Abstract

The two-factor model of emotion clarifies the complexities of the relationship between anxiety and depression through their varying associations with positive and negative affect. Although this model’s structure has been studied in children, the lack of parent report measures on model-specific constructs has thus far prevented a multi-informant perspective on the model. Capitalizing on recent advancements in parent report assessment instruments, the present investigation aimed to confirm the two-factor model of emotion per child self-report; expand the model’s applicability to include parent report; and create a combined-informant model with a large number of parent-child dyad pairs \( (N = 610) \). Structural equation modeling demonstrated good fit within parent and child informant models, but diminished fit for the multi-informant model. These results suggest a high degree of robustness with respect to informant type. Implications for the integration of multi-informant assessment information are discussed.

Keywords: Two-factor Model of Emotion, Positive Affect, Negative Affect, Multi-informant
A Multi-informant Multi-Measure Approach to the Two Factor Model of Emotion with Youth

The two-factor model of emotion, proposed by Watson and Tellegen (1985), employed two dimensions of affect to explain the complexities of the differential diagnosis of anxiety and depression. Dimensions of affect, unlike anxious and depressive psychopathology, are conceptualized as temperamental characteristics, which are thought to be constitutional and stable across time (Frick, 2004). Negative affect (NA), or the predisposition to experience negative emotions such as fear, sadness, anger and guilt, has been shown to correlate positively with both anxiety and depression (Brown, Chorpita & Barlow, 1998; Clark & Watson, 1991; Watson et al., 1995). Positive affect (PA), one’s energy, enthusiasm and excitement, has traditionally shown an inverse relationship with depression but no significant relationship with anxiety (Chorpita, Daleiden, Moffitt, Yim, & Umemoto, 2000). Clark and Watson (1991) later developed the tripartite model, which incorporated physiological hyper-arousal (PH), and a significant portion of the literature has utilized this model. However, PH has since been considered a lower order factor (Brown et al., 1998), or a transient physiological state rather than a temperamental trait (Lonigan & Phillips, 2001; Watson et al., 1995).

Although the two-factor and tripartite models were initially developed for adults, numerous studies have demonstrated the ability of NA and PA to describe patterns of negative emotion in children and adolescents (Chorpita, 2002; Crook, Beaver, & Bell, 1998; Huebner & Dew, 1995; Joiner, Catanzaro, & Laurent, 1996; Lonigan, Carey, & Finch, 1994; Lonigan, Hooe, David, & Kistner, 1999). For example, Lonigan and colleagues (1994) demonstrated that levels of PA were able to differentiate children with depression from those with anxiety while high NA levels could not discriminate these two groups. Consistent with evidence from the adult literature, research
regarding PH in children has found this factor to be inadequate in comparison to PA and NA in explanatory power (Brown et al., 1998; Chorpita, 2002; Chorpita, Plummer & Moffitt, 2000).

When researchers first began investigating the two-factor and tripartite models among children and adolescents, no measure of child affect existed in the literature. To address these concerns, Laurent, Catanzaro, Joiner, Rudolf, Potter et al. (1999) adapted the Positive and Negative Affect Schedule – Expanded Form (PANAS-X: Watson & Clark, 1994), an adult affect measure, to create the Positive and Negative Affect Scale for Children (i.e., PANAS-C: Laurent et al., 1999). The PANAS-C demonstrated strong psychometric properties and has since been successfully and repeatedly utilized in tripartite model research with children (Chorpita & Daleiden, 2002; Crook et al., 1998; Jacques & Mash, 2004).

The structure of the model in children has been assessed thus far using data from child self-reports only. Indeed, the argument could be made that given the nature of internalizing psychopathology, only the child’s report is necessary. However, the use of a single informant may disregard potentially useful information that differing perspectives can contribute towards a comprehensive assessment (Achenbach, McConaughy & Howell, 1987; De Los Reyes & Kazdin, 2005). The issue of utilizing multiple informants in clinical assessment is a complex one. De Los Reyes and Kazdin (2005) discussed consistently low cross-informant correlations, and suggested several factors that contribute to these discrepancies. For example, individual informants may be impacted by their attribution of the youth’s behavior, the context in which they interact with the youth, their perspective or stance during memory recall, and their motivations for reporting about the youth’s behavior. Although the field has yet to come to a consensus on how best to utilize information from multiple informants, researchers have proposed several methods. In their investigation of cross-informant issues, De Los Reyes and
Kazdin (2005) suggested that considering each informant’s data independently, rather than integrating data across informants, may best take into account the unique factors impacting each informant’s report. For instance, Power and colleagues (1998) investigated the incremental validity of parent, teacher, and self report in diagnosing Attention-Deficit/Hyperactivity Disorder (ADHD) in children. These authors concluded that in certain circumstances, such as ruling out ADHD, a single informant is best, while in other cases, such as positively diagnosing the disorder, a multi-informant approach is the most useful. As another example, a recent longitudinal study demonstrated that socioeconomic functioning in adulthood was differentially predicted by parents’ and teachers’ report of psychopathology in childhood (i.e., teacher rated depression and parent rated externalizing symptomology each predicted future adult functioning) (Dirks, Boyle, & Georgiades, 2011). As the authors suggest, these results indicate the value of considering each informant’s data in light of the factors associated with their unique perspective.

Along the same lines, Kraemer and colleagues (2003) posited that the careful selections of informants to provide different, complimentary information is more important than the number of informants utilized. These authors posit that because no informant, inclusive of the child, can be measured without error or considered the “gold standard,” individuals with maximum orthogonality to one another should be chosen to achieve the most accurate assessment. Such an approach would undoubtedly result in low cross-informant agreement, but would, as they suggest, provide a comprehensive assessment.

Very recently, measures of both PA and NA and anxious and depressive symptomology have been extended from child to parent report forms. Regarding affect measurement from a parental perspective, the PANAS-C (Laurent et al., 1999) was modified to create the Positive and Negative Affect Scale for Children, Parent Report Form (PANAS-C-P: Ebesutani, Okamura,
Higa-McMillan, & Chorpita, in press), and Ebetsutani and colleagues recently adapted the Revised Child Anxiety and Depression Scale to create the Revised Child Anxiety and Depression Scale – Parent Report Form (Ebesutani, Bernstein, Nakamura, Chorpita, & Weisz, 2010; Ebetsutani, Chorpita, Higa-McMillan, Nakamura, Regan, & Stumpf, in press). Both measures have demonstrated psychometric properties comparable with their respective child-report versions. These recent developments in cross-informant measurement allow for the collection of novel and informative data concerning the underlying structure of negative emotions in children. Given the development of these new scales and the lack of cross-informant youth literature related to the two-factor model, the time was ideal to conduct a multi-informant study on the two-factor model of emotion.

Capitalizing on recent, highly supported measurement devices for youth affect and internalizing symptomology from both the child and parent report perspectives, the current study examined the underlying structure of affect and internalizing psychopathology in a large sample of children and adolescents. First, the PANAS-C (Laurent et al., 1999) and RCADS (Chorpita et al., 2000) were used to create a child report model, which was hypothesized to demonstrate the established two-factor model structural relationships. Second, a two-factor model including only data from the parent report measures was evaluated to establish the strength of the model within this alternate reporting form. Finally, a multi-informant model including data from both children and parents was evaluated. Cross-informant literature within the context of the two-factor and tripartite models of emotion was non-existent at the time of this paper. Therefore, the present study aimed to investigate whether the structure of affect and psychopathology would remain consistent when data from multiple sources were integrated. Evidence is mixed as to the moderating effects of gender and age, with some research demonstrating stronger structural
relationships in girl and adolescent samples, and other studies finding no moderating effects (Crook et al., 1998; Huebner & Dew, 1995; Lonigan et al., 1999; Ollendick et al., 2003). Also, as no theoretical reason seems to exist to suggest moderating effects for gender or age, it was predicted that model structures would demonstrate statistical equivalency across these subgroups.

**Methods**

**Participants**

A total of 2,056 families were recruited to participate, of which 1,292 (62.8% response rate) responded to the initial inquiry. Of those initial responders, 1,286 completed one or more questionnaires from the assessment battery (99.5% participation rate). Participants were then removed from the analyses under the following circumstances: (a) child age or gender information was missing (n=85), (b) parent report forms were missing (n=524), or (c) more than 5% of their data was missing on any measure (n = 73). After these filters were applied, the final sample consisted of 610 parent-child dyads (47.5% of participants that completed one or more questionnaires) recruited from public and private schools across the island of Oahu. Participants constituted a non-clinic-referred sample of both boys (n = 362, 59%) and girls (n = 248, 41%). School-aged children between the ages of 8 and 18 were surveyed, with a mean age of 12.5 (SD = 2.78). Over 25 ethnicities were represented, with the largest groups reporting as Japanese (26%), Filipino (24%), Chinese (15%), Native Hawaiian (14%) and Caucasian (8%). Of the caregivers who specified their relationship to the child, 75.4% identified themselves as the child’s “Biological Mother,” 21.1% as the “Biological Father,” and 2.1% as “Other.” No participants, including youth eligible for special education, were denied the opportunity to participate for any reason.
Measures

The Positive and Negative Affect Scale for Children (PANAS-C; Laurent, Catanzaro, Joiner, Rudolf, Potter et al., 1999). The PANAS-C is a 27 item scale designed to assess childhood temperament. The two subscales, NA and PA, have 15 and 12 items respectively. On the PANAS-C, children are asked to rate on a five point likert scale to what extent certain words (e.g., lively, upset) describe how they have felt over the past few weeks. Laurent et al. (1999) reported alpha coefficients of .94 for NA, and .90 for PA in the scale development sample, and the current sample demonstrated similar alpha coefficients of .90 and .89 for the NA and PA scales respectively. Using a slightly modified version of the scale, Crook et al. (1998) indicated satisfactory test-retest reliability coefficients of .72 to .79 for the NA scale and .66 to .82 for the PA scale over two week and four week time periods, respectively. An exploratory factor analysis by the same authors revealed the NA and PA two factor structure previously established in the adult counterpart (Crook et al., 1998). Although NA and PA are purportedly orthogonal in adulthood, weak negative correlations have been found between the two subscales, suggesting the constructs may not be entirely independent in children (Chorpita & Daleiden, 2002; Laurent et al., 1999). Further, Lonigan et al. (1999) found that the NA subscale maintained strong positive correlations with the CDI (Kovacs, 1980) and RCMAS scales (Reynolds & Richmond, 1978) while the PA subscale maintained a stronger negative correlation with the CDI as compared to the RCMAS. Lastly, although the demographics of the PANAS-C development sample differ from the present sample, a study by Austin and Chorpita (2004) found minimal ethnic differences with regard to the relationships of affect and internalizing psychopathology within a multi-ethnic sample.
The Positive and Negative Affect Scale for Children – Parent Report Form (PANAS-C-P; Ebesutani, Okamura, Higa-McMillan & Chorpita, in press). Similar to the PANAS-C, the PANAS-C-P asks parents to rate how often in the last few weeks their child has felt a certain emotion (e.g., nervous, scared). This measure utilizes the same 27 descriptor items, five point likert scale, and scoring system as its child report counterpart. Using a confirmatory factor analysis, Ebesutani et al. (in press) found support for the two factor structure of NA and PA for the parent version of the PANAS-C. The internal consistency of the PANAS-C-P was found to be good with alphas of .93 and .92 for the PA and NA scales, respectively. The alpha coefficients for the present sample were .91 for the NA subscale and .92 for the PA subscale. Consistent with previous literature (e.g., Chorpita & Daleiden, 2002; Laurent et al., 1999), the PANAS-C-P NA and PA subscales were found to have a small but significant negative correlation (Ebesutani et al., in press).

Revised Child Anxiety and Depression Scales (RCADS; Chorpita et al., 2000). The RCADS is a 47 item scale scored on a four point likert scale with the qualifiers “Always,” “Often,” “Sometimes” and “Never.” Factor analysis of the RCADS resulted in six subscales congruent with childhood anxiety disorders and depression: Separation Anxiety Disorder (SAD; 6 items), Social Phobia (SOC; 9 items), Obsessive-Compulsive Disorder (OCD; 6 items), Panic Disorder (PD; 9 items), Generalized Anxiety Disorder (GAD; 7 items) and Major Depressive Disorder (MDD; 10 items) (Chorpita et al., 2000). Chorpita et al. (2000) reported fair to good test-retest reliability coefficients (ranging from $r = .65$ for OCD to $r = .80$ for SOC) and acceptable internal consistency with alpha coefficients ranging from .71 for OCD to .85 for PD. Alpha coefficients in the present sample were similar (SAD: .74; SOC: .81; OCD: .73; PD: .78; GAD: .81; and MDD: .79). Chorpita, Moffitt, and Gray (2005) supported the six factor structure
of the RCADS and confirmed the acceptable internal consistency, test-retest reliability and convergent validly of the scales in a clinical sample. Unlike the CDI, the RCADS subscales were also shown to maintain non-significant, near zero correlations with measures of oppositional behavior, suggesting their discriminant validity. Lastly, the samples used to develop and evaluate the RCADS have been similar in ethnic composition to the current study (Chorpita et al., 2000; Chorpita, Moffitt, & Gray, 2005).

**Revised Child Anxiety and Depression Scale – Parent Report Form (RCADS-P; Ebesutani et al., 2010).** The RCADS-P mirrors the child report version in form and overall psychometric properties. Like the RCADS, the RCADS-P has 47 items that yield the same six DSM-oriented subscales for childhood anxiety and depression: SAD, SOC, GAD, OCD, PD, and MDD. Using a multi-ethnic clinical sample, Ebesutani et al. (2010) demonstrated good reliability for the RCADS-P subscales, with alpha coefficients ranging from .82 for PD to .90 for SOC. In the present sample, alpha coefficients ranged from .66 to .85 (SAD: .66; SOC: .85; OCD: .74; PD: .69; GAD: .82; and MDD: .80). The RCADS-P also demonstrated good convergent validity with measures of both overall internalizing symptoms and anxiety/depression specifically within a clinical sample (Ebesutani et al., 2010). For example, the RCADS-P anxiety scales correlated with the CBCL (Achenbach & Rescorla, 2001) DSM-Oriented Anxiety Problems subscale while the RCADS-P depression scale was highly correlated with the CBCL DSM-Oriented Affective Problems subscale. In a community sample, Ebesutani et al. (in press) similarly found that the RCADS-P maintained high levels of internal consistency and test-retest reliability, and good internal and discriminant validity. Notably, RCADS-P was able to discriminate between youths with anxiety and depression, and between youths with each specific anxiety diagnoses assessed.
by the measure (e.g., the OCD subscale was able to differentiate youth with OCD from youth 
with another anxiety disorder).

**Procedure**

Thirteen public and private schools on Oahu were recruited to participate in the current 
study. Parent consent forms were distributed and returned through classroom teachers, and 
participating children provided assent on the date of survey administration. Children were 
administered surveys by trained research assistants in a group format, usually in a library or 
cafeteria (i.e., separated from students whose parents did not provide consent). The research 
measures were presented in a randomized order, and research assistants were available during 
administration to assist students with reading the questions. Participating children took parent 
survey packets home in pre-addressed and stamped envelopes on the day of survey 
administration. Reminder letters were sent to the parents who had not yet returned their survey 
packets within two weeks, and no parent surveys were received after four weeks past the initial 
data collection date. Families who participated received a five dollar gift card. All policies and 
procedures were approved by the University of Hawaii at Manoa’s Institutional Review Board.

**Analytic Strategy**

First, missing data were imputed using the Missing Values Analysis module of SPSS 16.0, 
which employs a maximum likelihood method based on expectation-maximization algorithms 
(Little & Rubin, 1987). The scope of this investigation was limited to the confirmatory approach 
to SEM because of the large amount of supportive evidence surrounding the relationships 
between internalizing psychopathology and affect (Brown et al., 1998; Chorpita, 2002; Ollendick 
et al., 2003; Stark & Laurent 2001). The latent structure of the model (see Figure 1) was 
evaluated using four different sets of observed variables: (1) child report forms only, (2) parent
report forms only, (3a) parent and child report forms using whole subscale scores as indicators and (3b) parent and child report forms using split subscale scores as indicators. Due to the importance of using more than one indicator in SEM models (Shumacker & Lomax, 2004), indicators for the single informant models were created by randomly splitting the subscales of the PANAS-C(-P) and RCADS(-P), thereby creating two indicators for each latent construct (cf. Chorpita, 2002; Ollendick et al., 2003). As an example, the original 12-item PANAS-C PA subscale was split into two indicators, each being represented by six randomly chosen items from the overall 12. The multi-informant model was analyzed with two different sets of indicators. First, the RCADS(-P) (Chorpita et al., 2000; Ebosutani, et al., 2010; Ebosutani et al., in press) and PANAS-C(-P) (Ebousutani et al., in press; Laurent et al., 1999) subscales were used in their entirety as indicators, resulting in two indicators per latent variable. Second, the multi-informant model was analyzed using the same split subscale scores used in the single reporting models, resulting in a total of four indicators for each latent variable. Across all models, the residual variances of the latent constructs of anxiety and depression were allowed to covary, reflecting shared variance not due to affective factors (e.g., ecological factors, symptom overlap, common method variance) (Chorpita, 2002; Kline, 2005).

Multiple standardized indicators of goodness of fit were examined in order to minimize the impact of artifactual influences on interpretation of the results. The Goodness of Fit Index (GFI; Joreskog & Sorbom, 1996), Adjusted Goodness of Fit Index (AGFI; Joreskog & Sorbom, 1981), and the Comparative Fit Index (CFI; Bentler, 1990) were used to test the absolute and relative fit of the model, with the conventional criteria of above .90 indicating good fit. Model fit balanced against parsimony was evaluated with Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), with a value of less than .05 signifying good fit and a value of less than .08
indicates fair model fit (Shumacker & Lomax, 2004; Steiger, 1989). The chi-square statistic was used to compare the goodness of fit between models, with larger values indicate worse fit (Byrne, 1989).

To evaluate for moderating effects, the complete data set was divided into four sample subsets: girls ($n = 248$), boys ($n = 362$), children aged 8 to 12 ($n = 298$), and adolescents aged 13 to 18 ($n = 312$) (cf. Green, Chorpita, & Austin, 2009). All four models were subsequently analyzed in a multi-sample solution (e.g., Joreskog & Sorbom, 1996) wherein subsets of the model parameters were sequentially constrained to be equal across sample sub-groups. The previously imposed constraints were maintained as each new set of constrained parameters were added (Arbuckle, 2007) and equivalence was inferred based on chi-square value changes after each new set of constraints was added.

**Results**

Consistent with previous multi-informant literature reports, parent and child subscale scores on the RCADS(-P) (Chorpita et al., 2000; Ebesutani, et al., 2010) and PANAS-C(-P) (Ebesutani et al., in press; Laurent et al., 1999) maintained low to moderate statistically ($p < .01$) significant correlations (see Table 2). Using paired sample $t$ tests, the RCADS-P subscale scores were shown to be significantly ($p < .001$) lower than their respective RCADS scores, which indicated that parents reported significantly less psychopathology overall than did their children (see Table 1). Children reported significantly more NA, but not PA in comparison to their parents (see Table 1). The purportedly orthogonal constructs of NA and PA demonstrated a non-significant correlation of $r (608) = .002, p = .952$ within child report and a weak yet significant negative correlation of $r (608) = -.15, p < .001$ within parent report. The path estimates for each of the
four models below maintained the predicted direction and were significant at the $p < .01$ level (see Table 3).

**Model 1: Child Report Model**

The child report model was used to test for potential performance differences between the present and previous samples of youth. As the model included data from only the child perspective, the RCADS (Chorpita et al., 2000) and PANAS-C (Laurent et al., 1999) subscale items were randomly split so that each original symptom and affect scale, respectively, was broken down into two smaller subscales that served as two indicators for each latent construct (cf. Chorpita, 2002; Ollendick et al., 2003). Fit statistics demonstrated good to excellent fit for the model, with GFI and CFI statistics above .95, an AGFI score above .90 and an RMSEA value of .05 (see Table 4). These results suggested the presence of the two factor structural relationships within the current sample of youth.

**Model 2: Parent Report Model**

Data from the PANAS-C-P (Ebesutani et al., in press) and the RCADS-P (Ebesutani et al., 2010) were used to evaluate the structural relationships within parent report of children’s affect and psychopathology. Similar to the child report model, randomly half-split RCADS-P and PANAS-C-P subscale scores represented the two indicators for each latent variable. The fit statistics for this model demonstrated a similar fit as compared to the child report only model (see Table 4). The GFI and CFI fell above .95, demonstrating excellent fit, and the AGFI and RMSEA scores fell within their respective good fit ranges. The parent report model chi-square statistic increased to a small degree from the child report model, indicating slightly diminished fit. These results indicated that the two affect dimensions evidenced in child self-report models may also be present within parent report of children’s internalizing psychopathology.
Model 3: Multi-Informant Model

For the first iteration of the multi-informant model, the RCADS(-P) and PANAS-C(-P) subscales were used in their entirety as the indicators for each latent variable, resulting in two indicators per latent variable. Initial analyses of the combined model revealed a small negative error variance of -.012 which was presumed to be a result of sampling error and was fixed to the value of 0 (Kano, 2002). The GFI and RMSEA fit statistics indicated good fit for the combined model, however, the AGFI and CFI both failed to demonstrate adequate fit (see Table 4; Model 3a). All fit statistics were lower than those of the single report models, and the chi-square value rose in comparison to the parent report model, indicating a decrease in fit level. In sum, fit indices for model 3a did not support our hypothesis; model factors were not adequately evidenced in the combined report model.

Another version of the combined model (3b) was evaluated to determine whether an increased number of indicators per latent variable would improve fit. This model included the same split subscale scores used in the first two models, resulting in four indicators per latent variable. With the exception of the RMSEA, the fit statistics indicated worse fit for this iteration of the model, and the chi-square statistic greatly increased and deviated away from models 1, 2, and 3a (see Table 4). These findings demonstrated that increasing the number of indicators by using the split subscale scores did not improve model fit.

Moderators

In four separate analyses, the child and parent report only model were each evaluated in multisample solutions across the two demographic features of gender (e.g., boys and girls sub-samples) and age (e.g., child [ages 8 to 12] and adolescent [ages 13 to 18] sub-samples). The fit statistics for all multisample solutions were very near those of their respective original models,
with the GFI, CFI and RMSEA indicating good to excellent fit. With a range of .87 to .91, the AGFI occasionally fell below the good fit criterion of .90 (see Table 4). When the four multisample solutions were analyzed with all parameters constrained to be equal across sample sub-groups, all four chi-square statistics changed significantly, suggesting that the model parameters may differ in some aspect across gender and age for both child and parent report. To determine the source of the discrepancy, the following subsets of parameters were sequentially constrained to be equal (cf. Chorpita, 2002): (a) measurement weights (i.e., paths from latent variables to their respective indicators), (b) structural weights (i.e., parameters representing relations among latent variables), (c) structural covariances (i.e., structural model variances and covariances), (d) structural residuals (i.e., structural model error term variances and covariances) and (e) measurement residuals (i.e., variances and covariances of the residual error variables in the measurement model) (Arbuckle, 2007).

First, the child report only model was evaluated for equivalence across girls and boys. The measurement residuals were the only added subset of parameters that, when constrained, caused a significant difference in the chi-square value. An examination of the general pattern of variance among the measurement error terms indicated that the girl subgroup demonstrated a higher level of error variance. Gender subgroups were then compared within parent report. All subsets of parameters, with exception of the measurement weights, differed across gender groups. This indicates that although the PANAS-C-P and RCADS-P subscales loaded similarly onto the latent constructs of affect and symptomology, the relationships among these variables differed significantly between girls and boys. Path coefficients between latent variables tended to be stronger for the girl subsample, while the boy subset generally demonstrated higher variance and covariance terms for the latent and residual error terms.
The child and adolescent subsamples were then evaluated for equivalence. In comparing the model structure across age sub-groups, differences emerged between the structural covariances, structural residuals and measurement residuals within both child and parent report. Within parent report, the child subset tended to demonstrate higher variance associated with the affective latent constructs and all structural and measurement error terms. The adolescent subsample, in comparison, generally had higher covariances between the residual error terms of the internalizing disorder latent variables. Within child self-report, the child subset demonstrated larger variances and covariances associated with the latent and observed variables.

Within the multi-informant report models, the multi-sample solutions across both age and gender were improper due to large negative error variances in the male sample subset and child sample subset. Therefore, the moderating effects of age and gender on the multi-informant models could not be determined.

**Discussion**

Study findings supported the structure of the two factor model of emotion for children and adolescents within child and parent reports separately. The parent report data demonstrated strong support for the model structures, suggesting that parent report may serve as a reliable method of measuring affect and psychopathology in children and adolescents. However, multi-informant models evidenced diminished fit in comparison to the single report models.

Moderator analyses demonstrated differences in aspects of the model across age and gender for both parent and child report forms. However, only the moderator of gender within parent report demonstrated a significant difference in the relationships between the latent constructs of affect and internalizing psychopathology. For the multi-informant model, age and gender groups also responded differently. The sample subsets of girls and adolescents evidenced poor model fit,
while the boys and younger children subsamples failed to achieve admissible solutions, most likely as a result of the large number of Heywood cases (i.e., negative error variances). Evidence from previous two-factor and tripartite model literature suggests that anxiety and depression are less distinguishable in younger children (Cole, Truglio, & Peeke, 1997) and as a result, model fit may be degraded within young child samples (cf. Jacques & Mash, 2004; Lonigan et al., 1999). Prior research has also indicated that anxiety and depression can be less differentiated in boys and thereby engender problems with model fit (Ollendick et al., 2003).

The current investigation also adds to the growing literature on the reliability of parent report in measuring childhood psychopathology. The correlations between parent and child measurements of the same construct were consistent with previous cross-informant literature (Achenbach et al., 1987; De Los Reyes & Kazdin, 2005; Meyer et al., 2001). Despite the moderate to low correlations between parent and child report indicators, the parent report model evidenced a very similar pattern of construct relationships to the child report model. This implies both the reliability of parent report and the similarity of parent report to child report in terms of the structure of childhood affect and psychopathology. Although the reliability of parent report is suggested, the present investigation does not directly speak to the validity of such information. There is some evidence, however, that parent report is a valid measure of childhood internalizing psychopathology. For example, Nauta, Scholing, Rapee, Abbott, Spence, et al. (2004) found that a parent version of the Spence Children’s Anxiety Scale (SCAS; Spence, 1998) was able to correctly identify and discriminate between children with separation anxiety disorder (SAD), social phobia (SOC), panic disorder (PD)/agoraphobia and obsessive compulsive disorder (OCD) approximately 70% of the time. Importantly, as De Los Reyes and Kazdin (2005) suggest, no one measurement strategy, including child self-report, is considered to be a completely valid
assessment of childhood psychopathology. Therefore, the divergence of child- and parent-report data does not necessarily indicate a lack of validity for parent reports, but rather the need to gather information from multiple sources to achieve the most accurate assessment. The question of validity in relation to parent report of childhood symptomology has yet to be fully addressed in the literature.

Through analyzing aspects of the two-factor model across multiple reporting forms, the current investigation addressed several issues within the cross-informant literature. First, low inter-rater correlations were evidenced within the present sample, indicating the consistency of this phenomenon in the literature, but now within an ethnically diverse sample. Second, the low cross-informant agreement, inferior fit of the multi-informant model, yet good fit of the single informant models suggests that parents and children have divergent but structurally similar perspectives related to affect and psychopathology. This diminished fit supports the suggestions of De Los Reyes and Kazdin (2005) and Dirks and colleagues (2001) that considering informant data separately may be a more beneficial approach than directly integrating data from multiple informants. Along these lines, our results suggest that combining data from two reliable measures does not inherently improve upon model measurement. In other words, the findings from the cross-informant literature are echoed in the results of the current study: effectively utilizing information from multiple informants requires more than a combination of assessment data, but rather a nuanced consideration of each report in light of factors such as the individual’s attribution of the behavior, memory biases, and motivations for reporting.

The present findings should be interpreted within the context of the following limitations. First, the design of the study may have benefited from the use of multiple measures of affect and psychopathology. However, no additional measures of comparable psychometric properties were
administered in our assessment battery for the study. Although additional measures could have been added to our battery, doing so would have increased the overall time for survey administration, potentially negatively impacting participation rates. Forthcoming studies may aim to replicate this study with other measures of affect and/or psychopathology. Additionally, although the practice of dividing subscales into smaller groups to form indicators is relatively common (cf. Chorpita, 2002; Ollendick et al., 2003), multiple measures would have been preferable to avoid error related to measurement precision. A second limitation of measurement stemmed from the lack of a gold standard measure of childhood affect, and the subsequent presence of conceptual overlap between items of the PANAS-C(-P) (Ebesutani et al., in press; Laurent et al., 1999) and RCADS(-P) (Chorpita et al., 2000; Ebesutani et al., 2010). For example the RCADS item “I feel sad or empty” does not seem substantively different from the PANAS-C item asking informants to rate how often they feel “Sad.” Although the presence of these conceptually similar items in the study measures is not ideal, the PANAS-C(-P) and RCADS(-P) represent two of the best measures currently available to study childhood affect and psychopathology. Additionally, although the current study benefited from a large and ethnically diverse group of participants, sample representativeness is a potential limitation of the current study given the 47.2% participation rate. As with all research projects, child and parent participation was voluntary, and it remains unknown if characteristics from those that did and did not complete the study vary substantially. Further, the small sample of Caucasian youth (i.e., 8%) in our study should be noted, as there may have been features of our predominantly non-Caucasian sample that could have affected our overall results. Boys were also slightly overrepresented within the sample (59%), which the authors speculate to have been a chance occurrence. Given these concerns, some caution is warranted when thinking about the
generalizability of this study’s findings. Finally, the time lag between the administrations of the parent and child questionnaires may have detracted from the strength of the results overall. Although temperament is thought to be a stable, enduring characteristic, informant ratings on the PANAS-C and PANAS-C-P could have been affected by having slightly different assessment dates. Similarly, scores on measures of psychopathology may be expected to change over short periods of time. As mentioned above, most parent and child questionnaires were completed within two weeks of one another and parent questionnaire packets were not included in the analyses if returned more than four weeks after a youth completed his/her questionnaires.

Given that research on parent perspectives of youth affect and internalizing symptomology within the context of the two-factor model of emotion is scant, steps should be taken to further validate parent report forms within additional community samples. Extending the analyses into clinical populations could also represent an important advancement towards developing a unified treatment approach for internalizing psychopathology. Within the clinical context, it may be informative to investigate the nature of the discrepancies between child and parent reports and their implications for treatment. Childhood measures of anxiety and depression are commonly thought to assess one common higher order construct of negative emotionality which underlies all internalizing psychopathology (Joiner et al., 1996; Lonigan et al., 1994). If NA is considered the common trait underlying both anxiety and depression, it may have predictive power for identifying at-risk populations of youth and become the target of a unified treatment approach for individuals with anxiety disorders, depression, or combined anxious and depressive symptomology. A unified approach might prove both efficient and effective with comorbid or misdiagnosed patients. Indeed some researchers in the adult literature have begun developing and investigating such treatments (Allen, McHugh, & Barlow, 2008; Barlow, Allen, & Choate,
2004; Moses & Barlow 2006; Trosper, Buzzella, Bennett, & Ehrenreich, 2009). The continual development of measurement instruments for temperamental constructs is also an important direction for future research. The scarcity of adequate measures of affect, especially those lacking overlapping items with measures of psychopathology, will continue to restrict research related to affect and the two-factor model of emotion.

In summary, the present investigation addressed multiple aspects of the literature regarding the two factor model of emotion. First, strong evidence was found for the two-factor model of emotion within child and parent report separately. Regarding the combined model, the degraded fit suggested that children and parents have diverging perspectives related to affect and psychopathology, and that directly integrating data from multiple sources may not be appropriate. As affect and psychopathology measurement advance, a multi-informant, multi-method approach to the two-factor model of emotion will continue to inform childhood assessment and treatment research.
References


Two-Factor Model of Emotion


doi:10.1023/A:1022806731527


doi:10.1007/BF00919131


doi:10.1097/00004583-199706000-00023


Table 1

*Means, Standard Deviations and Comparisons Between Parent and Child Informants*

<table>
<thead>
<tr>
<th></th>
<th>Child Mean (SD)</th>
<th>Parent Mean (SD)</th>
<th>t(609)</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RCADS(-P)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDD</td>
<td>8.3 (4.5)</td>
<td>3.9 (3.3)</td>
<td>21.7</td>
<td>1.13</td>
</tr>
<tr>
<td>PD</td>
<td>5.4 (4.1)</td>
<td>1.9 (2.1)</td>
<td>60.6</td>
<td>1.07</td>
</tr>
<tr>
<td>GAD</td>
<td>7.6 (4.1)</td>
<td>4.0 (3.0)</td>
<td>18.7</td>
<td>1.02</td>
</tr>
<tr>
<td>SOC</td>
<td>11.4 (5.0)</td>
<td>8.2 (4.3)</td>
<td>13.2</td>
<td>0.69</td>
</tr>
<tr>
<td>OCD</td>
<td>5.6 (3.5)</td>
<td>1.8 (2.4)</td>
<td>23.8</td>
<td>1.24</td>
</tr>
<tr>
<td>SAD</td>
<td>3.5 (3.2)</td>
<td>2.3 (2.4)</td>
<td>8.94</td>
<td>0.40</td>
</tr>
<tr>
<td><strong>PANAS-C(-P)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>31.7 (11.3)</td>
<td>22.8 (8.3)</td>
<td>17.62</td>
<td>0.90</td>
</tr>
<tr>
<td>PA</td>
<td>42.9 (9.5)</td>
<td>43.7 (8.6)</td>
<td>1.95</td>
<td>0.09</td>
</tr>
</tbody>
</table>

*Note.* All *t* tests are significant at the *p* < 0.01 level. MDD = Major Depressive Disorder, PD = Panic Disorder, GAD = Generalized Anxiety Disorder, SOC = Social Phobia, OCD = Obsessive Compulsive Disorder, SAD = Separation Anxiety Disorder, PA = Positive Affect, PD = Panic Disorder, SAD = Separation Anxiety Disorder, SOC = Social Phobia.
<table>
<thead>
<tr>
<th>Subscale</th>
<th>Present Sample</th>
<th>Past Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANAS-C(-P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>.22</td>
<td>.20&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>PA</td>
<td>.30</td>
<td>.33&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>RCADS(-P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDD</td>
<td>.19</td>
<td>.21&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>PD</td>
<td>.21</td>
<td>.17&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>GAD</td>
<td>.11</td>
<td>.14&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SOC</td>
<td>.18</td>
<td>.21&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>OCD</td>
<td>.18</td>
<td>.21&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SAD</td>
<td>.41</td>
<td>.39&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Note. All correlations are significant at the p<.01 level. MDD = Major Depressive Disorder, PD = Panic Disorder, GAD = Generalized Anxiety Disorder, SOC = Social Phobia, OCD = Obsessive Compulsive Disorder, SAD = Separation Anxiety Disorder, PA = Positive Affect, NA = Negative Affect. <sup>a</sup> = results from Ebesutani et al., in press; <sup>b</sup> = results from Ebesutani et al., 2010.*
### Table 3

**Path Coefficients for the Present Study**

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3a</th>
<th>Model 3b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDD</td>
<td>0.66</td>
<td>0.51</td>
<td>0.70</td>
<td>0.61</td>
</tr>
<tr>
<td>PD</td>
<td>0.61</td>
<td>0.53</td>
<td>0.72</td>
<td>0.57</td>
</tr>
<tr>
<td>GAD</td>
<td>0.63</td>
<td>0.51</td>
<td>0.77</td>
<td>0.58</td>
</tr>
<tr>
<td>SOC</td>
<td>0.52</td>
<td>0.40</td>
<td>0.56</td>
<td>0.48</td>
</tr>
<tr>
<td>OCD</td>
<td>0.55</td>
<td>0.48</td>
<td>0.69</td>
<td>0.58</td>
</tr>
<tr>
<td>SAD</td>
<td>0.45</td>
<td>0.33</td>
<td>0.45</td>
<td>0.37</td>
</tr>
<tr>
<td>PA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDD</td>
<td>-0.25</td>
<td>-0.30</td>
<td>-0.35</td>
<td>-0.24</td>
</tr>
<tr>
<td>NA</td>
<td>-0.02</td>
<td>-2.46</td>
<td>-6.76</td>
<td>-0.97</td>
</tr>
</tbody>
</table>

**Note.** All standardized path coefficients from the present study are significant at the $p<.01$ level. MDD = Major Depressive Disorder, PD = Panic Disorder, GAD = Generalized Anxiety Disorder, SOC = Social Phobia, OCD = Obsessive Compulsive Disorder, SAD = Separation Anxiety Disorder, PA = Positive Affect, PD = Panic Disorder, SAD = Separation Anxiety Disorder, SOC = Social Phobia.
Table 4

**Fit Statistics for Full and Sub-Sample Structural Models**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>$\chi^2$</th>
<th>df</th>
<th>GFI</th>
<th>AGFI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>610</td>
<td>223.71</td>
<td>81</td>
<td>.96</td>
<td>.93</td>
<td>.97</td>
<td>.05</td>
</tr>
<tr>
<td>Boys</td>
<td>362</td>
<td>164.32</td>
<td>81</td>
<td>.95</td>
<td>.91</td>
<td>.98</td>
<td>.05</td>
</tr>
<tr>
<td>Girls</td>
<td>248</td>
<td>171.95</td>
<td>81</td>
<td>.92</td>
<td>.87</td>
<td>.96</td>
<td>.07</td>
</tr>
<tr>
<td>Age</td>
<td>610</td>
<td>323.44</td>
<td>162</td>
<td>.94</td>
<td>.90</td>
<td>.97</td>
<td>.04</td>
</tr>
<tr>
<td>Younger</td>
<td>298</td>
<td>157.55</td>
<td>81</td>
<td>.94</td>
<td>.90</td>
<td>.97</td>
<td>.06</td>
</tr>
<tr>
<td>Older</td>
<td>312</td>
<td>165.89</td>
<td>81</td>
<td>.94</td>
<td>.90</td>
<td>.97</td>
<td>.06</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>610</td>
<td>339.73</td>
<td>162</td>
<td>.94</td>
<td>.89</td>
<td>.97</td>
<td>.04</td>
</tr>
<tr>
<td>Boys</td>
<td>362</td>
<td>190.40</td>
<td>82</td>
<td>.94</td>
<td>.90</td>
<td>.97</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>248</td>
<td>149.35</td>
<td>81</td>
<td>.93</td>
<td>.88</td>
<td>.97</td>
<td>.06</td>
</tr>
<tr>
<td>Age</td>
<td>610</td>
<td>369.33</td>
<td>162</td>
<td>.93</td>
<td>.89</td>
<td>.96</td>
<td>.05</td>
</tr>
<tr>
<td>Younger</td>
<td>298</td>
<td>164.04</td>
<td>81</td>
<td>.94</td>
<td>.89</td>
<td>.97</td>
<td>.06</td>
</tr>
<tr>
<td>Older</td>
<td>312</td>
<td>205.30</td>
<td>81</td>
<td>.93</td>
<td>.88</td>
<td>.96</td>
<td>.07</td>
</tr>
<tr>
<td>Model 3a</td>
<td>610</td>
<td>435.87</td>
<td>82</td>
<td>.91</td>
<td>.85</td>
<td>.60</td>
<td>.08</td>
</tr>
<tr>
<td>Model 3b</td>
<td>610</td>
<td>1633.36</td>
<td>441</td>
<td>.83</td>
<td>.80</td>
<td>.48</td>
<td>.07</td>
</tr>
</tbody>
</table>

*Note.* AGFI = Adjusted Goodness of Fit Index; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; RMSEA = Root Mean Square Error of Approximation. “Age” and “Gender” refer to the multi-sample solutions that evaluate those moderating effects. All $\chi^2$ statistics are significant at the $p<.01$ level.
Figure 1. Model 1: The two-factor tripartite model structure. (MDD = Major Depressive Disorder, PD = Panic Disorder, GAD = Generalized Anxiety Disorder, SOC = Social Phobia, OCD = Obsessive Compulsive Disorder, SAD = Separation Anxiety Disorder.)