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FIT OF THE TRIPARTITE MODEL WITH RESIDENTIAL YOUTH REFERRED FOR  
EXTERNALIZING PROBLEMS

THESIS

A Thesis  
presented in partial fulfillment of requirements  
for the degree of Master of Arts  
in the Department of Psychology  
The University of Mississippi

by

EU GENE CHIN

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## ABSTRACT

The tripartite model of anxiety and depression (Clark & Watson, 1991) has received strong support among adult, adolescent, and child populations. Clinical samples of children and adolescents in these studies, however, have usually been referred for treatment of anxiety and depression. This study investigated the fit of the tripartite model for children and adolescents in a large, inpatient facility who were referred primarily for externalizing problems. Structural Equation Modeling was used to test the tripartite model relationship between negative affect, positive affect, and mood symptoms. Multiple fit indices were used to provide a reliable and conservative evaluation of the model. As predicted, the tripartite model provided a good fit for a sample of children and adolescents with externalizing problems. Implications of these findings are discussed, both in terms of recommendations for residential assessment and utility of the tripartite model in understanding anxiety and depression in a different population.

## DEDICATION

This thesis is dedicated to everyone who inspired me to pursue a degree in psychology. In particular, I thank my parents who first impressed upon me the importance of education, teachers who inspired me to learn, and peers who walked with me through times of stress and anxiety.

## LIST OF ABBREVIATIONS AND SYMBOLS

CDI Children's Depression Inventory

CFI Comparative Fit Index

DEP Depression

DSM Diagnostic Statistical Manual

GAD Generalized Anxiety Disorder

MANOVA Multivariate Analysis of Variance

MASC Multidimensional Anxiety Scale for Children

MCAR Missing Completely At Random

MVA Missing Value Analysis

NA Negative Affect

OCD Obsessive Compulsive Disorder

PA Positive Affect

PANAS-C Positive and Negative Affect Scale for Children

PD Panic Disorder

PH Physiological Hyperarousal

RCADS Revised Child Anxiety and Depression Scale

RCMAS Revised Children's Manifest Anxiety Scale

RMSEA Root Mean Square Errors

SAD Separation Anxiety Disorder

SEM Structural Equation Modeling

SOC Social Anxiety

SRMR Standardized Root Mean Square Residual

STAIC State Trait Anxiety Inventory for Children

TLI Tucker-Lewis Index

## ACKNOWLEDGEMENTS

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## **Fit of the Tripartite Model with Residential Youth Referred for Externalizing Problems**

The issue of co-morbidity between anxiety and depression has a long history of research efforts aimed at explicating the relationship between these constructs. One of the most scrutinized theories for understanding this area is the tripartite model of anxiety and depression (Clark & Watson, 1991). The authors' seminal work initially proposed a two-level, three-part model to best conceptualize the experience of both anxiety and depression. They posited that anxiety and depression are two distinct disorders that share a common, underlying, superordinate temperamental trait, which they termed negative affect (NA). Each disorder was further defined to have a specific, subordinate temperamental component associated with it as well; a lack of a positive affect (PA) component was shown to be specific to depression, and an increased physiological hyperarousal (PH) component was demonstrated to be specific to anxiety. This model was based on a thorough review of all available, relevant psychometric literature at that point in time, and represented a high standard of quantitative analysis in the development of theory to guide the field (Clark & Watson, 1991).

Since that time this theory has been widely disseminated and continually refined to guide researchers' continued efforts in understanding anxiety and depression. In particular, there are strong implications of the model for informing nosology in terms of conceptualizing anxiety and depression as strongly related dimensional constructs, collectively referred to as emotional disorders (Brown, Chorpita, & Barlow, 1998; Chorpita, 2002; Chorpita & Daleiden, 2002; Clark & Watson, 1991; Joiner, Catanzaro, & Laurent, 1996; Joiner & Lonigan, 2000; Watson, Gamez,

& Simms, 2005; Watson et al., 1995). This has guided contemporary efforts to revise the Diagnostic and Statistical Manual (DSM; American Psychiatric Association, 1994), in that the next revision is slated to include a category for “mixed anxiety and depression” as suggested by the progenitors of this model 20 years ago (Clark & Watson, 1991). In order to meet the proposed diagnostic criteria, the individual has to have three or four symptoms of major depression (which must include depressed mood and/or lack positive affect) and anxious distress, which is operationalized as two or more of the following symptoms: irrational worry, having trouble relaxing, motor tension, preoccupation with unpleasant worries, fear that something awful may happen (American Psychiatric Association, 2010). The literature review that follows will provide a more detailed account of studies advancing knowledge of the tripartite model, with emphasis on the narrowly focused selection strategies utilized by most previous studies. This review will culminate in a description of the current study, which examines the tripartite model in the context of children and adolescents referred for treatment of externalizing disorders (a disparate population in comparison to previous research).

### **Support for adult populations**

The tripartite model has received strong support among various adult populations. In a sample of psychiatric outpatient adults, Jolly, Dyck, Kramer, and Wherry (1994) examined the relationship between NA and PA in relation with depressive and anxiety symptoms in adults referred to a university-affiliated outpatient psychiatry clinic. Of these individuals, 40.1% had depressive diagnoses, 7.0% anxiety disorder diagnoses, and 29.9% other diagnoses. Anxiety and depressive symptoms as well as PA and NA were measured by self-report measures and analyzed via Pearson product-moment correlations. The authors reported that NA was significantly related to anxiety (e.g., feeling fearful and tense) and depressive symptoms (e.g.,

feeling hopeless). PA, on the other hand, correlated significantly higher with depressive symptoms (e.g., anhedonia, lack of energy) than with anxious symptoms.

As an extension of this study, Dyck, Jolly, and Kramer (1994) investigated the fit of NA, PA, and PH in the same sample. The study attempted to extract factors in a variety of symptom and mood measures via exploratory factor analysis. The first factor analysis produced NA and PA with depression having strong loadings on the PA factor. The second factor analysis, which included additional symptom variables, produced a three-factor solution. However, the additional third factor (PH) also correlated highly with the NA factor, suggesting that the NA and PH may not be orthogonal. Nonetheless, the authors concluded that PA was useful in distinguishing depression and anxiety symptoms.

Watson et al. (1995) examined the tripartite model fit with a non-clinical and clinical adult sample. Seventy-eight percent of the non-clinical sample were employees in a metropolitan area while the rest of the non-clinical participants were visitors in a hospital and members of local social and church groups. The patient sample was obtained from a substance abuse treatment program at the Cleveland Department of Veteran Affairs Medical Center. Correlational analysis, factor analysis, and hierarchical regression analyses supported idea that general distress is the common component of anxiety and depression. In addition, PH is specific to anxiety and PA is specific to depression, Watson et al. (1995) concluded that a tripartite model demonstrated utility in understanding the commonalities and differences between anxiety and depression.

Brown, Chorpita, and Barlow (1998) examined the relations between various tripartite models and DSM-IV mood and anxiety disorders with a sample of adult outpatients receiving assessment and treatment for anxiety and stress disorders. Using Structural Equation Modeling

(SEM; Ullman, 2007), Brown et al. (1998) reported that the best fitting model included (1) a significant path from NA to Depression (DEP), Generalized Anxiety Disorder (GAD), Panic Disorder (PD), Obsessive Compulsive Disorder (OCD), and Social Phobia (SOC); (2) significant path from PA to DEP, and (3) significant paths from PH to GAD, PD, OCD, and SOC. The study concluded that higher order trait dimensions, such as NA, may be essential to understanding the etiology and comorbidity of emotional disorders.

More recently, Phillip, Washington, Raouf, and Norton (2008) investigated the relationship of NA with PD, SOC, OCD, GAD, DEP with undergraduate students aged 17 to 59 years of age, from the following ethnic groups: African American, Caucasian, Hispanic, and Asian. The authors utilized a series of multi-group confirmatory factor analyses to examine structural invariance across groups and concluded that the hypothesized tripartite framework of anxiety and depression was generally acceptable across these ethnic groups even though the relationship between NA and these disorders may differ in magnitude across different ethnic groups. Phillip et al. (2008) concluded that these results suggest that anxious and depressive disorders across different ethnic groups are generally associated with NA in a manner that is predicted by the tripartite model.

### **Support for child and adolescent populations**

This model has also accumulated support as applied to understanding anxiety and depression in child and adolescent populations. Joiner, Catanzaro, and Laurent (1996), for instance, tested the tripartite model with a sample of youth psychiatric inpatients. The authors hypothesized that the tripartite model (which has strong support among adult populations) would be applicable to child and adolescent populations. An exploratory factor analysis and a Schmid-

Leiman transformation (Gorusch, 1983; Loehlin, 1987) suggested that the tripartite model provided the best model fit for this population. The authors concluded that the structure of mood-related symptoms may not differ much between adults and youths. Thus, similar assessment methods that measure tripartite constructs with adults could be further refined and adapted with children and adolescent populations.

Chorpita, Albano, and Barlow (1998) examined a tripartite model of anxiety and depression with a sample of outpatient children receiving treatment for stress and anxiety disorders, based on slightly different terminologies: fear (autonomic arousal), anxiety (negative affect), and depression (lack of positive affect). Chorpita et al. (1998) investigated the following models via factor analyses: (1) one-factor, (2) two-factor (anxiety and depression), (3) two-factor (depression/anxiety and fear, and (4) three-factor (anxiety, fear, depression) models. A three-factor model demonstrated the best fit compared to the other models. The authors also reported that the three-factor structure fitted older (aged 12-17) and younger groups (aged 6-11) equally well. Overall, the results of this study suggested that the three-factor model (anxiety, fear, depression) has the best support for use with child and adolescent populations.

Joiner and Lonigan (2000) examined whether the depression aspect of the tripartite model would relate to youth's diagnostic status (depressive vs. externalizing symptoms) and its relation with future depressive and anxiety symptoms with an inpatient sample of children and adolescents. Children who received a primary diagnosis that included elements of internalizing and externalizing symptoms were excluded from the study. Results from multiple regression analyses demonstrated that a combination of low PA and high NA significantly associated with a diagnosis of depression but not externalizing symptoms. When measured across two time points (follow-up session administered two months after baseline), NA was found to be a specific and

significant predictor of depression changes among children with low PA, but not among children with high PA. Overall, Joiner and Lonigan (2000) concluded that the tripartite model of anxiety and depression demonstrated applicability and clinical utility when used with inpatient children with a primary diagnosis of depressive disorders.

In one of the largest studies with a non-clinical sample, Chorpita (2002) investigated the relation between NA, PA, PH, depression and anxiety disorders in children and adolescents from 13 public and private schools in O'ahu, HI. The study involved testing a series of progressively elaborated models (NA; NA and PA; NA, PA and PH) via confirmatory factor analyses. The best fitting model was then tested for equivalence across gender and grade levels. The authors reported that the best fitting model placed NA and PA as orthogonal factors, with NA positively correlated with depression and anxiety, PA was only negatively correlated with depression, and PH was only associated with PD. No major differences were found across gender. Although the relationship parameters from NA to SOC, NA to PD, and NA to GAD show a general decline as grade levels increases, the path from PA to DEP remained constant across grade levels.

Lambert et al. (2004) found similar results for a school sample of predominantly African American adolescents in Grades 6-9 that lived in an urban setting. Goodness of fit indices suggested adequate fit for a three-factor model for Grade 6 children. Longitudinal confirmatory factor analyses were conducted to measure the model invariance of the three-factor model across grade levels. The overall results supported a three-factor model that was consistent with Clark and Watson's (1991) tripartite model. Although minor differences were found on factor loadings and item intercepts across grade levels, Lambert et al. (2004) reasoned that partial invariance was sufficient to assume that the same construct was being measured across age groups in the context of developmental growth.

Austin and Chorpita (2004) examined ethnic group differences when looking at average scores for NA, PA, and symptoms of anxiety and mood disorders. In addition, the relationships between these constructs were also examined. Participants were drawn from a non-clinical school-based sample (grades 3-12) and represented the following ethnic groups: White, Chinese American, Filipino, Native Hawaiian, and Japanese American. A multivariate analysis of variance (MANOVA) demonstrated that NA and PA levels did not differ across ethnic groups, except for the Native Hawaiian group. SEM analysis demonstrated that high NA was associated with greater anxiety and high NA and low PA were associated with greater depression across ethnic groups. However, variations in terms of anxiety severity were present among different ethnic groups. Thus, the authors concluded that the relationships between NA, PA, anxiety, and depression relate to each other in a manner consistent with the tripartite model even though anxiety and depressive levels may differ across ethnic groups.

However, there have also been exceptions to the usual support found for the tripartite model. Buckby et al. (2008), for example, tried to determine whether a tripartite structure, validated in non-clinical populations, would be robust in a young (aged 15-24) clinical sample referred for non-psychotic problems in Australia. The study conducted several competing confirmatory factor analysis models and reported that the 2-factor model demonstrated superior fit and parsimony compared to 1- or 3 factor models. This suggests that two broad, but highly correlated, constructs underlie anxiety and depression. The authors concluded that the tripartite model may require further revision for child and adolescent clinical populations.

A review of recent studies that examined the relation between PH and anxiety disorders strongly suggests that PH is the least consistent construct compared to NA and PA. Contrary to Clark and Watson's (1991) tripartite model, PH is not specific to every anxiety disorder (Brown



et al., 1998, Chorpita et al., 1998). Some studies have even found significant correlations between PH and DEP (Jacques and Mash, 2004). However, a consistent finding across studies is the relation between PH and PD in community (Chorpita, 2002), outpatient (Brown et al., 1998), and inpatient (Joiner et al., 1996) samples of children and adolescents. Thus, we consider PH to be the least important of the three tripartite components – and at best, would only be ancillary to the model.

### **Goals of the present study**

When and where clinical samples of children and adolescents have been included in research, it has usually been within the context of clinical referrals for treatment of anxiety and depression. Thus, it was important to examine the fit of a tripartite model for child and adolescents referred for reasons not related to anxiety and depression. The current study offered an examination of a clinical sample of children from a large, inpatient facility that was referred for externalizing problems (i.e., aggression, defiance, disturbances of conduct). It was hypothesized that the tripartite model will be supported in this sample, in accord with the established pattern of relationships reviewed above. Specifically, it was posited that:

1. NA and PA will provide a good model fit for predicting symptoms of anxiety and depression in this sample
2. The path between NA and anxiety and depression will exhibit a significant positive correlation
3. The path between PA and depression will exhibit a significant negative correlation

## **Method**

### **Participants**

Participants were youths ( $N = 178$ ; ages 7 – 17; 52.5% female) from a large, inpatient facility in Jackson, Mississippi who were referred as a step down from acute-care hospitalization and/or for externalizing problems (e.g., aggression, temper tantrums, irritability, destructive behaviors) too severe to be treated in less restrictive settings. Most youths spend about six months residing in the inpatient facility (typically as long as insurance organizations are willing to reimburse fees) and some are also referred back to the facility due to the high degree of impairment caused by externalizing problems. The ethnic composition of the facility comprised primarily of African Americans (49.4%), followed by Caucasians (30.9%). Occasionally Hispanic (.6%), Asian (.6%), and other ethnicities (5.1%) were also represented (remaining 13.5% did not indicate their ethnicity). The majority of the sample did not have their biological parents (46.5%), stepparents (74.0%), or grandparents (76.5%) at home and were mostly from rural, low-income communities. Every child completed a standard battery of measures shortly after being processed into the facility (detailed below).

### **Instruments**

Scientifically supported self-reports were utilized as assessment tools, which is a rarity in residential settings (Connor et al., 2000). Instruments used included the Revised Child Anxiety

and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) and the Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999).

**Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999).**

This 30-item measure (Appendix A) was designed to assess the PA and NA constructs for children populations. It requires respondents to rate how often they have felt a described affect on a 5-point Likert-type scale that ranges from 1 (very slightly or not at all) to 5 (extremely). For the purposes of this study, however, we only analyzed a subset of this measure since the 27-item measure has demonstrated superior psychometric properties and analyzing it this way would only entail excluding 3 items from the analysis (Ebesutani, Okamura, Higa-McMillan, & Chorpita, 2011). Principal component analysis of the 27-item version supported a two-component structure (NA and PA), based on a large non-clinical sample ( $N = 707$ ) of students grades 4 – 8 (Laurent et al., 1999). In regards to reliability, Laurent et al. (1999) reported item-total correlations that exceeded the .30 criterion (Nunnally & Bernstein, 1994) for both NA and PA components. Hughes and Kendall (2009) also reported favorable Cronbach  $\alpha$  values (.87 for NA and .92 for PA) for a clinical sample of children. In terms of convergent validity, Laurent et al. (1999) reported that the NA component highly correlated with the Children's Depression Inventory (CDI; Kovacs, 1980-1981) and State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973). Hughes and Kendall (2009) also reported moderate correlations between the NA subscale and the Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997), Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978) and the CDI. In terms of discriminant validity, Laurent et al. (1999) reported that PA did not have a significant partial correlation with the STAIC Trait Anxiety subscale after NA and CDI scores were controlled for in the first step of a hierarchical regression.

**Revised Child Anxiety and Depression Scale (RCADS; Chorpita et al., 2000).** This 47-item self-report measure (Appendix B) was designed to assess anxiety and depressive symptoms. Specifically, the scales in this measure correspond to DEP, GAD, SOC, Separation Anxiety Disorder (SAD), OCD, and PD. Respondents choose from several options to indicate how often each item applies to them. Scores range from “never” (0 point), “sometimes” (1 point), “often” (2 points), to “always” (3 points). Chorpita et al. (2000) reported promising reliability coefficients when examined with a non-clinical children sample: alpha coefficients for each subscale ranged from  $\alpha = .71$  (OCD) to  $\alpha = .85$  (GAD). Similar findings were found for a clinical sample as well (subscale  $\alpha$  coefficients ranging from .78 - .88; Chorpita, Moffitt, & Gray, 2005). Confirmatory factor analyses suggested that the subscales demonstrated adequate model fit (Chorpita et al., 2000). The subscales correlated positively and significantly with convergent measures (DEP with CDI; RCADS anxiety scales with RCMAS). In terms of discriminant validity, non-significant results were obtained when RCADS anxiety subscales were correlated with the CDI (with the exception of the PD subscale).

### **Statistical Analysis**

Data from youths who complete the PANAS-C and the RCADS with fewer than 10% missing items were included in the study. Missing data from cases that did not exceed this threshold were imputed using the Missing Value Analysis (MVA) module of SPSS 17.0 (SPSS for Windows). The PANAS-C produced a non-significant Little’s “Missing Completely At Random” (MCAR) value ( $p > .05$ ), suggesting that there was no systematic bias with the data. However, The RCADS produced a significant Little’s MCAR value ( $p < .001$ ), suggesting there might be a systematic bias with the data. Taken together, these values provided partial support

for the imputation strategy described above. Descriptive statistics were calculated to summarize relevant demographics of the participants.

Structural Equation Modeling (SEM; Ullman, 2007) was used to test the tripartite model relationship between NA and PA, as measured by the PANAS-C, and emotional disorders as measured by the RCADS (refer to Appendix A for the proposed path diagram). SEM is an array of statistical techniques that allows the researcher to examine a set of relationships between one or more independent variables (continuous or discrete), and one or more dependent variables (continuous or discrete). It is a confirmatory technique, as opposed to exploratory, that is used to test a theory of how variables interact with each other. Specifically, SEM enabled us to examine whether the tripartite model produces an estimated population covariance matrix that is consistent with the sample (observed) covariance matrix; thus, enabling us to determine whether the tripartite model serves as a valid framework to understand anxiety and depression in children and adolescents referred for externalizing disorders. This is the standard technique used by seminal studies in this area to examine the fit of the tripartite model in different populations (e.g., Brown, Chorpita, & Barlow, 1998; Austin & Chorpita, 2004). The sample covariance matrix among the variables was evaluated using Mplus (Muthen & Muthen, 2007).

Multiple fit indices were used to provide a reliable and conservative evaluation of the model (Jaccard & Wan, 1996). In order to increase interpretability of results in terms of what will constitute support of the study's hypotheses in the context of SEM analyses, it may be helpful to define some relevant terms. The  $\chi^2$  goodness of fit statistic, for example, is one of the most common criteria used to assess goodness of fit (Schumacker, 1992). According to conventional standards, a ratio of  $\chi^2$  to the degrees of freedom that is equal to or less than 2.0 suggests that the model is a good fit. Another prevalent way to evaluate model fit is by

evaluating absolute and incremental fit indexes (Hu & Bentler, 1999). An absolute fit index assesses how well a proposed model reproduces the sample data without any reference to the amount of increment it adds to the model fit (Hu & Bentler, 1999). The root mean square error (RMSEA; Browne & Cudeck, 1993) and the standardized root mean square residual (SRMR; Bentler, 1995) were among the absolute fit indexes recommended in the literature (Hu & Bentler, 1999). A RMSEA value equal to or lower than .06 and an SRMR value equal to or lower than .08 indicate a good fit (Hu & Bentler, 1999). An incremental fit index, on the other hand, calculates the amount of improvement in fit by comparing the intended model with a baseline model, typically a null model in which all observed variables are uncorrelated (Bentler & Bonett, 1980). The Comparative Fit Index (CFI; Bentler, 1990) and the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973) were among the incremental fit indexes recommended by Hu and Bentler (1999). A CFI and TLI value equal to or higher than .95 indicates good model fit (Hu & Bentler, 1999).

## Results

The percentage of youths who had borderline internalizing scores on the RCADS were as follows (Figure 1): DEP (20.5%); GAD (9.9%); SOC (1.9%); SAD (36.6%); OCD (11.8%); PD (16.8%). The percentage of youths who had clinically elevated internalizing scores on the RCADS were as follows (Figure 1): DEP (15.5%); GAD (6.2%); SOC (1.2%); SAD (26.7%); OCD (6.8%); PD (13.7%).

The model for the tripartite factors and anxiety and depression symptoms demonstrated the anticipated good model fit. The  $\chi^2$  (229) was 330.96, producing a ratio of  $\chi^2$  to the degrees of freedom that was less than 2.0. Three fit statistics (RMSEA = .050; SRMR = .052; CFI = .95) supported the conclusion that the tripartite model was a good model fit. One fit statistic (TLI = .94), on the other hand, narrowly missed the desired threshold (i.e.,  $\geq .95$ ) for optimal model fit (i.e.,  $\geq .95$ ) but was still in the “adequate” range (between .90 and .95). Loadings of indicators on their latent variables ranged from .50 to .90 ( $M = .78$ ;  $SD = .10$ ; Figure 2). Overall, four of five fit-indices suggested that NA and PA provide a good model fit for depressive and anxiety disorders, providing empirical support for the tripartite model of anxiety and depression for a sample of youths with externalizing problems.

Consistent with Clark & Watson’s (1991) original tripartite model, the path between NA and PA was not significantly correlated ( $p > .05$ ). Standardized loadings from NA to anxiety and depressive disorders were as follows (in increasing order): .54 (NA to GAD), .58 (NA to SOC), .59 (NA to SAD), .62 (NA to DEP), .64 (NA to PD), and .67 (NA to OCD). These statistically

significant standardized loadings confirmed the hypothesis that NA correlates positively with anxiety and depressive symptoms. The standardized loading between PA and DEP was also significant (-0.18), confirming the prediction that PA and DEP will exhibit a significant negative correlation.



## **Discussion**

The tripartite model (Clark & Watson, 1991) is one of the most well researched theories that explicate the commonalities and differences between anxiety and depressive symptoms. Although the tripartite model has strong support among outpatient, inpatient, and non-clinical samples, previous investigations have utilized rather narrowly constrained samples (i.e., mostly referrals for the treatment of anxiety and depression). This study was an attempt to investigate the fit of the tripartite model with a sample of children and adolescents exhibiting severe externalizing problems in the context of a residential setting. As hypothesized, and consistent with previous research, the model exhibited strong explanatory value for symptoms of emotional disorders. Thus, regardless of potentially different etiologies of internalizing and externalizing problems (Fanti & Henrich, 2010), NA and PA remain important, relevant temperamental features when anxiety and depression are of interest.

As predicted, there was a positive association between NA and symptoms for all anxiety (GAD, SOC, SAD, OCD, and PD) and depressive disorders (DEP). Thus, youth who exhibited severe externalizing problems also reported a non-specific general distress component when assessed on affective symptoms. Moreover, as previous studies reported, PA appeared to be a critical factor that distinguished anxiety and depressive symptoms. Taken together, these findings suggest that a combination of high NA and low PA characterizes depressive symptoms and high NA characterizes all types of anxious symptoms among youths with severe externalizing problems.

These results have implications for assessment strategies for children and adolescents with externalizing problems, particularly those in residential treatment settings. Evidence-based assessments are rarely used and internalizing problems are typically neglected in these settings (Connor et al., 2004), due in no small part to time constraints hindering comprehensive assessment. Thus, an approach that is efficient and informative would have a higher likelihood of fitting and diffusing within residential settings. The tripartite model has the potential to address such a need as it provides a foundational description of anxiety and depressive symptoms among those with internalizing and externalizing problems. In other words, it (1) serves as a more parsimonious framework compared to traditional taxonomic symptom reports (i.e., categorical via the DSM system) and (2) offers clearer guidelines for instrument construction, especially for those designed to maximize differentiation between anxiety and depressive symptoms. Currently, the PANAS-C would be a suitable instrument to measure both constructs since it is efficient, simple to administer and has strong psychometric properties (Ebesutani et al., 2011). In settings where evidence-based assessment instruments are rarely utilized (e.g., residential facilities), instruments like the PANAS-C could be a minimal addition to assessment procedures. Nonetheless, having symptom (e.g., RCADS) and affective (e.g., PANAS-C) report instruments would constitute a more comprehensive approach compared to a singular methodology to assessment.

As predicted, there were no significant pathways between NA and PA – evidence that NA and PA are independent of each other. This finding is consistent with the majority of extant studies (e.g., Chorpita, 2002), but is contrary to those that focused on African American samples (Lambert et al., 2004; Gaylord-Harden, Elmore, Campbell & Wethington, 2011). Our study, although focused on a sample with externalizing problems, was also primarily composed of

African Americans. One possible explanation for these discrepant findings is the use of different measurement strategies. Lambert et al. (2004), for instance, selected a subset of items from the Baltimore How I Feel (BHIF; Ialongo, Kellam, & Poduska, 1999) measure based on how items were chosen from the CDI and RCMAS in previous analytic studies of the tripartite model (Chorpita et al., 1998; Joiner et al., 1996). Similarly, Gaylord-Harden et al. (2011) used items from the CDI and RCMAS to create NA and PA factors as examined by Chorpita et al. (1998) and Joiner et al. (1996). It was posited that African American samples tended to report affective symptoms differently, thus making it difficult for NA and PA to be fully differentiated. Modern measurement strategies – namely, the PANAS-C (Laurent et al., 1999) – have advanced the field’s ability to more accurately assess NA and PA constructs. Although it is unclear why Gaylord-Harden et al. (2011) did not use the PANAS-C, the current study has an advantage over the measurement strategies available to studies produced prior to approximately 2000 since the PANAS-C is now considered the gold standard for tripartite measurement in youth (c.f., Chorpita & Daleiden, 2002). The current findings are thus far singular, however, and await replication in future studies.

This study has a few notable strengths. First, we examined a large, focal sample of children and adolescents who exhibited significant externalizing problems. This represented a departure from the well-established program of research examining the tripartite model in samples relatively homogenous for presenting problems (i.e., anxiety and depression). Second, this sample was primarily composed of African Americans from rural settings – a population that has not received much research attention in the past. Third, we used best-known, scientifically supported self-report measurement tools that assessed NA and PA, as well as DSM-IV anxiety and depressive symptoms – which is a rarity in residential settings (Connor et al., 2000). Lastly,

the use of structural equation analysis matches the degree of statistical rigor and nature of methods employed in previous seminal studies. This offers the best, most relevant, examination possible, and increases the degree of congruence with extant literature concerning the tripartite model in youth. Nonetheless, this study was not without limitations. All results were obtained from single, self-reported instruments. Thus, quantified values of NA, PA, and anxiety and depressive symptoms are necessarily influenced by artifactual variance introduced by the sole method of assessment (i.e., mono-method bias; Campbell & Fiske, 1959). This limitation is not unique to this particular study, however, since it is a common limitation with extant studies that examine the fit of the tripartite model.

The findings of this study also point toward future research that can extend these results. For example, studies could (1) compare the fit of the tripartite model for Caucasian and African American samples with externalizing problems using multi-group structural equation modeling to examine differential fit between these ethnic groups; (2) diversify the type of informants and methods used to assess DSM-IV anxiety and depressive symptoms to obviate a mono-method bias; and (3) examine how different types of risk factors that typically associate with externalizing problems (e.g., family adversity, low socioeconomic status, and single parent status; Ackerman, D'Eramo, Umylnyl, Schultz, & Izard, 2001) might relate with tripartite constructs. Further research of this nature could streamline assessment practices, not just for populations with internalizing problems, but for those with externalizing problems as well.

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## LIST OF APPENDICES

Figure 1. Percentage of youths with borderline and clinically elevated scores for anxiety and depressive symptoms as measured by the Revised Child Anxiety Depression Scale (Chorpita et al., 2000). DEP = Depression; GAD = Generalized Anxiety Disorder; SOC = Social Phobia; SAD = Separation Anxiety Disorder; OCD = Obsessive Compulsive Disorder; PD = Panic Disorder.

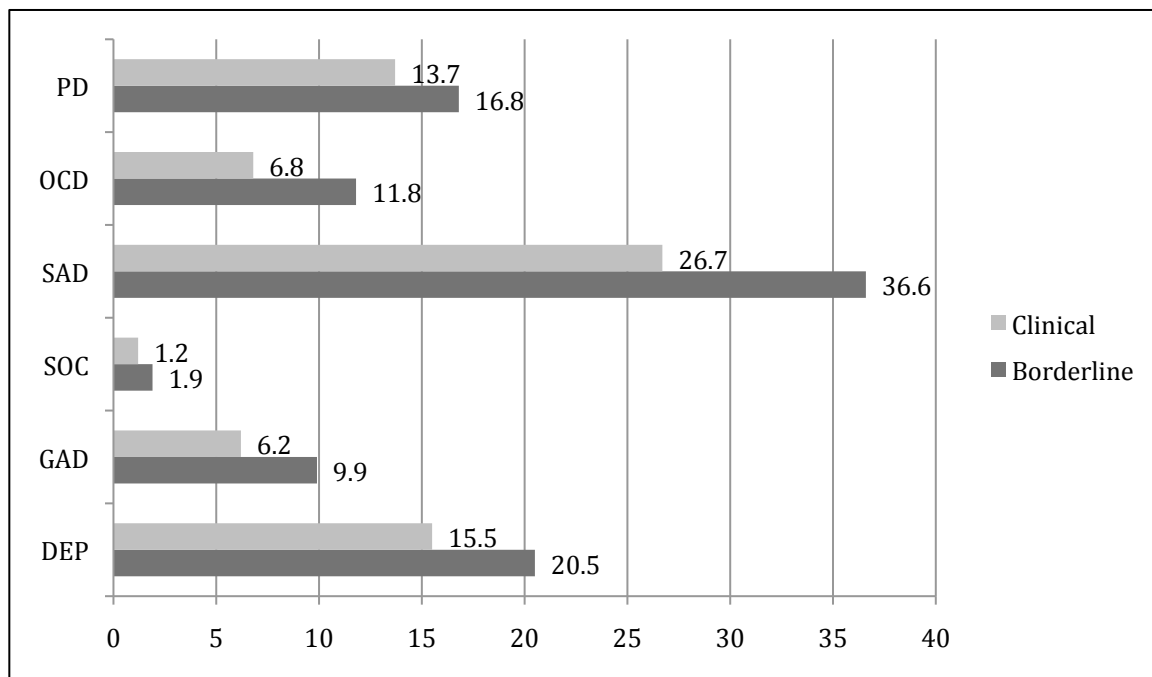
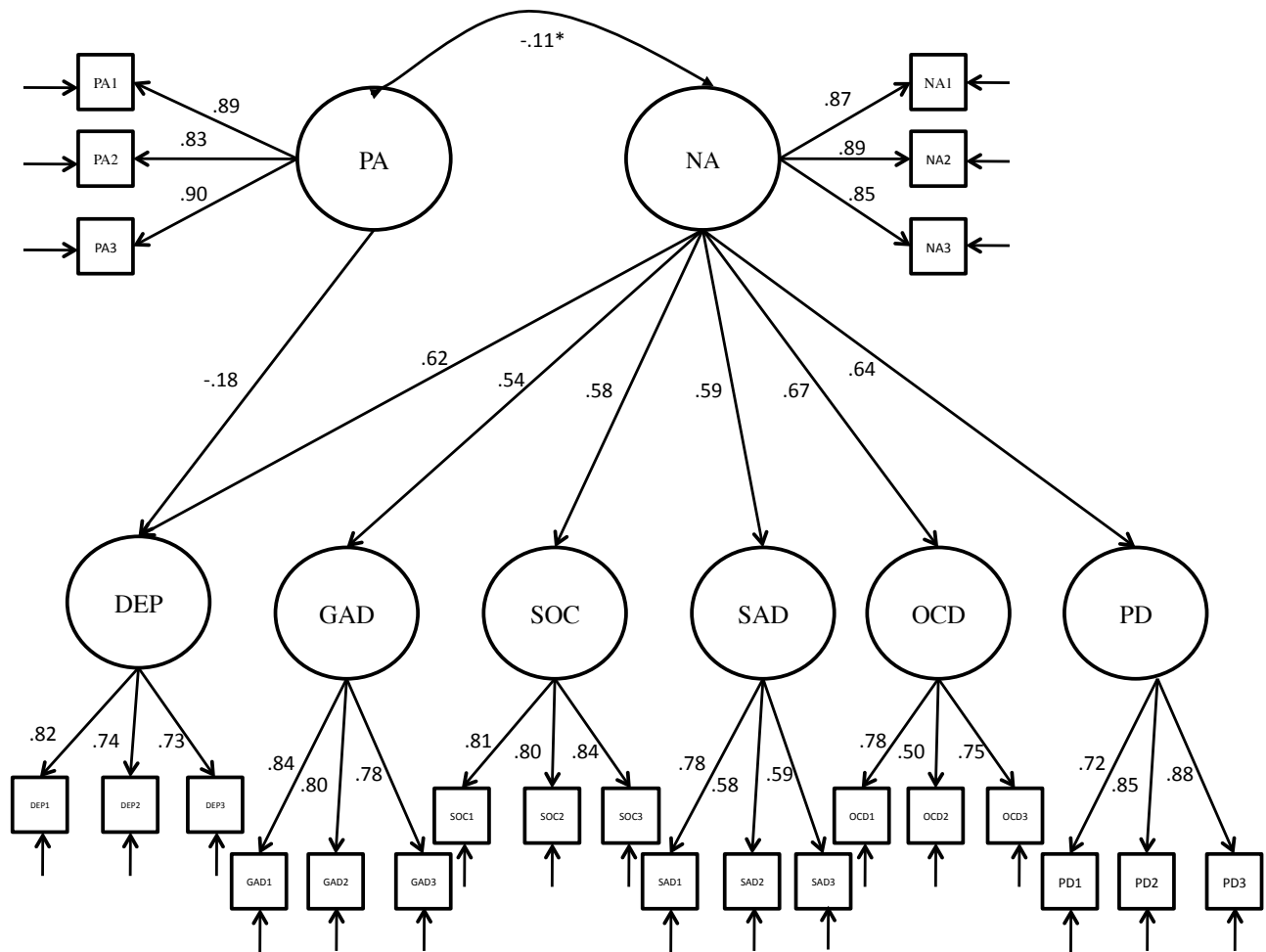




Figure 2. Results of a structural model for two higher order tripartite factors over DSM-IV depression and anxiety disorders. Item parcels, located in boxes, serve as indicators for each disorder. All standardized loadings were significant except for the path between PA and NA. DEP = Depression; GAD = Generalized Anxiety Disorder; SOC = Social Phobia; SAD = Separation Anxiety Disorder; OCD = Obsessive Compulsive Disorder; PD = Panic Disorder.

\* $p > .05$ .







## Appendix A

### Positive and Negative Affect Scale for Children (PANAS-C)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to the word. Indicate to what extent you have felt this way in **the past few weeks**.

		Very Slightly or Not at All	A little	Moderately	Quite a lot	Extremely
1.	Interested	1	2	3	4	5
2.	Sad	1	2	3	4	5
3.	Frightened	1	2	3	4	5
4.	Alert	1	2	3	4	5
5.	Excited	1	2	3	4	5
6.	Ashamed	1	2	3	4	5
7.	Upset	1	2	3	4	5
8.	Happy	1	2	3	4	5
9.	Strong	1	2	3	4	5
10.	Nervous	1	2	3	4	5
11.	Guilty	1	2	3	4	5
12.	Energetic	1	2	3	4	5
13.	Scared	1	2	3	4	5
14.	Calm	1	2	3	4	5
15.	Miserable	1	2	3	4	5
16.	Jittery	1	2	3	4	5
17.	Cheerful	1	2	3	4	5
18.	Active	1	2	3	4	5
19.	Proud	1	2	3	4	5
20.	Afraid	1	2	3	4	5
21.	Joyful	1	2	3	4	5

22.	Lonely	1	2	3	4	5
23.	Mad	1	2	3	4	5
24.	Fearless	1	2	3	4	5
25.	Disgusted	1	2	3	4	5
26.	Delighted	1	2	3	4	5
27.	Blue	1	2	3	4	5
28.	Daring	1	2	3	4	5
29.	Gloomy	1	2	3	4	5
30.	Lively	1	2	3	4	5



## Appendix B

### Revised Child Anxiety and Depression Scale (RCADS)

Please put a circle around the word that shows how often each of these things happen to you.

There are no right or wrong answers.

	<b>Never</b>	<b>Sometimes</b>	<b>Often</b>	<b>Always</b>
<b>1. I worry about things . . . . .</b> .....	Never	Sometimes	Often	Always
<b>2. I feel sad or empty . . . . .</b> .....	Never	Sometimes	Often	Always
<b>3. When I have a problem, I get a funny feeling in my stomach</b>	Never	Sometimes	Often	Always
<b>4. I worry when I think I have done poorly at something . . . . .</b>	Never	Sometimes	Often	Always
<b>5. I would feel afraid of being on my own at home . . . . .</b> .....	Never	Sometimes	Often	Always
<b>6. Nothing is much fun anymore . . . . .</b> .....	Never	Sometimes	Often	Always
<b>7. I feel scared when I have to take a test . . . . .</b> .....	Never	Sometimes	Often	Always
<b>8. I feel worried when I think someone is angry with me . . . . .</b>	Never	Sometimes	Often	Always
<b>9. I worry about being away from my parents . . . . .</b> .....	Never	Sometimes	Often	Always
<b>10. I get bothered by bad or silly thoughts or pictures in my mind</b>	Never	Sometimes	Often	Always
<b>11. I have trouble sleeping . . . . .</b> .....	Never	Sometimes	Often	Always
<b>12. I worry that I will do badly at my school work . . . . .</b> .....	Never	Sometimes	Often	Always
<b>13. I worry that something awful will happen to someone in my family . . . . .</b> .....	Never	Sometimes	Often	Always
<b>14. I suddenly feel as if I can't breathe when there is no reason for this . . . . .</b> .....	Never	Sometimes	Often	Always

15. I have problems with my appetite . . . . . .....	Never	Sometimes	Often	Always
16. I have to keep checking that I have done things right (like the switch is off, or the door is locked) . .....	Never	Sometimes	Often	Always
17. I feel scared if I have to sleep on my own. . . . . .....	Never	Sometimes	Often	Always
18. I have trouble going to school in the mornings because I feel nervous or afraid . . . . . .....	Never	Sometimes	Often	Always
19. I have no energy for things . . . . . .....	Never	Sometimes	Often	Always
20. I worry I might look foolish . . . . . .....	Never	Sometimes	Often	Always
21. I am tired a lot . . . . . .....	Never	Sometimes	Often	Always
22. I worry that bad things will happen to me . . . . . .....	Never	Sometimes	Often	Always
23. I can't seem to get bad or silly thoughts out of my head ...	Never	Sometimes	Often	Always
24. When I have a problem, my heart beats really fast .....	Never	Sometimes	Often	Always
25. I cannot think clearly . . . . . .....	Never	Sometimes	Often	Always
26. I suddenly start to tremble or shake when there is no reason for this . . . . . .....	Never	Sometimes	Often	Always
27. I worry that something bad will happen to me . . . . . .....	Never	Sometimes	Often	Always
28. When I have a problem, I feel shaky . . . . . .....	Never	Sometimes	Often	Always
29. I feel worthless . . . . . .....	Never	Sometimes	Often	Always
30. I worry about making mistakes . . . . . .....	Never	Sometimes	Often	Always
31. I have to think of special thoughts (like numbers or words) to stop bad things from happening. . . . . .....	Never	Sometimes	Often	Always
32. I worry what other people think of me . . . . . .....	Never	Sometimes	Often	Always

33. I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds) . . . . .	Never	Sometimes	Often	Always
34. All of a sudden I feel really scared for no reason at all . . . . .	Never	Sometimes	Often	Always
35. I worry about what is going to happen . . . . .	Never	Sometimes	Often	Always
36. I suddenly become dizzy or faint when there is no reason for this . . . . .	Never	Sometimes	Often	Always
37. I think about death . . . . .	Never	Sometimes	Often	Always
38. I feel afraid if I have to talk in front of my class . . . . .	Never	Sometimes	Often	Always
39. My heart suddenly starts to beat too quickly for no reason . . . . .	Never	Sometimes	Often	Always
40. I feel like I don't want to move . . . . .	Never	Sometimes	Often	Always
41. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of . . . . .	Never	Sometimes	Often	Always
42. I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order) . . . . .	Never	Sometimes	Often	Always
43. I feel afraid that I will make a fool of myself in front of people	Never	Sometimes	Often	Always
44. I have to do some things in just the right way to stop bad things from happening . . . . .	Never	Sometimes	Often	Always
45. I worry when I go to bed at night . . . . .	Never	Sometimes	Often	Always
46. I would feel scared if I had to stay away from home overnight	Never	Sometimes	Often	Always
47. I feel restless . . . . .	Never	Sometimes	Often	Always

## VITA

### Eu Gene Chin

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#### EDUCATION

University of Nebraska Lincoln (UNL), Lincoln, NE  
Bachelor of Arts (Honors)  
Major: Psychology

Graduation Date: Fall 2009  
Cumulative G.P.A: 3.969/4.0  
Psychology G.P.A: 3.945/4.0

Minor: Chemistry

Honors Thesis: The effect of smoking during pregnancy on infant development: visual expectations at six months

Supervising Professors: Sandra Wiebe, PhD & Anne Schutte, PhD

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#### AWARDS

Honorable Mention for Harry K. Wolfe Award, UNL, (April 2009)

UNL Honors Program (Aug 2007 – Aug 2009).

Dean's List, College of Arts & Sciences, UNL (Aug 2007 – Aug 2009).

Dean's Honor Roll, American Degree Transfer Program, INTI College Subang Jaya (Jan 2006 - Aug 2007).

International Student Scholar's Award (Aug 2007).

Merit Scholarship Award (June 2006).

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#### FELLOWSHIPS/GRANTS

Undergraduate Creative Activities and Research Experience (UCARE) Award

Students endowed with this award may request any level of support up to \$2,000 for the first year and \$4,400 for the second year for the proposed collaboration between student and faculty sponsor.

*Title: The effect of smoking during pregnancy on infant development: visual expectations*

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#### CONFERENCE PRESENTATIONS

**Chin, E.,** Ebesutani, C., Buchanan, E., & Young, J. (2011). *Applicability of the 21-item Depression, Anxiety, and Stress Scale (DASS-21) as a General Measure of Psychological Distress*. Poster will be presented for the 2011 Association for Behavioral and Cognitive Therapies, Toronto – Canada.



**Chin, E.,** Ebesutani, C., & Young, J. (2011, November). *Examining a Temperamental Reactivity-To-Stress Approach with the Tripartite Model of Anxiety and Depression*. Poster will be presented for the 2011 Association for Behavioral and Cognitive Therapies, Toronto – Canada.

Drescher, C., & **Chin, E.** (2010, November). *Developmental Assets Profile: a Ugandan youth population*. Poster will be presented at the 2011 American Psychological Association Annual Convention, Washington, D. C.

**Chin, E.,** Drescher, C., & Trent, L., Ambrose, A., Heiden, L., & Young, J. (2010, October). *Dissemination in school systems: feedback from Behavioral Vital Signs Personnel*. Poster presented at the Center for School Mental Health, Albuquerque, NM.

**Chin, E.,** Heiden, L., Damon, J., Hight, Terry., & Young, J. (2010, November). *Fit of the Tripartite Model with Residential Youth Referred for Externalizing Problems*. Poster presented at the 2010 Association for Behavioral and Cognitive Therapies, San Francisco, CA.

**Chin, E.,** Schulenberg, S. E., Kua, E. (2010). *Psychometric Review of the General Health Questionnaire for use with Malaysian Populations*. Poster presented at the ASEAN Regional Union of Psychological Societies, Kuala Lumpur – Malaysia.

**Chin, E.,** West, T., Lenhardt, J., & Brock, A. (2009, April). *Examining internalizing problems of sexually abused youth across time*. Poster presented at the Midwestern Psychological Association Convention – Psi Chi Program, Chicago, IL.

**Chin, E.,** Wiebe, S., & Watts, K. (2009, April). *The effect of smoking during pregnancy on infant development: Visual expectations at six months*. Poster presented at the University of Nebraska Undergraduate Research Conference, Lincoln, NE (as stipulated in UCARE agreement).

Klinkebiel, C., West, T., **Chin E.,** Brock, A., Dostal, H., & Dawley, E. (2008, November). *Effectiveness of Teacher-Child Interaction Training in Improving School Readiness Skills in a Head Start Classroom*. Poster presented at Association for Behavioral and Cognitive Therapies Convention, Orlando, FL.

Brock, A., **Chin E.,** Lenhardt, J. (2008, April). *Examining the Emotional and Behavioral Symptoms of Siblings of Sexually Abused Youth: Implications for Assessment and Treatment*. Poster presented at the University of Nebraska Undergraduate Research Conference, Lincoln, NE.

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