnerabilities from Outcomes: Distinctions between Trait Affect and Depressive Symptoms in Adolescent and Adult Samples

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### Abstract

**Background**—Trait negative affect and trait positive affect are affective vulnerabilities to depressive symptoms in adolescence and adulthood. While trait affect and the state affect characteristic of depressive symptoms are proposed to be theoretically distinct, no studies have established that these constructs are statistically distinct. Therefore, the purpose of the current study was to determine whether the trait affect (e.g. temperament dimensions) that predicts depressive symptoms and the state affect characteristic of depressive symptoms are statistically distinct among early adolescents and adults. We hypothesized that trait negative affect, trait positive affect, and depressive symptoms would represent largely distinct factors in both samples.

**Method**—Participants were 268 early adolescents (53.73% female) and 321 young adults (70.09% female) who completed self-report measures of demographic information, trait affect, and depressive symptoms.

**Results**—Principal axis factoring with oblique rotation for both samples indicated distinct adolescent factor loadings and overlapping adult factor loadings. Confirmatory factor analyses in both samples supported distinct but related relationships between trait NA, trait PA, and depressive symptoms.

**Limitations**—Study limitations include our cross-sectional design that prevented examination of self-reported fluctuations in trait affect and depressive symptoms and the unknown potential effects of self-report biases among adolescents and adults.

**Conclusions**—Findings support existing theoretical distinctions between adolescent constructs but highlight a need to revise or remove items to distinguish measurements of adult trait affect and depressive symptoms. Adolescent trait affect and depressive symptoms are statistically distinct,

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but adult trait affect and depressive symptoms statistically overlap and warrant further consideration.

### Keywords

trait negative affect; trait positive affect; depression; temperament

Trait negative affect (NA) and trait positive affect (PA) are two consistently demonstrated affective vulnerabilities to depressive symptoms in adolescence and adulthood (1, 2, 3). Although depressive symptoms are characterized by an excess of state NA and lack of state PA, trait levels of affect are considered to be theoretically distinct from the state affect symptoms of depressive symptoms (4). Theories on affective vulnerabilities to depressive symptoms (1, 5) propose that high NA and low PA uniquely predict depressive symptoms, but significant correlations between measures of trait affect and depressive symptoms suggest that researchers may be measuring the same affective phenomenon but labeling overlapping components of this phenomenon as orthogonal predictors and outcomes (6, 7). While trait affect and the state affect characteristic of depressive symptoms are proposed to be theoretically distinct, no studies have established that these constructs are statistically distinct. The purpose of the current study was to examine the shared and unique variance contributed by commonly used self-report measures of trait affect and depressive symptoms among early adolescents and adults. To this end, we conducted Principal Axis Factoring (PAF) and Confirmatory Factor Analyses (CFA) to examine the Early Adolescent Temperament Questionnaire, Revised (EATQ-R; 8) and the Children's Depression Inventory, Second Edition (CDI-II; 9) among a sample of early adolescents (ages 9–14) as well as the Adult Temperament Questionnaire (ATQ; 5) and Center for Epidemiologic Studies Depression Scale (CES-D; 10) among a sample of adults (ages 18 to 41). The EATQ-R and ATQ are derived from the same research group and theoretical view of temperament, so their proposed factor structures are similar (5, 8).

### Theory on Trait Affect and Depressive Symptoms

All individuals are born with inherited affective dispositions that interact with environmental circumstances to form temperamental traits beginning very early in life (11, 12). According to Rothbart (13), temperament is a combination of genetic and environmental factors that provide the foundation for an individual's unique personality. The primary components of temperamental affect are NA and PA, which collectively describe an individual's degree of emotional reactivity across situations and predispose individuals to certain mental health outcomes, including depressive symptoms (1, 14). As dimensions of temperament, therefore, NA and PA may be considered the foundation of personality factors (13, 15, 16). NA describes an individual's tendency to experience intense and frequent negative emotions and represents a temperamental precursor to the personality factor of Neuroticism, which may be defined as a person's degree of negative emotional experiences across time and situations (17). Relatedly, PA describes an individual's tendency to experience intense and frequent activity, pleasure, and positive anticipation of the future (14) and may be considered a temperamental precursor to the personality factor of Extraversion/Surgency, which may be

defined as a person's degree of positive emotions, interpersonal warmth and approach tendencies, and novelty seeking activities (17).

While it is difficult to conceptually disentangle high NA and low PA from depressive symptoms, the primary distinction is that trait affect represents the emotional reactivity of temperament, which is strongly founded in inherited tendencies and remains largely stable across time and situations (5). While depressive symptoms may persist across many years for some individuals (18, pp. 155–188), depressive symptoms do not present as lifelong tendencies beginning at birth and are not considered a core element of temperament. Despite the discrete and episodic nature of many depressive symptom presentations, research has found that a significant portion of depressive symptoms in adolescence and adulthood may be represented as trait-like tendencies that remain fairly stable across time (19, 20, 21). However, research also supports the distinct contributions of NA and PA in predicting future depressive symptoms, even after controlling for current depressive symptoms (2, 22, 23). In further support of the conceptual distinctions between trait affect and depressive symptoms, the tripartite model of depression and anxiety (1) asserts that low PA and high NA differentially predict depressive symptoms, with high NA predicting both depression and anxiety while low PA is unique to depression. From this theoretical perspective, depression is both characterized by and predicted by a combination of high NA and low PA. However, individuals high in NA and low in PA do not always develop depressive symptoms, suggesting that the constructs are not entirely overlapping (1, 24).

While there is substantial stability in depressive symptoms over time in adolescence and adulthood to support trait-like vulnerability, rates of clinically significant depressive symptoms are considerably lower in adolescence compared to adulthood (25, 26). These developmental differences in depression prevalence are likely due to complex and constantly shifting differences between adolescent and adult populations that cannot be fully addressed by the scope of our work, including pubertal changes in the transition to adulthood (27, 28) and an individual's negative cognitive style, which demonstrates distinct trajectories across adolescence that are impacted by factors including maternal parenting and cognitive style, biological sex, and temperament (29). Given the roles of high NA and low PA in consolidating risk to depression from adolescence into adulthood, we examined the relationships between trait affect and depressive symptoms among a sample of adolescents and a sample of young adults to (a) compare developmental periods of lower versus higher vulnerability to depressive symptoms and (b) examine whether NA and PA represented distinct constructs from the trait-like qualities of depressive symptoms.

## Factor Structure of Trait Affect and Depressive Symptoms

To investigate the statistical overlap of trait affect and depressive symptoms measures, we examined questionnaires of the constructs that are commonly used in adolescent and adult studies. For adolescents, we examined the EATQ-R self-report for trait affect and the CDI-II self-report for depressive symptoms. For adults, we examined the ATQ for trait affect and the CES-D for depressive symptoms.

## EATQ-R

The EATQ-R was recently factor analyzed as measuring the distinct constructs of Negative Emotionality, Positive Emotionality, and Effortful Control (30), which was supported by Rothbart's model of temperament. Previous studies similarly supported Rothbart's model through the latent factor structure of the original EATQ (31), although earlier research divided Positive Emotionality into Surgency and Affiliativeness (8). The original EATQ-R publication also labeled low levels of Shyness and low levels of Fear under the Surgency superscale, even though future researchers grouped Shyness and Fear under Negative Emotionality (30). The original EATQ-R publication contained a Depressed Mood measure that included items assessing sadness and happiness, but these items were designated as separate from trait affect and not included as a temperament scale. In order to distinguish temperament items from depressed mood items, therefore, the EATQ-R contains no NA items that reference sadness and no PA items that reference happiness or pleasure. The EATQ-R has demonstrated strong internal consistency and reliability (32).

## CDI-II

Four scales are identified for the CDI-II (Negative Mood/Physical Symptoms, Negative Self-Esteem, Interpersonal Problems, and Ineffectiveness; 9) that are similar to the original CDI five factor model, which is more extensively researched due to its longer lifespan in the literature (Anhedonia, Negative Mood, Negative Self-Esteem, Interpersonal Problems, and Ineffectiveness; 33). Factor analyses of the CDI in child and adolescent community samples indicated five factors (Externalizing, Dysphoria, Self-Deprecation, School Problems, and Social Problems) for children and an additional sixth factor for adolescents (Biological Dysregulation) contained within the higher order factors of Internalizing and Externalizing symptoms (34, 35). The CDI was able to distinguish children and adolescents with and without depressive disorder diagnoses (36) and demonstrated similar factor structures for European and African American youth despite varying item correlations across factors (37). However, no study has examined the latent factor structure of the CDI-II independently from the Kovacs CDI literature or compared item correlations with measures of trait affect, such as the EATQ-R.

## ATQ

As an adult version of the EATQ-R, factor analysis of the ATQ indicated a five factor model (Orienting Sensitivity, Effortful Control, Extraversion, Affiliativeness, and NA) with NA divided into aggressive and non-aggressive NA in some samples (5). As a follow-up factor analysis, a higher-order two factor model was identified with the first factor comprising Extraversion/Positive Emotionality, Orienting Sensitivity, and Affiliativeness, and the second factor comprising NA and Effortful Control (38). NA and PA are proposed to be theoretically and statistically distinct; however, literature indicates significant conceptual overlap and statistical correlation between both ATQ scales of trait affect (5, 38). The ATQ factor structure also contains several items with language common on measures of depressive symptoms, such as "Sometimes I feel very depressed" in the NA Sadness scale and "I rarely feel happy" in the PA scale. Despite considerable language overlap at the item

level, however, no studies have compared the ATQ with a measure of depressive symptoms such as the CES-D.

## CES-D

Radloff (10) originally proposed a four factor model for the CES-D (Depressed Affect, PA, Somatic and Retarded Activity, and Interpersonal) that has been supported in community and clinical adult samples (39, 40, 41). However, more recent evaluation of the four factor model proposed that a two factor model of NA and PA offered a more parsimonious factor structure, since the original four factor model demonstrated superior fit largely due to its ability to account for the residual covariance of the four reverse-coded items (42). Research similarly supported a two factor model of NA and PA among alternative versions of the CES-D (43), which prompted our proposed objective to disentangle the measurement of affective vulnerabilities to depression from the affective symptoms of depression.

## Current Study

The current study sought to disentangle affective vulnerabilities to depression from depressive symptoms to examine whether the statistical relationships between measurement items mapped onto the intended theoretical constructs. We hypothesized that NA, PA, and depressive symptoms would represent largely distinct factors in both samples. This distinction would be indicated by separate construct measurements (i.e., NA, PA, and depressive symptoms) loading onto distinct factors through PAF. We also hypothesized that adolescent trait affect and depressive symptoms would be more statistically distinct than the adult constructs, given the intentional exclusion of depressed mood items in the EATQ-R. We then examined the model fit of various representations of the factors through CFA, and we hypothesized that factor relationships would be best represented as distinct but related constructs (Model 1) and models representing the adolescent and adult PAF results (Models 5–6) would improve model fit compared to Model 1.

## Method

### Participants

**Adolescent sample**—Participants were 268 (53.73% female) early adolescents recruited from middle schools in the Pacific Northwest who were 9 to 14 years old ( $M=12.02$ ,  $SD=0.82$ ). Approximately 58.96% of the participants were Caucasian, 1.12% were African American, 4.48% were Asian American, 1.87% were Hispanic/Latino American, and 8.21% identified as another or multiple cultural backgrounds.

**Adult sample**—Adult participants were 371 (70.09% female) undergraduate students recruited from a university in the Pacific Northwest who were 18–41 years old ( $M=19.05$ ,  $SD=2.04$  years). Approximately 69.54% of participants were Caucasian, 3.77% were African American, 15.36% were Asian American, 0.54% were Native American, 5.39% were Hispanic/Latino American, and 5.39% identified as another or multiple cultural backgrounds.

## Procedure

**Adolescent sample**—Adolescent participants were recruited from middle schools across two academic years to complete a pen-and-paper administered questionnaire that included measures of demographic information, trait affect, and depressive symptoms. Participants received a \$5 gift card as compensation.

**Adult sample**—Adult participants were recruited from undergraduate psychology courses across two academic years to complete an electronically administered questionnaire that included measures of demographic information, trait affect, and depressive symptoms. Participants received course research credit as compensation.

## Measures

**Adolescent NA**—NA was measured with the 22-item EATQ-R NA superscale (8) intended for community and clinical populations ages 9–15 years. The NA superscale is comprised of three subscales: Fear, Frustration, and Shyness. Responses ranged from 1 (almost always untrue of you) to 5 (almost always true of you) for items such as “I feel scared when I enter darkened room at home” and “It really annoys me to wait in long lines.” Higher scores indicated greater NA, and three items were reverse-coded. Cronbach’s alpha coefficients for the NA superscale ranged from .65 to .80 in community samples (8) and .83 in our sample.

**Adolescent PA**—PA was measured with the 11-item High Intensity Pleasure scale of the Surgency superscale (8) intended for community and clinical populations ages 9–15 years. Responses ranged from 1 (almost always untrue of you) to 5 (almost always true of you) for items such as “I find the idea of driving a race car exciting” and “I prefer friends who are exciting and unpredictable.” Higher scores indicated greater PA, and three items were reverse-coded. Cronbach’s alpha coefficients for the High Intensity Pleasure scale ranged from .71 to .77 in community samples (8, 44) and .75 in our sample.

**Adolescent depressive symptoms**—Adolescent depressive symptoms over the past two weeks were measured with the 28-item CDI-II (9) intended for community and clinical populations ages 7–17 years. The CDI-II is comprised of four subscales: negative mood, negative self-esteem, ineffectiveness, and interpersonal problems. Responses ranged from 0 (absence of symptoms) to 2 (definite symptoms) for statements such as “I am sad once in a while,” “I am sad many times,” and “I am sad all the time.” Higher scores indicated more severe depressive symptoms, and 14 items were reverse-coded. The CDI demonstrated strong internal consistency in community and clinical populations with Cronbach’s alpha coefficients ranging from .80 to .94 (45, 46). The CDI-II alpha was .88 in our sample.

**Adulthood NA**—NA was measured with the 51-item NA superscale (5) intended for community adult populations. The NA superscale is comprised of four subscales: Fear, Sadness, Discomfort, and Frustration. Responses ranged from 1 (extremely untrue of you) to 7 (extremely true of you) for items such as, “I become easily frightened” and “I am rarely a patient person.” Higher scores indicated greater NA, and 15 items were reverse-coded.

Cronbach's alpha coefficients for the four scales that comprise the NA superscale ranged from .76 to .86 in community samples and .88 in our sample.

**Adulthood PA**—PA was measured with the 11-item PA scale within the larger dimension of Extraversion/Surgency (5) that is intended for community adult populations. Responses ranged from 1 (extremely untrue of you) to 7 (extremely true of you) for items such as, "I rarely feel happy" and "When I don't feel unhappy, I usually feel happy instead of neutral." Higher scores indicated greater PA, and four items were reverse-coded. Cronbach's alpha coefficients for the Extraversion/Surgency superscale that measures PA was reported as .84 in a community sample and .81 in our sample.

**Adulthood depressive symptoms**—Adult depressive symptoms over the past week were measured with the 20-item CES-D (10) intended for community and clinical adult populations. Responses ranged from 0 (rarely or none of the time) to 3 (most or all of the time) for items such as, "I was bothered by things that usually don't bother me" and "I felt hopeful about the future." Higher scores indicated more severe depressive symptoms, and four items were reverse-coded. Cronbach's alpha coefficients for the CES-D were reported as .85 in a community sample and .88 in our sample.

### Data Analytic Plan

Data were multiply imputed for adolescent and adult samples for missingness percentages of 1.46% and 0.57%, respectively. Adult data were missing completely at random as indicated by Little's MCAR test (adult  $\chi^2[3116]=3041.18$ ,  $p=.828$ ), but adolescent data were missing non-randomly (adolescent  $\chi^2[2115]=2485.33$ ,  $p<.001$ ) due to the attrition of 8/268 participants on the final 2–8 items of the trait affect measure. We conducted one joint analysis of the EATQ-R and CDI-II items simultaneously and two joint analyses of the ATQ and CES-D items using PAF with oblique rotation to examine item overlap based on the recommendations of Gorsuch (47). We then conducted CFA in the adolescent and adult samples to determine whether statistical modeling of trait affect (i.e., EATQ-R and ATQ) and depressive symptoms (i.e., CDI-II and CES-D) best fit the data through modeling NA, PA, and depressive symptoms.

PAF creates an item correlation matrix with estimates of communality (i.e., the proportion of variance in each measured item shared with other items), which are grouped into factors based on item correlations (48). Oblique factor rotation allows the factors produced to correlate, which is desired since we propose that trait affect and depression items measure related constructs (49). To determine whether an item loaded onto a factor, we identified item correlations equal to or greater than  $|.4|$  as significant (50). To determine the number of factors to extract across the first EATQ-R and CDI-II analysis and the second ATQ and CES-D analysis, we utilized the combined rules of examining the number of eigenvalues greater than one, only including factors with three or greater significant item loadings, evaluating the scree plot for value flattening, and considering a priori theory.

We also conducted CFA for the adolescent and adult samples using Structural Equation Modeling (SEM) in AMOS 23.0 to examine whether our PAF best represented the relationships between trait affect and depressive symptoms through five adolescent model

comparisons and six adult model comparisons (51, pp. 53–95). To our knowledge, no existing publications compare adolescent and adult measures of trait affect and depressive symptoms through PAF and CFA. The CFA extends the PAF by examining (a) whether the theoretically-supported models or the PAF-supported models represent a good fit to the data and (b) to what extent the PAF-supported models represented a superior model fit compared to the theoretically-supported models.

For each sample we separately compared nested models to determine which model best represented the data. Model 1 represented NA, PA, and depressive symptoms freely covaried; Model 2 was identical to Model 1 with covariances fixed to 0; Model 3 also was identical with covariances fixed to 1; and Model 4 was identical with covariances fixed to the values of the other sample (i.e., adolescent Model 4 covariance values fixed to the values of the freely covaried adult sample and vice versa). These nested models examined whether the factor relationships were best represented as distinct but related (Model 1), independent (Model 2), the same constructs (Model 3), or identical to the other sample if relationships were allowed to freely vary (Model 4). Model 5 represented the factors from the PAF, and the adult CFA additionally compared a Model 6 that represented the revised PAF.

Several CFA model fit indices were referenced to interpret model goodness of fit. We first examined  $\chi^2$  values between models to determine which models were significantly closest to 0 after accounting for degrees of freedom. We then examined the Comparative Fit Index (CFI; 95 or above indicates good model fit, .90 or above indicates adequate model fit; 52). The Root Mean Square Error of Approximation also was examined to determine model fit (RMSEA; .08 or less indicates reasonable model fit; 53). Lastly, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were examined, with lower values associated with improved model fit. Adolescent Model 5 and adult Models 5 and 6 were not nested with Model 1, so only the AIC and BIC values were compared for model fit.

## Results

Several metrics were calculated to establish that our data were suitable for analysis. First, all anti-image matrix values were equal to or greater than .5 on the diagonal, which indicated that there was sufficient common variance between items to allow PAF. Second, the Kaiser-Meyer-Olkin Measure of Sample Adequacy was greater than .5 (adolescent PAF=.79; adult PAF=.86; adult revised PAF=.80), which indicates that the partial correlations between items were small. Finally, Bartlett's Test of Sphericity was significant (adolescent PAF  $\chi^2[1830]=5466.11$ ,  $p<.001$ ; adult PAF  $\chi^2[3321]=11397.89$ ,  $p<.001$ ; adult revised PAF  $\chi^2[2485]=8098.49$ ,  $p<.001$ ), which indicated that item correlations differed significantly from zero and contained sufficient covariance. The R-determinants approached zero for both samples, which did not compromise analyses according to Field (54) and was anticipated due to hypothesized item overlap between measures. Table 1 provides adolescent and adult intercorrelations, which were calculated by computing mean scores for all variables and calculating correlations between variables.



### Adolescent Sample: EATQ-R and CDI-II PAF

Three factors were identified for the adolescent sample. Eigenvalues were above one for 18 factors, and three factors demonstrated at least three significant and distinct item loadings. Scree plot patterns indicated that values significantly dropped after three factors and a priori theory supported a three factor model (NA, PA, and depressive symptoms). Factor 1 exclusively represented CDI-II depressive symptoms. Factor 2 represented PA items of the EATQ-R and Shyness items from the EATQ-R NA superscale. Factor 3 represented the Fear and Frustration items of the NA superscale (Table 2). Adolescent depressive symptoms distinctly loaded on a separate factor from trait affect, demonstrating no double factor loadings with trait affect factors. Taken together, the distinct loading of CDI-II items onto a single factor supports statistical discrimination between the constructs of trait affect and depressive symptoms.

### Adult Sample: ATQ and CES-D PAF

Three factors were identified for the adult sample. Eigenvalues were above one for 23 factors, three factors demonstrated at least three significant and distinct item loadings, scree plot patterns indicated that values significantly dropped after three factors, and a priori theory indicated three factors (NA, PA, and depressive symptoms). Factor 1 represented CES-D depressive symptoms, NA Sadness items, and PA items. Factor 2 represented NA Fear and Frustration items. Factor 3 largely represented the impact of events on NA and PA (Table 3). Despite the clear loading of depressive symptoms on a single factor, there was substantial overlap across factors with four double loadings.

### Adult Sample: Revised ATQ and CES-D PAF

Due to the considerable shared variance between trait affect and depressive symptoms, we further examined item-level relationships between the ATQ and CES-D to determine how to better disentangle the measurements of NA, PA, and depressive symptoms among adults. Since the ATQ does not contain a distinct Depressed Mood scale to parallel the EATQ-R structure (8), we examined correlations between the ATQ items and CES-D scale to determine which ATQ items significantly overlapped in content with depressive symptoms. We used the same criterion of significance as our PAF to determine whether an item significantly loaded onto the CES-D, which identified item correlations equal to or greater than  $|.4|$  as significant (50). This technique resulted in the removal of 11 ATQ items (7 Sadness and 4 PA items; Table 4).

Of the 7 Sadness items excluded, 4 items contained “depressed” or “depression,” and the remaining 3 items referenced sadness lasting for a long duration but did not reference sadness in response to a specific event. The remaining non-excluded Sadness items also contained “sad” or “sadness,” but all non-excluded items were in reference to specific events and not did describe sadness as lasting a long duration. For example, the excluded item “I often feel sad” is not event-specific and references duration, while the non-excluded item “I feel sad when saying goodbye to friends or relatives whom I know I will not see for a long time” is event-specific and does not reference duration. Hence, the strong overlap between Sadness items and depressive symptoms items may be due to the inclusion of “depressed” or

“depression” in the item content and a similar content reference to experiencing sadness that persists without reference to a specific event.

Of the 4 PA items excluded, all 4 items referenced limited positive emotion, and even after reverse-scoring these items demonstrated the highest loadings with the CES-D. These items may represent anhedonia, so individuals higher in depressive symptoms may relate more strongly to a PA item such as “It takes a lot to make me feel truly happy” compared to a PA item such as, “It doesn’t take much to evoke a happy response in me,” even though both of these items contain the word “happy.” Hence, the strong overlap between certain PA items and depressive symptoms items may be due to item phrasing. All excluded items were boldened and italicized in Table 4 to compare the item content between the excluded and non-excluded items.

Three factors were identified for the adult sample. Eigenvalues were above one for 22 factors, three factors demonstrated at least three significant and distinct item loadings, scree plot patterns indicated that values significantly dropped after three factors, and a priori theory indicated three factors (NA, PA, and depressive symptoms). Factor 1 represented CES-D depressive symptoms with 1 Sadness item, 1 Discomfort item, and 1 PA item. Factor 2 represented NA Fear, Frustration, and Discomfort items. Factor 3 represented Sadness and PA items (Table 4). Only two double loadings occurred of trait affect items and depressive symptoms, which was two fewer than the original adult PAF. In addition, only three trait affect items loaded on Factor 1 containing depressive symptoms, which represented a significant improvement compared to the 15 items that loaded onto the factor with depressive symptoms in the original PAF that did not exclude overlapping ATQ items (Tables 3 and 4).

### **Adolescent Sample: EATQ-R and CDI-II CFA**

Adolescent covariances between NA and PA as well as NA and depressive symptoms were in the expected directions for Model 1, which represented distinct factors for NA, PA, and depressive symptoms. The lack of a covariance between adolescent PA and depressive symptoms may be attributable to limited scope of the adolescent PA items, which is further examined in the discussion. Across model fit indices, Model 1 demonstrated superior model fit compared to Models 2–4, which were nested within this factor structure and differed only in covariance values. RMSEA values for all models supported goodness of fit. However, the RMSEA independence models were less than 0.158 for all models, which produced lower values of the CFI that should not be interpreted regarding adequacy of model fit (55). Model 5 was not nested with Model 1 to allow  $\chi^2$  difference comparison, but Model 5 AIC and BIC indicated slightly superior model fit for Model 5 over Model 1, and the  $\chi^2$  value was significantly lower for Model 5 compared to Model 1. Overall, Model 1 demonstrated the best model fit and was very similar to Model 5 model fit indices given their almost identical factor structure (only 3 items differed in factor loading across Models 1 and 5; Table 5).

### **Adult Sample: ATQ and CES-D CFA**

Adult covariances between NA, PA, and depressive symptoms were in the expected directions for Model 1, which represented distinct factors for NA, PA, and depressive

symptoms. The adolescent and adult covariances between NA and depressive symptoms were identical at .15, which supports a similar relationship between NA and depressive symptoms across this developmental period. Across model fit indices, Model 1 demonstrated superior model fit compared to Models 2–4, which were nested within this factor structure and differed only in covariance values. RMSEA values for all models supported goodness of fit. However, the RMSEA independence models were less than 0.158 for all models, which produced lower values of the CFI that should not be interpreted regarding adequacy of model fit (55). Models 5 and 6 were not nested with Model 1 to allow comparison, but Model 5 AIC and BIC values indicated slightly superior model fit for Model 5 over Model 1, and the  $\chi^2$  value was significantly lower for Model 5 compared to Model 1. Notably, Model 6 AIC and BIC values indicated a considerably superior model fit compared to Model 1, and the  $\chi^2$  value was significantly lower for Model 6 compared to Model 1. Model 1 demonstrated the best model fit among the nested model comparisons (i.e., Models 1–4), but Model 6 demonstrated the best model fit indices and fit considerably better than Model 1 based on  $\chi^2$ , AIC, and BIC values (Table 5).

## Discussion

Our study examined affective vulnerabilities to depression and depressive symptoms to determine whether the statistical relationships between measurement items supported distinct theoretical constructs. Consistent with a priori theories, the adolescent and adult samples both produced three factor PAF models. The adolescent sample supported clear statistical distinctions between NA, PA, and depressive symptoms, while the adult sample indicated considerable statistical overlap between NA Sadness, PA, and depressive symptoms. While adolescent Model 1 (theoretically-supported factor structure) and Model 5 (statistically-supported factor structure) were nearly identical in model fit, the corresponding adult Models 1 and 5 more drastically differed in model fit values. In addition, adult Model 6 (revised PAF factor structure) demonstrated a significant improvement in model fit compared to Models 1 and 5. In sum, our PAF hypotheses were supported for distinct adolescent and adult factor structures between NA, PA, and depressive symptoms, with greater item content overlap demonstrated among adults. Additionally, our CFA hypotheses were supported that factor relationships would be best represented as distinct but related constructs (Model 1) and that our PAF models (Models 5–6) would improve model fit compared to Model 1.

There are several potential explanations for the distinct factor structure of the adolescent sample compared to the overlapping factor structure of the adult sample. One explanation is that the language distinctions of the EATQ-R and CDI-II ensured distinct construct measurement while the language similarities of the ATQ and CES-D resulted in overlap. The EATQ-R separated items referencing depression, sadness, happiness, and pleasure as a distinct scale labeled Depressed Mood. However, the ATQ did not omit depressive language and includes numerous items that are similar or nearly identical to CES-D items (e.g., the ATQ reverse-scored item “I rarely feel happy” and the CES-D item “I was happy”). Consequently, our removal of ATQ items that demonstrated significant loadings with the CES-D significantly improved factor distinctions between adult trait affect and depressive symptoms. This language overlap may explain the statistical overlap in ATQ-CES-D factor

loadings and indicate a need for the ATQ to revise or omit certain items that share language with measures of depressive symptoms. Another explanation is that fewer adolescents may have experienced clinically significant depressive symptoms compared to the adult sample, so there was less adolescent endorsement of depressive symptoms. While depressive symptoms exist on a continuum of severity, greater time to experience stress and subsequent depressive symptoms among adults may complicate the relationships between trait affect and depression.

Our study supports the tripartite model in asserting that NA and PA are distinct constructs from the depressive symptoms that they uniquely predict (1, 30), which was previously uninvestigated in adolescent and adult samples. These distinctions were demonstrated in our adolescent sample through the EATQ-R and CDI-II loading onto distinct factors, which supports the use of the EATQ-R and CDI-II as measuring distinct predictors and outcomes. These distinctions were also partially supported in our adult sample, although considerable statistical overlap in ATQ and CES-D items indicated a need to revise and potentially omit similar item content across instruments. Second, our adolescent factor structure supports the grouping of Shyness with Surgency rather than NA, which is a division that lacks consensus in the literature (30) but is supported by the original EATQ-R publication (8, 30). Third, findings supported distinctions between trait affect and depressive symptoms by demonstrating that not all individuals with combined high NA and low PA develop depressive symptoms, which would occur if trait affect and depressive symptoms were statistically equivalent constructs. Rather, a consolidation of risk was observed, with a combination of high NA and low PA more strongly predicting depressive symptoms in adulthood compared to adolescence. Specifically, 13.79% of our adolescent sample that reported high NA (top 25%) and low PA (bottom 25%) reported clinically significant depressive symptoms. Using the same cutoffs, 73.17% of our adult sample reported clinically significant depressive symptoms, which indicates a considerable consolidation of trait risk in the transition to adulthood.

### Limitations and Future Directions

One limitation is that our study was cross-sectional, which prevented examination of self-reported fluctuations in trait affect and depressive symptoms. As a result, it is recommended that future studies include multiple reports of trait and state to determine to what extent participant reports of trait affect and state affect are correlated across time. In addition, our results were specific to the EATQ-R, ATQ, CDI-II, and CES-D instruments. As a result, the generalizability of our findings may be limited to these instruments and research is needed with alternative measurements of trait affect and depressive symptoms to more firmly support our conclusions. Third, it is unknown to what extent differences between adolescent and adult samples demonstrate differences in self-reporting between age groups. In particular, developmental differences between our samples may contribute to observed differences in the EATQ-R and ATQ factor structures, since early adolescence is a period of lower vulnerability to depressive symptoms while adulthood in university settings is a period of higher vulnerability (25, 26).

As a third limitation, it is unknown to what extent differences between adolescent and adult samples demonstrate differences in self-reporting between age groups. Previous research discusses social desirability and similar response biases that result in self-report measurement error (56, 57), but we found no publications that compared adolescent and adult self-report biases. The language similarities between the ATQ and CES-D among adults support statistical overlap due to similar wording across measures, but future research is needed to understand differences in how adolescents and adults may distinctly self-report information.

Lastly, the EATQ-R PA items used in this study may provide a restricted measure of PA that captures the degree of intense positive experiences and pleasurable novel experiences, whereas the ATQ PA items encompass everyday experiences of pleasure that may be more representative of PA and more accurately predict the anhedonia characteristic of depressive symptoms. While the High Intensity Pleasure subscale of the EATQ-R provides a more limited measure of PA, pleasure derived from intense and novel positive experiences relates to the anhedonia characteristic of depression (58, 59). Anhedonia has been conceptualized as a multidimensional construct consisting of disruptions in wanting, liking, and learning processes related to pleasurable or rewarding stimuli (60, 61), and reduced effort or motivation to engage in rewarding stimuli is a core symptom of depressive disorders (61, 62). We also acknowledge that these distinct item measurements of PA may partially explain differences in the factor structures of our adolescent and adult samples. To address this limited view of PA in future studies, we invite researchers to include a broader spectrum of items to measure PA for adolescents and adults.

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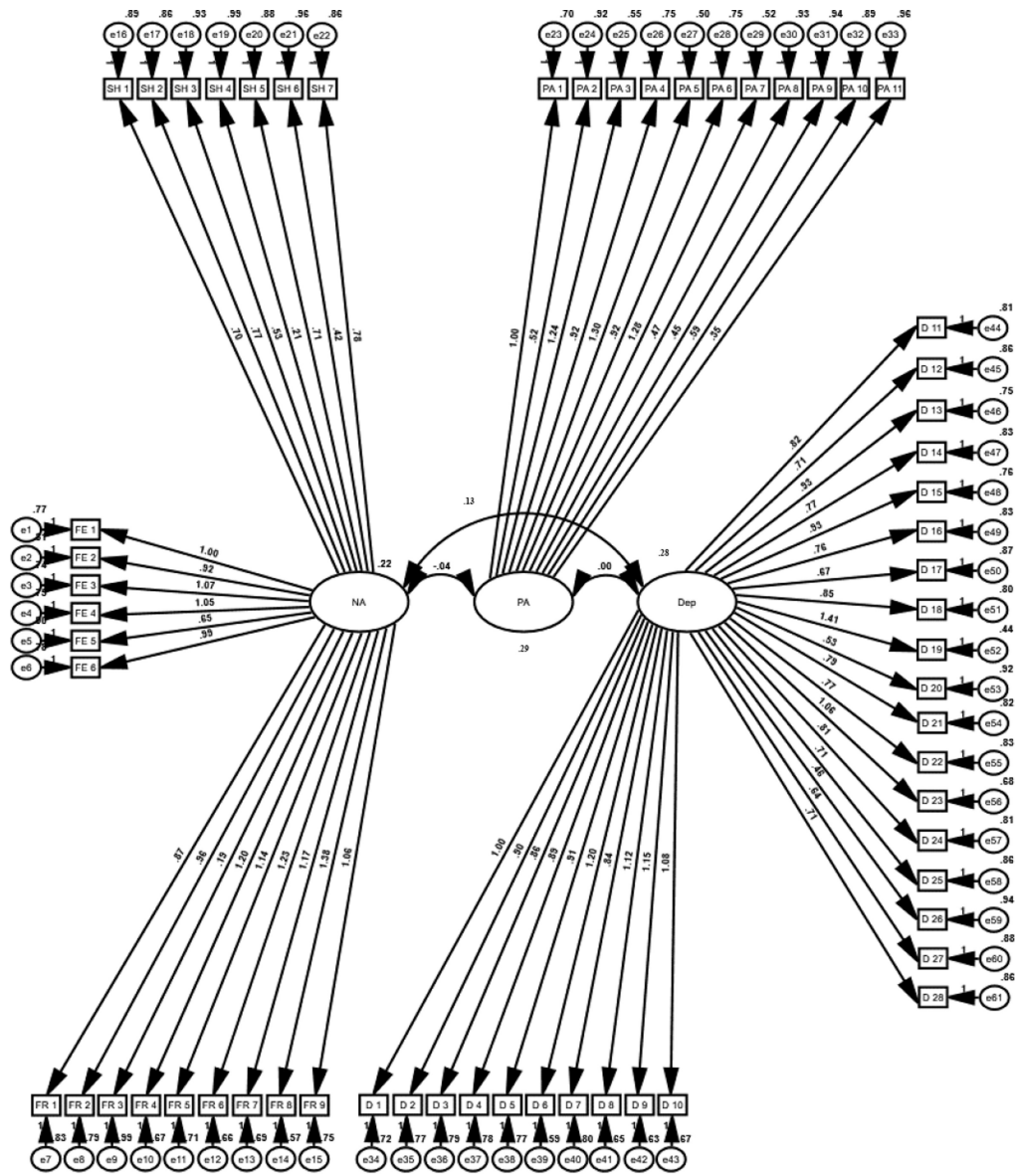
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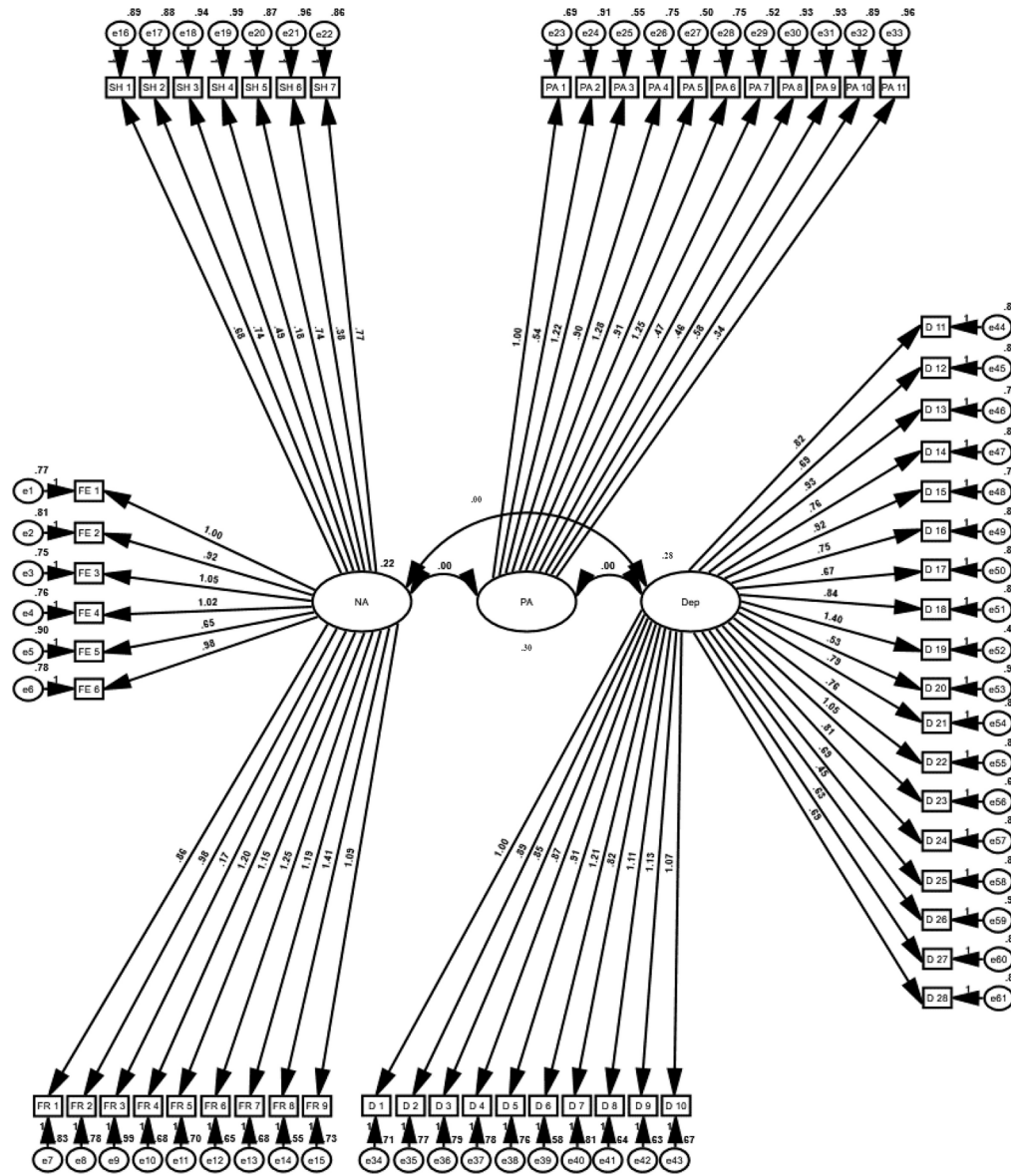


### Highlights

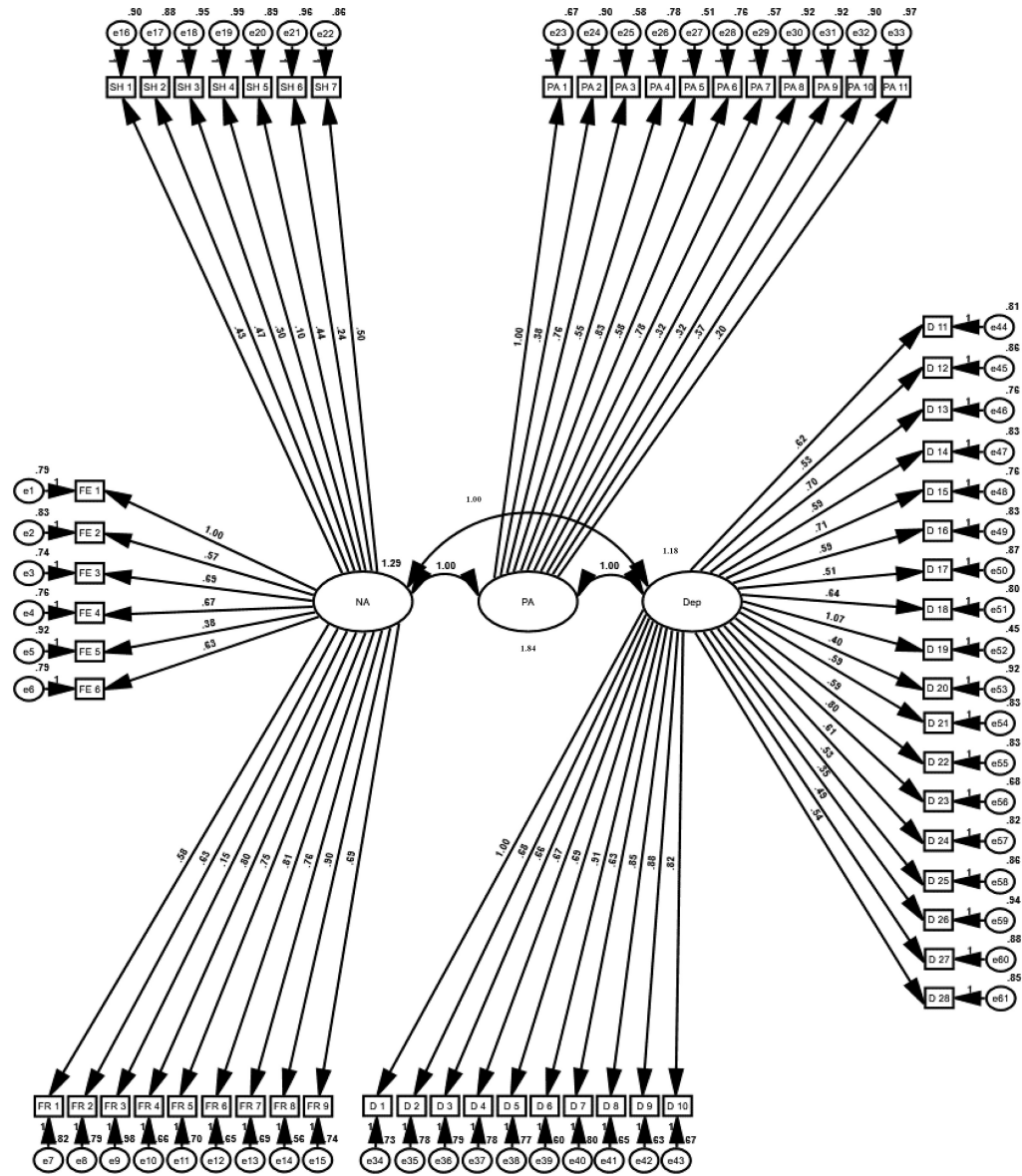
1. We examined whether trait affect and depression are distinct constructs.
2. Adolescent trait affect and depressive symptoms are statistically distinct.
3. Adult trait affect and depressive symptoms demonstrated some statistical overlap.
4. We recommend ATQ revisions to distinguish adult trait affect from depression.



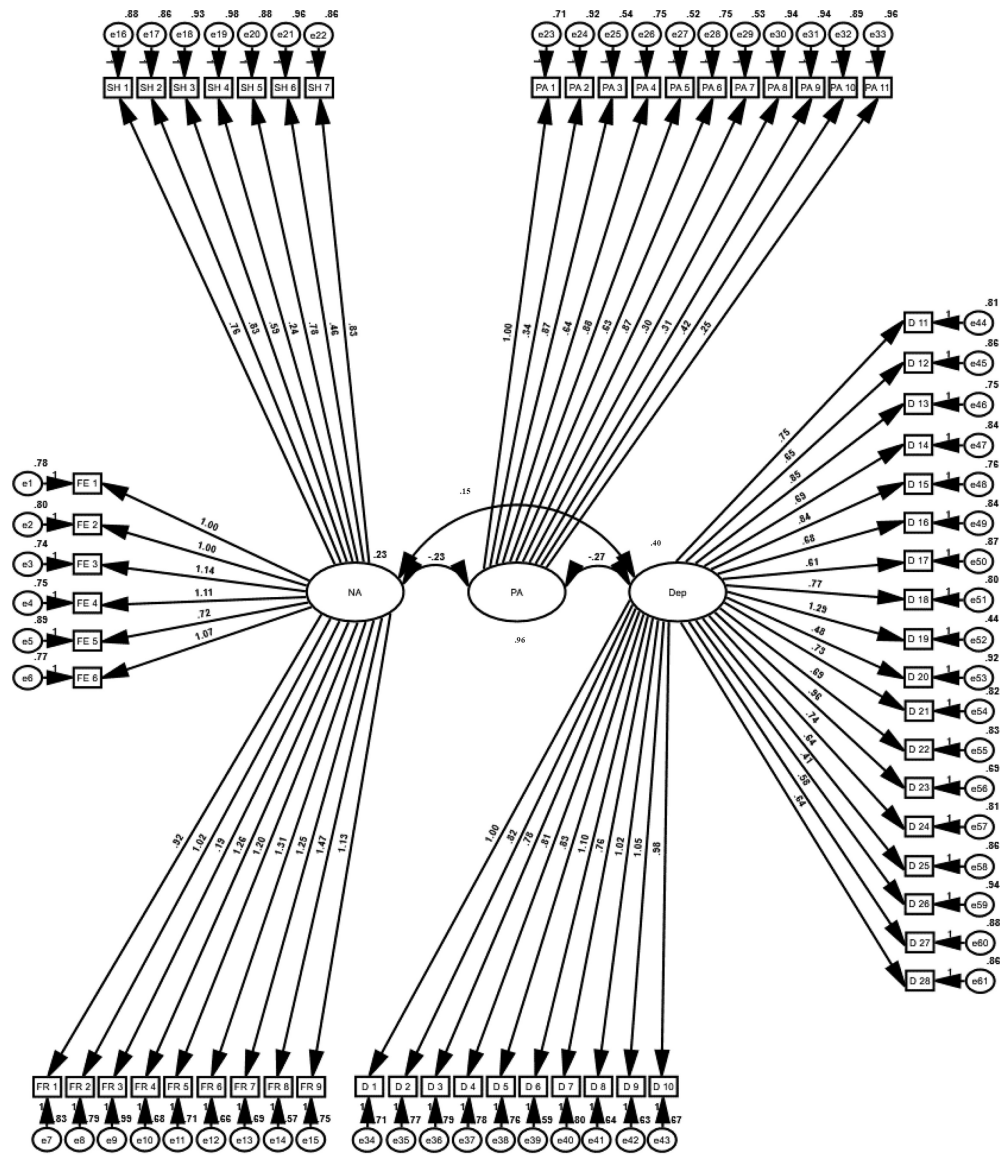
a. Adolescent CFA model 1.



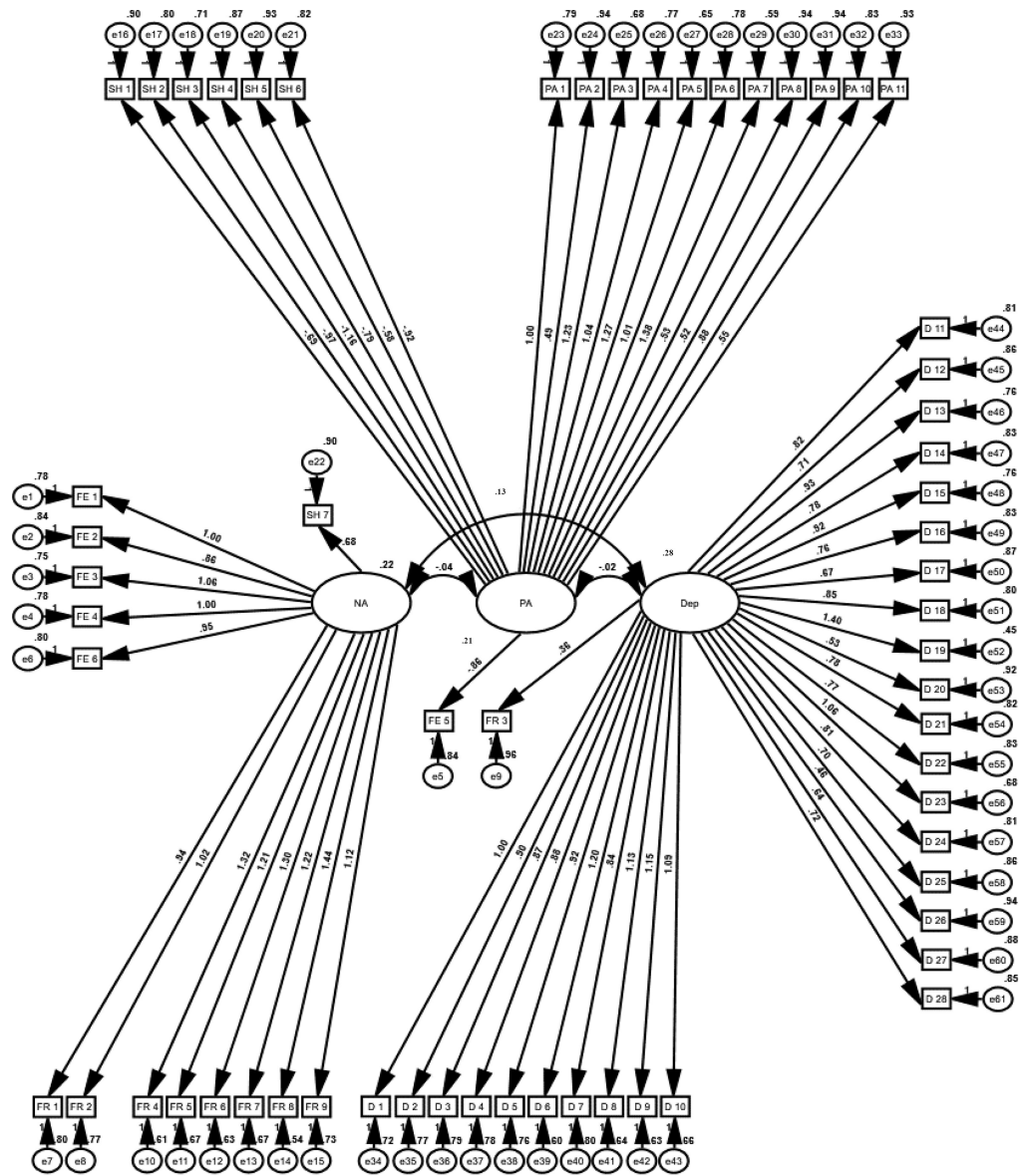
b. Adolescent CFA model 2.



c. Adolescent CFA model 3.

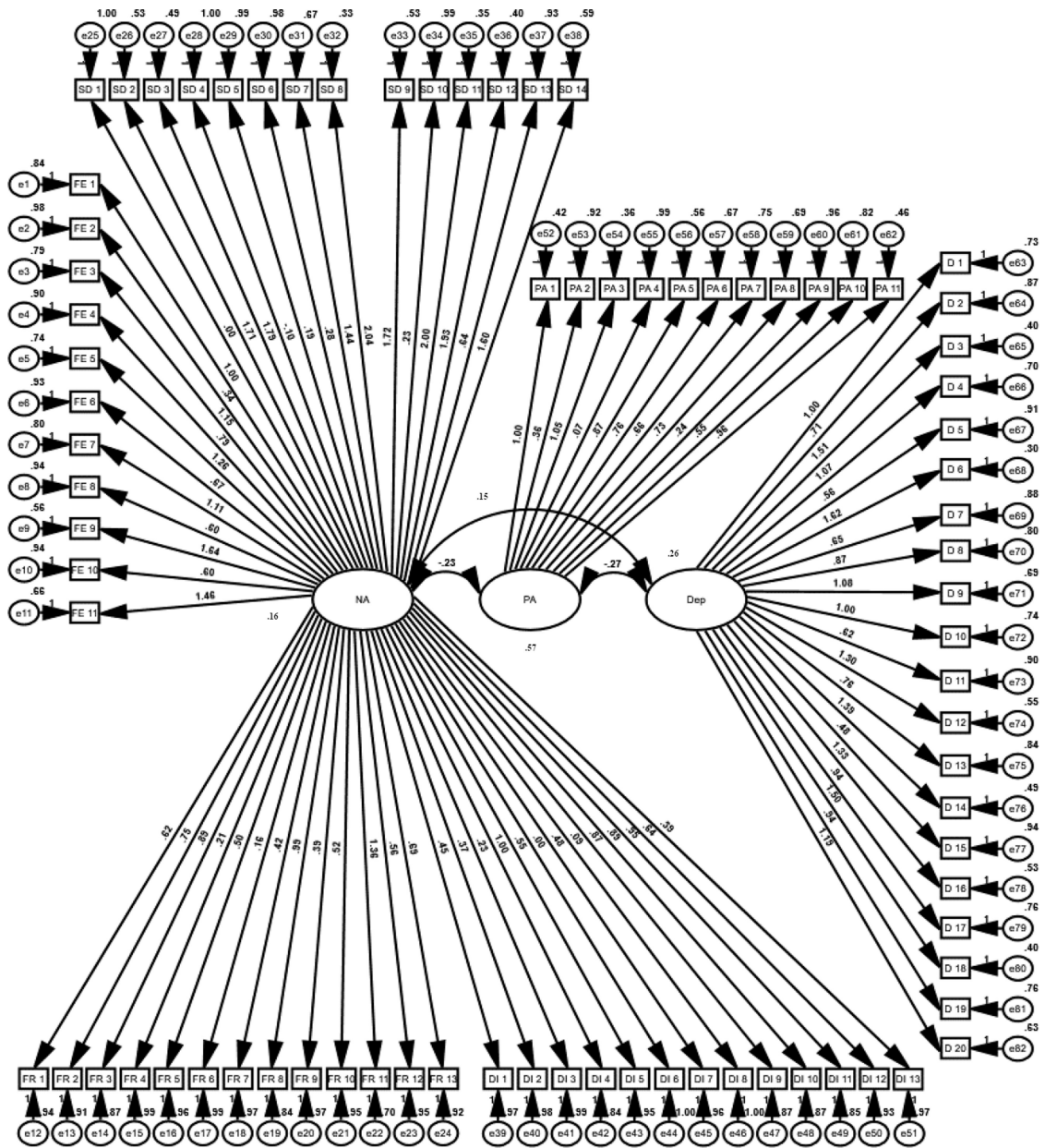


d. Adolescent CFA model 4.

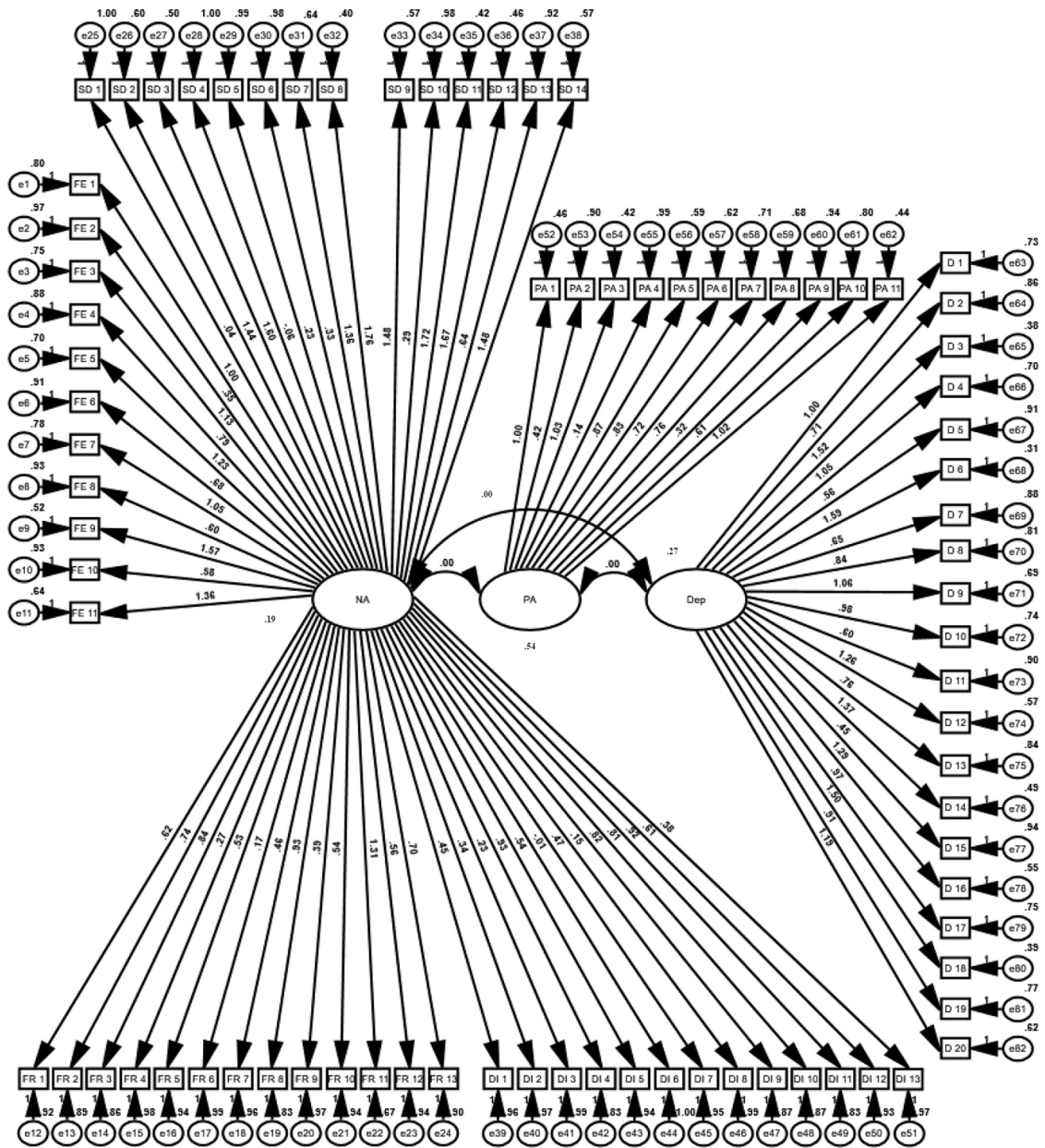


e. Adolescent CFA model 5.

**Figure 1.**  
Adolescent CFA models 1–5.

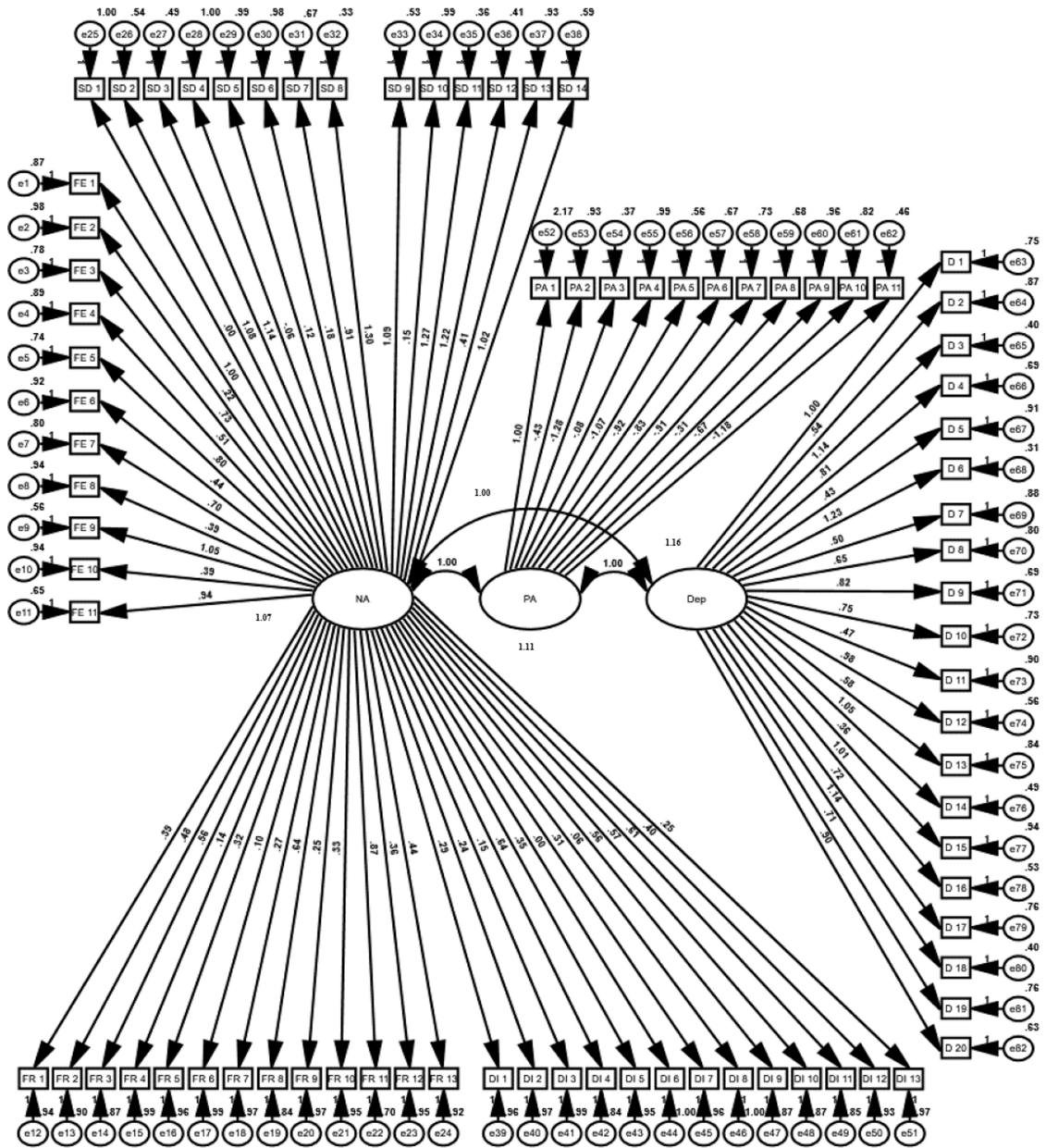


a. Adult CFA model 1.

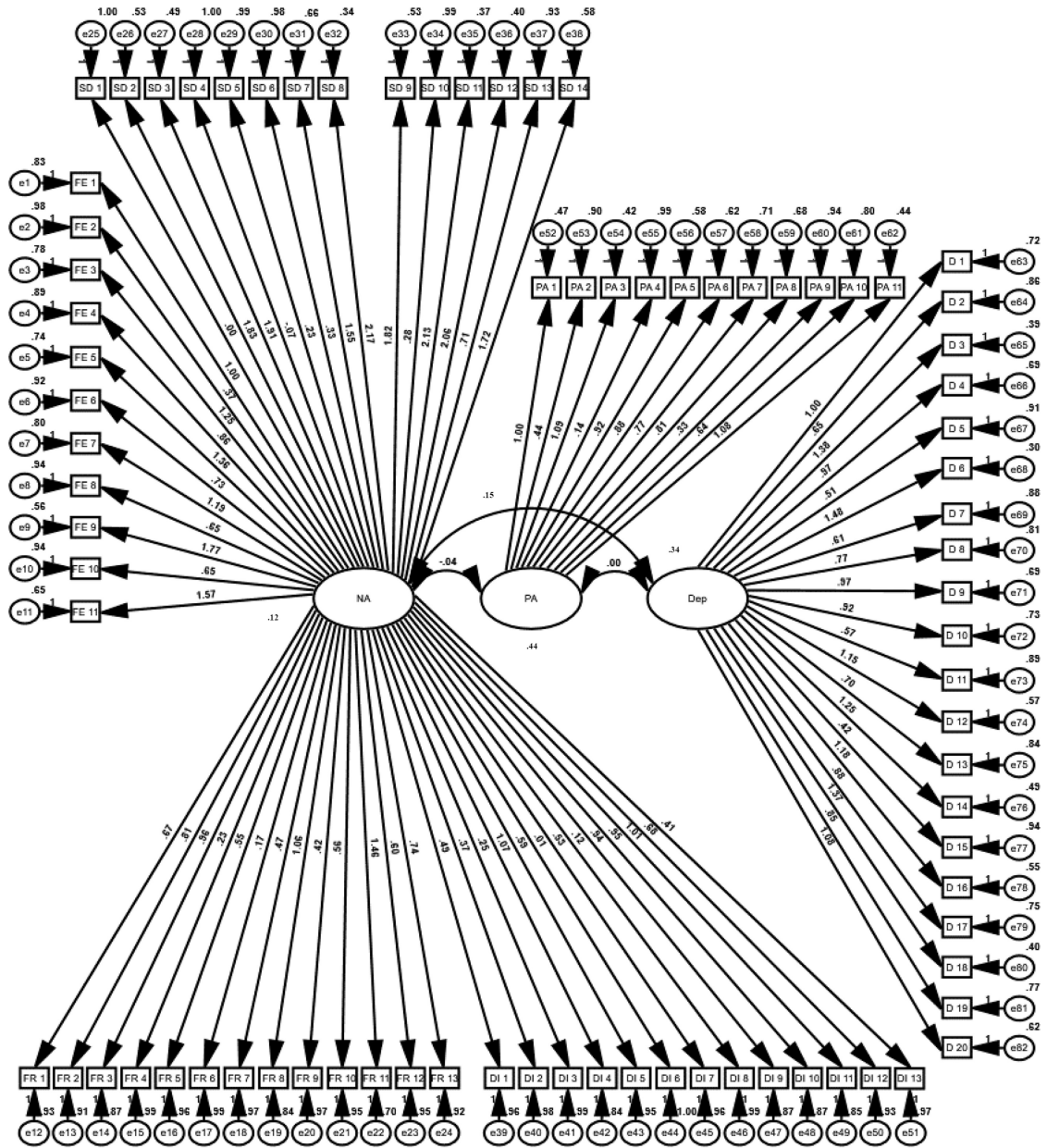


b. Adult CFA model 2.

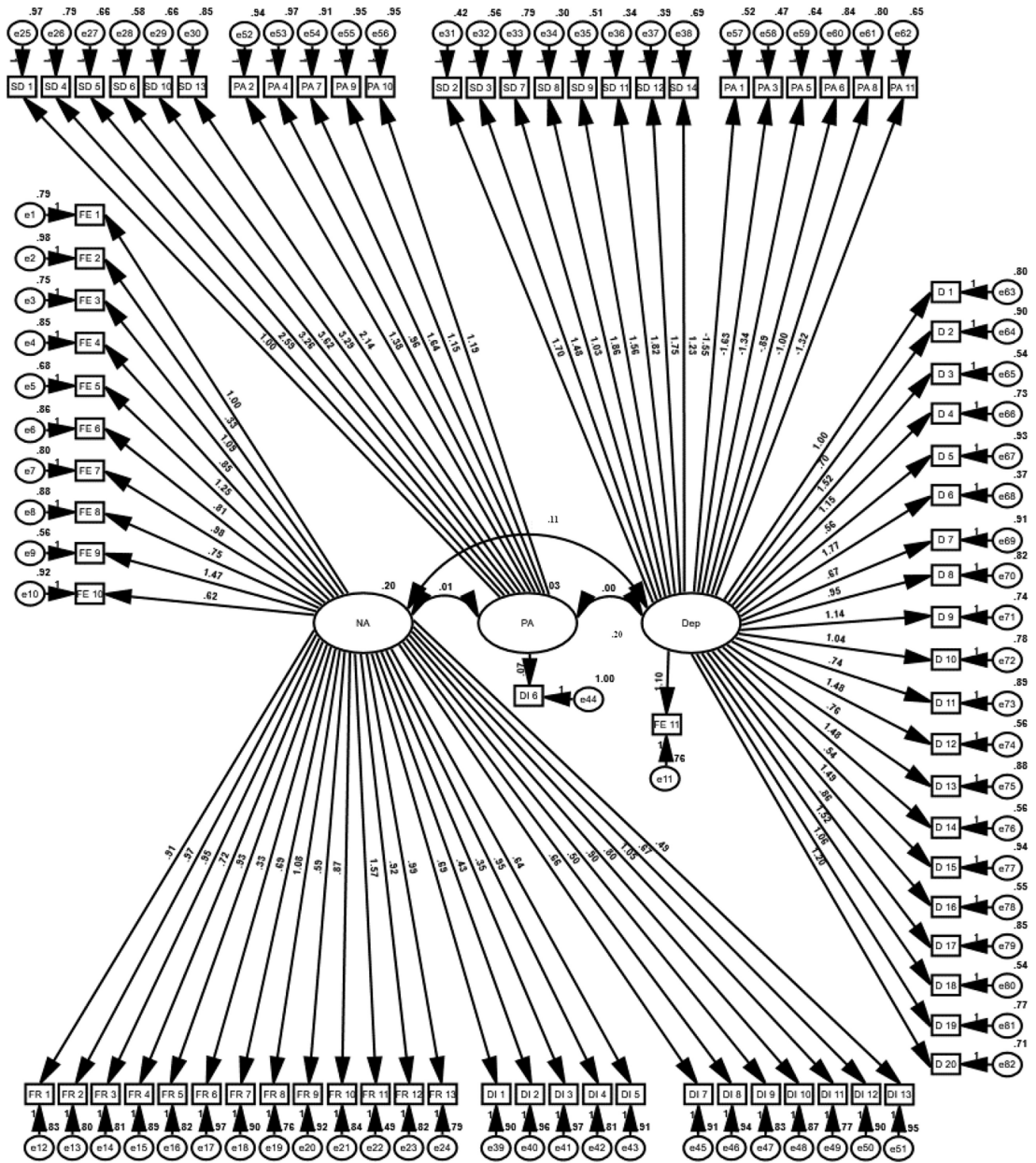




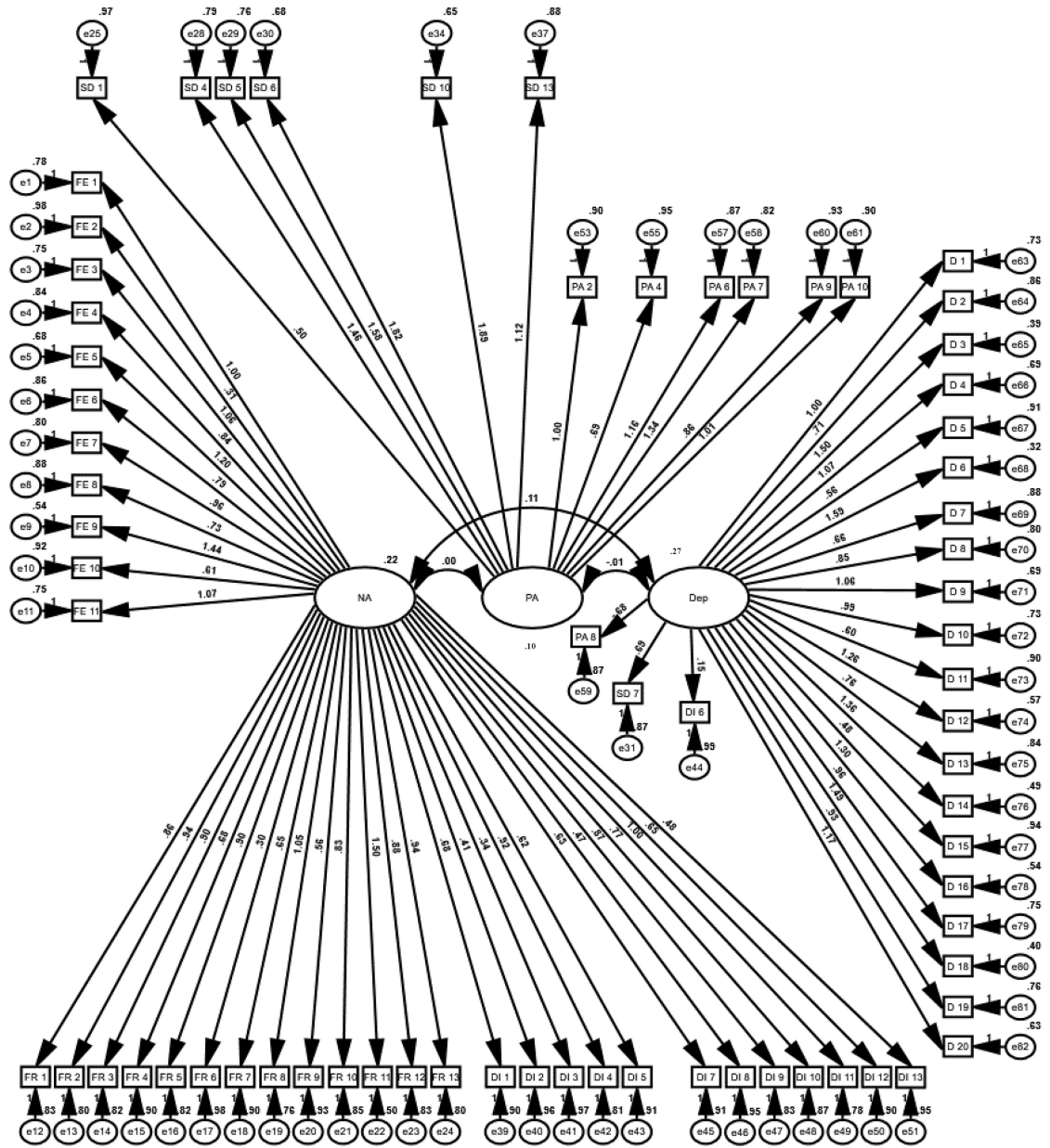
c. Adult CFA model 3.



d. Adult CFA model 4.



e. Adult CFA model 5.



f. Adult CFA model 6.

**Figure 2.**  
Adult CFA models 1–6.

**Table 1**

Adolescent and Adult Intercorrelations and Descriptives

	1	2	3	4	5	6	7	8	9	10	11	12
Adolescent Original Scales												
1. Fear (NA)												
2. Frustration (NA)	.52**											
3. Shyness (NA)	.33**	.15*										
4. PA	-.22**	.03	-.24**									
5. Dep	.36**	.43**	.20**	.03								
6. Factor 1 (Dep)	.34**	.45**	.19**	.04	.99**							
7. Factor 2 (PA)	.03	.10	.37**	.79**	.15*	.15*						
8. Factor 3 (NA)	.82**	.88**	.36**	-.07	.44*	.44**	.12					
M	2.61	2.99	2.68	3.21	0.39	0.36	2.97	2.91				
SD	0.78	0.64	0.71	0.63	0.32	0.23	0.41	0.61				
$\alpha$	.67	.77	.77	.75	.88	.86	.55	.83				
Adult Original Scales												
1. Fear (NA)												
2. Frustration (NA)	.39**											
3. Sadness (NA)	.60**	.27**										
4. Discomfort (NA)	.44**	.37**	.32**									
5. PA	-.30**	-.25**	-.37**	-.30**								
6. Dep	.41**	.21**	.64**	.31**	-.47**							
7. Factor 1 (Sadness/PA/Dep)	.38**	.17**	.57**	.25**	-.18**	.93**						
8. Factor 2 (NA)	.76**	.79**	.49**	.75**	-.36**	.37**	.31**					
9. Factor 3 (Sadness/PA)	.18**	-.05	.47**	.06	.49**	.13*	.26**	.05				

	1	2	3	4	5	6	7	8	9	10	11	12
10. Revised Factor 1 (Dep)	.43**	.22**	.66**	.33**	-.43**	.99**	.94**	.39**	.18**			
11. Revised Factor 2 (NA)	.79**	.78**	.51**	.75**	-.37**	.39**	.33**	1.00**	.05	.40**		
12. Revised Factor 3 (Sadness/PA)	.37**	.07	.74**	.10	.36**	.32**	.46**	.21**	.84**	.36**	.22**	
M	4.22	3.88	3.98	3.94	5.08	0.72	1.79	4.02	4.76	1.23	3.99	4.44
SD	0.95	1.46	0.96	0.75	0.88	0.45	0.30	0.67	0.66	0.43	0.50	0.54
$\alpha$	.77	.80	.81	.67	.81	.88	.74	.85	.54	.86	.86	.61

Note. NA = Negative Affect, Early Adolescent Temperament Questionnaire, Revised; PA = Positive Affect, Early Adolescent Temperament Questionnaire, Revised; Dep = Depressive Symptoms, Center for Epidemiologic Studies, Depression Scale.

\* p < .01,

\*\* p < .001.

**Table 2**

## Adolescent Factor Structure Matrix for Principal Axis Factoring with Oblique Rotation

	Factors		
	1	2	3
NA: Fear			
I worry about getting into trouble	.22	-.06	.46
I get frightened riding with a person who likes to speed	.13	-.27	.44
I worry about my family when I'm not with them	.33	-.11	.47
I am nervous of the kids who push people and throw books	.33	-.13	.47
I worry about my parent(s) dying or leaving me	.01	-.36	.33
I feel scared when I enter darkened room at home	.22	-.19	.46
NA: Frustration			
I am a patient person (R)	.24	.06	.43
It bothers me when I make a phone call and the line is busy	.16	.04	.51
I get upset if I want to do something and parents won't let me	.19	.16	.11
It bothers me when people are slow about getting ready	.36	.12	.58
I get irritated when I have to stop something I am enjoying	.25	.02	.56
It really annoys me to wait in long lines	.28	.01	.61
I get frustrated when I make a mistake in school work	.24	-.07	.52
It frustrates me if people interrupt me when I'm talking	.29	-.03	.63
I get upset if I'm not able to do a task really well	.19	.07	.57
NA: Shyness			
I feel shy about meeting new people	.20	-.37	.20
I feel shy with kids of the opposite sex	.25	-.49	.22
If asked to deliver a message, I feel uncomfortable	.19	-.61	.07
I can think of something to say, even with strangers (R)	.11	-.41	-.02
It is easier for me to talk to people I know than to strangers	-.02	-.22	.35
I am shy	.16	-.49	.03
I am not shy (R)	.24	-.20	.28
PA			
I find the idea of driving a race car exciting	.11	.44	.07
I prefer friends who are exciting and unpredictable	.11	.27	.24
I wouldn't be afraid to skateboard or ride down a steep hill	-.01	.48	-.15
Skiing fast down a steep slope sounds scary to me (R)	-.03	.42	-.12
I would not be afraid to try a risky sport, like deep-sea diving	.11	.52	-.11
I wouldn't want to go on the frightening rides at the fair (R)	.08	.44	-.12
I wouldn't be afraid to try something like mountain climbing	.04	.55	-.16
When people tell me exotic places, it makes me want to go	.09	.27	.17
I think it would be exciting to move to a new city	.07	.25	.10
I enjoy places where there are big crowds and excitement	-.09	.46	.01
I wouldn't like living in a really big city, even if it was safe (R)	-.01	.25	-.12
Depressive Symptoms			

	Factors		
	1	2	3
I am sad all the time	.52	.00	.13
Nothing will ever work out for me (R)	.47	-.09	.15
I do everything wrong	.46	.13	.21
Nothing is fun at all	.48	-.15	.21
I am important to my family	.48	.07	.16
I hate myself (R)	.63	.02	.13
All bad things are my fault (R)	.42	-.06	.24
I want to kill myself	.57	.01	.24
I feel like crying every day (R)	.58	.01	.26
I feel cranky all the time (R)	.56	.04	.29
I do not want to be with people at all	.46	-.22	.08
I cannot make up my mind about things (R)	.38	-.15	.22
I look ugly	.49	.02	.13
I have to push myself all the time to do my schoolwork (R)	.42	.23	.25
I have trouble sleeping every night (R)	.49	.01	.16
I am tired all the time	.41	.17	.19
Most days I do not feel like eating (R)	.35	.02	.13
I worry about aches and pains all the time	.42	.01	.24
I feel alone all the time	.74	-.11	.27
I never have fun at school (R)	.28	-.06	.11
I do not have any friends	.42	-.18	.10
I do very badly in subjects I used to be good in	.42	.05	.16
I can never be as good as other kids (R)	.57	.02	.23
Nobody really loves me (R)	.45	-.13	.11
I get into arguments with friends all the time	.36	-.05	.18
I fall asleep during the day all the time (R)	.24	.12	.18
Most days I feel like I can't stop eating (R)	.34	.07	.13
It is very hard to remember things	.37	-.01	.28
Eigenvalue	8.90	4.44	3.31
Percent Variance	14.60	7.28	5.42

Note. Some items are paraphrased to conserve space. There are three statements offered for each CDI-II item, so the most extreme symptom anchor for each item was provided. NA = Negative Affect, Early Adolescent Temperament Questionnaire, Revised; PA = Positive Affect, Early Adolescent Temperament Questionnaire, Revised



**Table 3**

## Adult Factor Structure Matrix for Principal Axis Factoring with Oblique Rotation

	Factors		
	1	2	3
NA: Fear			
I become easily frightened	.29	.42	.33
Looking down from a high place would make me feel uneasy	.08	.13	.06
I often worry about things that turn out to be unimportant	.33	.42	.26
When I am enclosed in small places I feel uneasy	.20	.38	.06
I rarely worry (R)	.34	.51	.20
Loud noises sometimes scare me	.19	.34	.29
I often think about negative outcomes that are not likely to occur	.35	.37	.04
It does not frighten me if I am alone and discover someone close (R)	.16	.32	.15
I am always worried about something	.50	.58	.12
When I try something new, I am rarely concerned about failing (R)	.16	.28	-.03
Sometimes, I feel a sense of panic or terror for no reason	.48	.44	.06
NA: Frustration			
I am rarely a patient person	.08	.44	-.15
I usually remain calm when things are not going smoothly for me (R)	.16	.45	-.04
I often get irritated when I get a busy signal	.26	.40	.04
I rarely become annoyed when I have to wait in a slow line (R)	-.07	.42	-.08
Whenever I have to sit and wait for I become agitated	.05	.48	.02
I seldom become annoyed when I'm driving and hit red lights	-.03	.19	-.07
I get very annoyed when poor weather interferes with my plans	.05	.34	.18
I usually work on improving things instead of getting frustrated (R)	.27	.48	-.15
I seldom become irritated when someone is late (R)	.05	.30	-.07
I find it very annoying when a store does not stock an item	.07	.42	.04
It doesn't take much to make me feel frustrated or irritated	.34	.71	-.07
I am usually a patient person (R)	.06	.47	-.22
I find it annoying to wait for a phone connection	.11	.49	-.04
NA: Sadness			
I seldom become sad when I watch a sad movie (R)	-.03	.06	.17
I felt so depressed that simple activities required a lot of effort	.74	.21	-.04
I sometimes feel sad for longer than an hour	.65	.37	.04
I seldom become sad when I hear of an unhappy event (R)	.01	-.05	.44
I rarely feel sad after saying goodbye to friends or relatives (R)	.05	.10	.42
I feel sad when saying goodbye to friends or relatives	.07	.15	.50
Sometimes minor events cause me to feel intense sadness	.46	.39	.27
I often feel sad	.81	.35	-.04
I rarely ever feel depressed for more than an hour or two (R)	.67	.30	-.12
When I hear of an unhappy event, I immediately feel sad	.06	.09	.52
In comparison to others, experience longer sadness or depression	.78	.34	-.09

	Factors		
	1	2	3
Sometimes I feel very depressed	.75	.29	-.02
I usually feel weepy while reading the sad part of a story	.20	.22	.39
Sometimes disappointments cause me to feel down for hours	.54	.46	.15
NA: Discomfort			
Foul odors seem to bother me more than other people	.11	.33	.10
Loud music is unpleasant to me	.10	.19	-.09
There are a lot of food dishes that I find to taste very unpleasant	.06	.18	.03
I'm often bothered by light that is too bright	.33	.38	.01
I find certain scratchy sounds very irritating	.16	.28	.09
Feeling rough clothing against my bare skin rarely bothers me (R)	.05	-.04	.07
When I wear a tight collar it makes me uncomfortable	.12	.29	.02
Foul odors don't bother me very much (R)	-.05	.27	.21
Colorful flashing lights bother me	.27	.37	-.05
Very bright colors sometimes bother me	.29	.33	-.14
I find loud noises to be very irritating	.24	.47	-.03
I rarely find it irritating when something touches my skin (R)	.16	.28	-.05
I find many strong aromas/fragrances to be unpleasant	.07	.25	-.08
PA			
I rarely feel happy (R)	-.67	-.21	.31
I have felt so good that I could not imagine feeling better	-.10	-.12	.34
When I feel happy, it usually does not last very long (R)	-.69	-.32	.32
Sometimes minor events cause me to feel intense pleasure	.11	-.03	.28
I seem to be unable to feel pleasure from events and activities (R)	-.57	-.27	.24
When I don't feel unhappy, I usually feel happy instead of neutral	-.37	-.28	.37
It doesn't take much to evoke a happy response in me	-.32	-.27	.45
Sometimes I feel good throughout most of the day	-.42	-.26	.30
Without mind altering substances, I have felt intense pleasure	.00	-.09	.32
I rarely have days where I don't experience intense happiness	-.25	-.21	.34
It takes a lot to make me feel truly happy (R)	-.54	-.28	.42
Depressive Symptoms			
I was bothered by things that don't usually bother me	.47	.17	.16
I did not feel like eating; my appetite was poor	.34	.00	.11
I could not shake off the blues even with help from family or friends	.71	.10	.11
I felt that I was just as good as other people (R)	.53	.22	.09
I had trouble keeping my mind on what I was doing	.26	.16	.02
I felt depressed	.81	.19	.07
I felt that everything I did was an effort	.32	.10	.19
I felt hopeful about the future (R)	.43	.15	-.15
I thought my life had been a failure	.52	.16	-.03
I felt fearful	.48	.24	.18
My sleep was restless	.34	.11	.09

	Factors		
	1	2	3
I was happy (R)	.67	.10	-.26
I talked less than usual	.36	.13	.05
I felt lonely	.69	.11	.06
People were unfriendly	.24	.20	-.08
I enjoyed life (R)	.67	.17	-.24
I had crying spells	.43	.08	.31
I felt sad	.71	.17	.12
I felt that people dislike me	.48	.21	.01
I could not get "going"	.57	.03	.06
Eigenvalue	14.87	4.82	4.05
Percent Variance	18.14	5.88	4.93

Note. Some items are paraphrased to conserve space. Loadings with a strikethrough are ~~.40~~ but not the item's highest loading. NA = Negative Affect, Adult Temperament Questionnaire; PA = Positive Affect, Adult Temperament Questionnaire; R = reverse-coded item.

**Table 4**

Revised Adult Factor Structure Matrix for Principal Axis Factoring with Oblique Rotation

	Factors		
	1	2	3
NA: Fear			
I become easily frightened	.27	.42	.36
Looking down from a high place would make me feel uneasy	.07	.13	.07
I often worry about things that turn out to be unimportant	.30	.42	.29
When I am enclosed in small places I feel uneasy	.19	.38	.06
I rarely worry (R)	.30	.51	.23
Loud noises sometimes scare me	.19	.33	.33
I often think about negative outcomes that are not likely to occur	.31	.38	.06
It does not frighten me if I am alone and discover someone close (R)	.17	.32	.15
I am always worried about something	.45	.59	.14
When I try something new, I am rarely concerned about failing (R)	.14	.28	-.04
Sometimes, I feel a sense of panic or terror for no reason	.42	.42	.07
NA: Frustration			
I am rarely a patient person	.03	.45	-.16
I usually remain calm when things are not going smoothly for me (R)	.14	.46	-.03
I often get irritated when I get a busy signal	.23	.40	.04
I rarely become annoyed when I have to wait in a slow line (R)	-.08	.42	-.08
Whenever I have to sit and wait for I become agitated	.05	.48	.02
I seldom become annoyed when I'm driving and hit red lights	-.06	.19	-.06
I get very annoyed when poor weather interferes with my plans	.05	.33	.19
I usually work on improving things instead of getting frustrated (R)	.23	.50	-.15
I seldom become irritated when someone is late (R)	.02	.30	-.06
I find it very annoying when a store does not stock an item	.06	.42	.06
It doesn't take much to make me feel frustrated or irritated	.29	.72	-.06
I am usually a patient person (R)	.01	.48	-.23
I find it annoying to wait for a phone connection	.07	.49	-.01
NA: Sadness			
I seldom become sad when I watch a sad movie (R)	-.02	.05	.18
I felt so depressed that simple activities required a lot of effort			
I sometimes feel sad for longer than an hour			
I seldom become sad when I hear of an unhappy event (R)	.06	-.07	.43
I rarely feel sad after saying goodbye to friends or relatives (R)	.07	.08	.43
I feel sad when saying goodbye to friends or relatives	.09	.13	.53
Sometimes minor events cause me to feel intense sadness	.40	.39	.30
I often feel sad			
I rarely ever feel depressed for more than an hour or two (R)			
When I hear of an unhappy event, I immediately feel sad	.07	.07	.53
In comparison to others, experience longer sadness or depression			

	Factors		
	1	2	3
Sometimes I feel very depressed			
I usually feel weepy while reading the sad part of a story	.20	.21	.41
Sometimes disappointments cause me to feel down for hours			
NA: Discomfort			
Foul odors seem to bother me more than other people	.13	.33	.10
Loud music is unpleasant to me	.09	.19	-.04
There are a lot of food dishes that I find to taste very unpleasant	.08	.18	.03
I'm often bothered by light that is too bright	.32	.39	.02
I find certain scratchy sounds very irritating	.16	.28	.10
Feeling rough clothing against my bare skin rarely bothers me (R)	.08	-.04	.03
When I wear a tight collar it makes me uncomfortable	.13	.30	.01
Foul odors don't bother me very much (R)	-.02	.25	.21
Colorful flashing lights bother me	.27	.38	-.04
Very bright colors sometimes bother me	.26	.34	-.14
I find loud noises to be very irritating	.21	.47	.01
I rarely find it irritating when something touches my skin (R)	.13	.29	-.06
I find many strong aromas/fragrances to be unpleasant	.06	.25	-.07
PA			
I rarely feel happy (R)			
I have felt so good that I could not imagine feeling better	-.07	-.13	.33
When I feel happy, it usually does not last very long (R)			
Sometimes minor events cause me to feel intense pleasure	.10	-.04	.28
I seem to be unable to feel pleasure from events and activities (R)			
When I don't feel unhappy, I usually feel happy instead of neutral	-.31	-.30	.32
It doesn't take much to evoke a happy response in me	-.27	-.29	.44
Sometimes I feel good throughout most of the day	-.37	-.28	.28
Without mind altering substances, I have felt intense pleasure	.01	-.10	.31
I rarely have days where I don't experience intense happiness	-.21	-.23	.32
It takes a lot to make me feel truly happy (R)			
Depressive Symptoms			
I was bothered by things that don't usually bother me	.50	.20	.10
I did not feel like eating; my appetite was poor	.37	.03	.08
I could not shake off the blues even with help from family or friends	.75	.14	.06
I felt that I was just as good as other people (R)	.55	.25	.06
I had trouble keeping my mind on what I was doing	.29	.18	.00
I felt depressed	.80	.24	.03
I felt that everything I did was an effort	.35	.12	.17
I felt hopeful about the future (R)	.44	.18	-.16
I thought my life had been a failure	.55	.20	-.06
I felt fearful	.51	.27	.16
My sleep was restless	.33	.13	.09

	Factors		
	<b>1</b>	<b>2</b>	<b>3</b>
I was happy (R)	.66	.15	-.29
I talked less than usual	.39	.15	.00
I felt lonely	.70	.14	.03
People were unfriendly	.25	.21	-.10
I enjoyed life (R)	.68	.22	-.27
I had crying spells	.49	.09	.27
I felt sad	.75	.21	.07
I felt that people dislike me	.49	.24	-.01
I could not get "going"	.61	.07	.01
Eigenvalue	10.21	4.36	3.75
Percent Variance	14.38	6.14	5.29

Note. Some items are paraphrased to conserve space. Loadings with a strikethrough are ~~.40~~ but not the item's highest loading. NA = Negative Affect, Adult Temperament Questionnaire; PA = Positive Affect, Adult Temperament Questionnaire; R = reverse-coded item. Boldened and italicized items were excluded from analyses

**Table 5**

Adolescent and Adult Model Fit Indices

Models	$\chi^2$ (df)	$\chi^2$ (df)	CFI	RMSEA	AIC	BIC
<u>Adolescent Model Fit Indices</u>						
Model 1 (3 factors: NA, PA, Dep)	3326.95 (1766)		.620	.058	3576.95	4025.83
Model 2 (3 factors fixed to 0)	3391.69 (1769)	64.74 (3)	.605	.059	3635.69	4073.79
Model 3 (3 factors fixed to 1)	3589.64 (1769)	262.69 (3)	.557	.062	3833.64	4271.74
Model 4 (3 factors fixed to Adult)	3410.46 (1769)	83.51 (3)	.600	.059	3654.46	4092.56
Model 5 (3 factors from Table 2)	3287.94 (1766)	-39.01 (0)	.629	.057	3537.94	3986.81
<u>Adult Model Fit Indices</u>						
Model 1 (3 factors: NA, PA, Dep)	7050.94 (3236)		.584	.061	7384.94	8014.77
Model 2 (3 factors fixed to 0)	7455.30 (3239)	404.36 (3)	.541	.064	7783.30	8401.82
Model 3 (3 factors fixed to 1)	7701.02 (3239)	650.08 (3)	.514	.066	8029.02	8647.54
Model 4 (3 factors fixed to adolescent)	7229.32 (3239)	178.38 (3)	.565	.062	7557.32	8175.83
Model 5 (3 factors from Table 3)	6870.85 (3236)	-180.09 (0)	.604	.059	7204.85	7321.82
Model 6 (3 factors from Table 4)	5144.06 (2411)	-1906.88 (825)	.565	.060	5434.06	5518.25

Note. NA = Negative Affect; PA = Positive Affect; Dep = Depressive Symptoms; EATQR = Early Adolescent Temperament Questionnaire, Revised; CDI-II = Child Depression Inventory, Second Edition; ATQ = Adult Temperament Questionnaire; CES-D = Center for Epidemiologic Studies, Depression Scale.

All  $\chi^2$  were statistically significant at  $**p < .001$ . Model 4 factor correlations for each sample were fixed to the values of the other sample to allow a direct test of differences between samples. RMSEA independence models were less than 0.158 for all models, which produces lower values of the CFI that should not be interpreted ( $\Delta$ ).