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Developmental Changes in the Structure of Affect: Is the Tripartite Model Equally Valid for Younger and Older Children?

Bryan B. Bushman
Utah State University

DEVELOPMENTAL CHANGES IN THE STRUCTURE OF AFFECT: IS THE TRIPARTITE MODEL EQUALLY VALID FOR YOUNGER AND OLDER CHILDREN?

by

Bryan B. Bushman

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ABSTRACT

Developmental Changes in the Structure of Affect:

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by

Bryan B. Bushman, Master of Science

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Major Professor: Susan L. Crowley, Ph.D.
Department: Psychology

Many studies investigating the validity of the Tripartite model of affect in children have been supportive of the model. However, few studies have examined if older and younger children structure affect similarly. The current study used confirmatory factor analytic techniques (SEM) to test the validity of the tripartite model in two developmentally distinct populations of children (third and sixth grade). Confirmatory factor analytic methods examined one-factor, two-factor correlated, and two-factor uncorrelated models. Furthermore, the pattern of correlations between positive affect (PA), negative affect (NA), and dependent measures of anxiety and depression was calculated.

The results indicated the two-factor correlated and two-factor uncorrelated models demonstrated adequate fit across samples. However, in the younger sample the

correlation between NA and PA was larger and statistically significant compared to the older sample, thus supporting the hypothesis that older and younger children structure affect differently. Limitations of the study and clinical/developmental implications are discussed.

(129 pages)

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Bryan B. Bushman

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CHAPTER I

INTRODUCTION

Psychologists have struggled for years to understand the fundamental differences between anxiety and depression. Whether they are defined in dimensional terms or as diagnostically distinct disorders, the high amount of symptom overlap makes it difficult to identify definitive criteria that will consistently delineate the two constructs. Theories as to the relationship between anxiety and depression abound. Some clinicians have theorized that they are, in fact, the same construct manifesting itself differently (Dobson, 1985b; Kendler, Neale, Kessler, Heath, & Eaves, 1992). Others have postulated that they are completely different constructs that just happen to share some common symptoms (Clark, Beck, & Stewart, 1990; Clark, Steer, & Beck, 1994).

A recent model, based on the latter idea, is called the Tripartite Model (Clark & Watson, 1991). The Tripartite model proposes that anxiety and depression share common symptoms that can be conceptualized as a single component called negative affectivity (NA). NA is the negative emotional state or general distress shared by both constructs. Anxiety and depression diverge, however, in relationship to two other factors. According to the model, high levels of physiological hyperarousal (PH) are specific to anxiety, while low levels of positive affect (PA) or anhedonia are specific to depression. Consequently, the Tripartite model makes allowances for the similarity of symptomology while simultaneously providing the capacity to differentiate depression and anxiety.

Many studies investigating the validity of the Tripartite model in adult populations have been supportive of its principle features (Jolly, Dyck, Kramer, & Wherry, 1994; Watson, Clark, & Carey, 1988; Watson et al., 1995). For instance, Brown, Chorpita, and Barlow (1998) compared measures of PH, PA, and NA with the presence or absence of depression or anxiety disorders as defined in the *Diagnostic and Statistical Manual of Mental Disorders--IV* (*DSM-IV*; American Psychiatric Association [APA], 1994). In accordance with the Tripartite model, they concluded that high levels of NA were related to both sets of disorders while low levels of PA and high levels of NA were specifically associated with a diagnosis of depression. In comparison, high levels of PH and NA were specifically associated with a diagnosis of anxiety. Findings such as these have caused many researchers to concede that assessment of low PA in combination with high NA is often sufficient to distinguish depression from anxiety (Krueger, Caspi, Moffitt, Silva, & McGee, 1996; Trull & Sher, 1994).

Similar findings have also been demonstrated in children (Chorpita, Albano, & Barlow, 1998; Crowley & Emerson, 1996; Epkins & Meyers, 1994; Murphy, Marelich, & Hoffman, 2000). However, developmental theory and some recent empirical findings have indicated that younger and older children may not structure anxious and depressive affect in quite the same manner (Cole, Truglio, & Peeke, 1997; Glasberg & Abound, 1982; Lonigan, Hooe, David, & Kistner, 1999; Weisz, 1981). Therefore, models that propose a way to structure anxious and depressive affect, like the Tripartite model, may not apply uniformly to both younger and older children. Despite such concerns, many studies examining the structure of affect in children have lumped all age ranges of children into the same subject pool (Chorpita, Daleiden, Moffitt, Yim, & Umemoto,

2000; Joiner, Catanzaro, & Laurent, 1996; Lonigan, Carey, & Finch, 1994).

To date, few studies have addressed the application of the Tripartite model in younger and older children. Cole et al. (1997) investigated the utility of the Tripartite model in third- and sixth-grade children using self-report measures. Cole et al. concluded that younger children were less able to distinguish between anxiety and depression because the factors representing PA and NA in this sample were highly negatively correlated. Conversely, the data from the older children were more consistent with the Tripartite model because PA and NA were less correlated and, therefore, had more utility in distinguishing anxiety from depression.

A more recent study by Lonigan et al. (1999) also examined data taken from self-report measures administered to children. Many of their results are similar to Cole and colleagues' findings. Confirmatory factor analysis revealed that a two-factor oblique model (i.e., PA and NA were correlated) was a better fit for the data derived from the younger sample while a two-factor orthogonal model (i.e., PA and NA were uncorrelated) was a better fit for the older sample. Furthermore, Lonigan and colleagues found that PA was less negatively correlated with depression in the younger sample. These findings indicate that the PA and NA factors on which the Tripartite model is based are less distinct from one another in younger children. Consequently, these authors provide indirect evidence that some of the symptoms of anxiety and depression begin to differ from one another as a child matures.

However, Lonigan et al. (1999) and Cole and colleagues' (1997) studies are limited by several factors. First, the results indicating a difference in how younger and older children structure affect were not the intended purpose of either study. Second,

where the Lonigan study included a measure that directly assessed components of the Tripartite model, the Cole study did not. Therefore, the Cole and colleagues' results could have resulted from using general measures of anxiety and depression rather than more specific measures used to assess components of the Tripartite model. The sample size in the Lonigan study was insufficient to analyze data for different grades of children separately. In addressing this limitation, Lonigan and colleagues stated, "...future studies should address a more fine-grained examination of potential age differences" (p. 384). Only one other study has examined developmental differences in affect structure with two large samples of different age children and a measure that specifically assessed the Tripartite constructs (Turner & Barrett, 2003); however, this study did not specifically examine a two-factor uncorrelated solution. Therefore, it is still unclear whether or not the constructs of PA and NA are more distinct in the older group and less distinct in the younger group, as the results of Cole et al. and Lonigan et al. imply.

The present study proposes to investigate developmental differences in affect structure by examining the applicability of key aspects of the Tripartite model in two developmentally different samples of children. The methodology for the study will directly address limitations identified in previous research. Specifically, unlike the Cole et al. (1997) study, the present study included a measure that directly assessed components of the Tripartite model. Furthermore, unlike the Lonigan et al. (1999) study, the present study also collected a large sample of two developmentally distinct groups of children so that any differences in affect structure can be adequately investigated. Analyses were conducted using confirmatory factor analytic methods in

both older and younger children to more clearly understand the relationship between key components of the Tripartite model and self-report measures of anxiety and depression. A review of the relevant literature will be provided before discussing the specific research questions to be addressed.

CHAPTER II

LITERATURE REVIEW

This literature review will present an overview of relevant topics pertaining to the current study. Data supporting the utility of the Tripartite model in adults and children will be presented. The literature review will continue with a discussion of how developmental differences may impact the utility of the model with younger children. Studies supporting the notion that younger children structure affect differently, as indicated by the Tripartite model, will be examined. Finally, strengths and limitations of these studies will also be identified to determine how the current study may add to the body of research by building upon previous conclusions while accounting for the literature's limitations.

Anxiety and Depression: Differences, Similarities, and Measurement Issues

This first section will delineate the primary differences and similarities of anxiety and depression. Traditionally the measurement of anxiety and depression has been done with self-report measures. However, as will be discussed, the high amount of internalized general distress that both constructs share creates special difficulties when trying to tease apart differences. Therefore, the difficulties inherent in using self-report measures will be discussed. Data will be presented regarding: (a) the high correlations found among self-report instruments designed to measure anxiety and depression, (b) the results of factor analytic studies, and (c) how various researchers

have interpreted these results. The findings presented in this section will pertain primarily to adults so as to establish some general trends regarding self-report measurement before limiting the discussion to children.

Construct Differences

For years, psychologists have struggled to understand the primary differences between anxiety and depression. One example of this dilemma is the great deal of overlap in the diagnostic criteria for anxious and depressive disorders as defined by the *DSM-IV* (APA, 1994). Common symptoms include subjective feelings of discomfort, difficulty in thinking or concentrating, negative and unrealistic thoughts, misinterpretation of symptoms and events, worry, irritability, fatigue, and social withdrawal. The two phenomena are not without differences, however. For instance, depression is often distinguished from anxiety by the hallmark characteristics of depressed mood or loss of interest in activities that were previously considered enjoyable. Additional characteristics such as a preoccupation with death, feelings of worthlessness or excessive guilt, and loss of weight (or failure to make expected weight gains in children) are also typically associated with depression but not with anxiety (APA). Furthermore, depression is often associated with flat or negative affect and a persistence of negative mood state without such physiological symptoms like heightened arousal (Clark, 1989). In contrast, the symptoms of anxiety often include overt behaviors, such as avoidance and withdrawal; and physiological responses, such as sweating, nausea, shaking, and general arousal. Those who suffer from the symptoms of anxiety are also distinguished from those suffering from depression by

their frequent tendency to be overly sensitive to physical cues regarding specific feared situations or events (Merrell, 2001).

There is also some evidence indicating that the two constructs can be differentiated based on specific cognitions (Beck, 1976). Beck stated that anxiety and depression could be distinguished by the content of the maladaptive cognitions that are associated with the symptoms of the two disorders. When depression is experienced themes of loss and failure dominate cognitive experience. These themes, when experienced over and over again, turn into absolute statements about past loss and future potential. When anxiety is experienced, however, cognitions are dominated by "what if" thinking or themes of danger to the self. Therefore, according to Beck's content specificity hypothesis, anxiety and depression can be discriminated if measures tapping cognitive content are used. Research has shown some impressive support for this idea (Clark, Beck, & Brown, 1989; Jolly & Dykman, 1994; Lerner et al., 1999). Clark and colleagues (1990), in comparing the content of a cognitions checklist that was filled out by both anxious and depressed patients, stated, "depressed patients reported significantly more hopelessness, lower self-worth, and more negative thoughts involving loss and past failure. The anxious group, on the other hand, had significantly more thoughts of anticipated harm and danger" (p. 153).

Construct Similarities

Despite these differences, the similarities of anxiety and depression have created a considerable amount of overlap between the two constructs both diagnostically and symptomatically. Some researchers, for example, have reported that up to 70% of

patients with anxiety disorders had at least one major depressive episode- a hallmark for the diagnosis of major depression (Breier, Charney, & Heninger, 1985). Another study compared a group of clinically anxious and a group of clinically depressed adolescents and found that the two groups shared such symptoms as poor school performance, appetite and sleep problems, somatic complaints, and obsessive rumination (Hershberg, Carlson, Cantwell, & Strober, 1982). The high degree of symptom overlap between anxiety and depression have led some researchers to believe that, "if the clinical features alone are considered, it is not possible to separate anxiety states from neurotic depression" (Johnstone et al., 1980, p. 327).

This issue is further complicated because those who are suffering from anxiety and/or depression often cannot differentiate the experience of two constructs themselves. Common clinical experience demonstrates that: (a) patients are often unable to discriminate their own specific symptoms of anxiety and depression (Leff, 1978); and (b) the disorders tend to be highly comorbid (King, Ollendick, & Gullone, 1991). In fact, some have gone so far as to theorize that anxiety and depression's frequent co-occurrence could be "a function of long-term emotional states which might have merged with one another over time and are indistinguishable at the time of study" (King et al., p. 23). Even if this sentiment were untrue, it would appear that anxiety and depression share a common feeling of internalized general distress that makes teasing apart the constructs very difficult, even for those persons experiencing the symptoms.

Measurement Issues: The Dilemma of Self-Report Instruments

If anxiety and depression are difficult to differentiate diagnostically,

symptomatically, or by client experience because of this common feeling of internalized general distress: what viable options remain to assist the clinician in distinguishing the constructs from one another? Self-report measures would appear to be a proper solution because they are one of the only known ways to, hypothetically, assess internal functioning. Ideally, such measures would help the patient to distinguish between anxiety and depression by providing items that apply to specific dimensions of each construct.

This sounds good theoretically; however, the research regarding this notion is less than encouraging. For instance, correlations between various self-report measures of anxiety and depression average .66 for clinical populations and .70 for nonclinical populations (Clark & Watson, 1991; Dobson, 1985b; Norvell, Brophy, & Finch, 1985). In fact, some anxiety scales predict clinical ratings of depression as well as they do anxiety and vice versa (Watson & Kendall, 1989). An example of this rather robust phenomenon can be demonstrated by examining data related to two of the most widely used self-report measures of anxiety and depression in children: the Reynolds Children Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985) and the Children's Depression Inventory (CDI; Kovacs, 1985). In one study, the RCMAS and CDI scores of 150 adolescents were highly correlated (r = .70, .71) with each other at two different points in time (Tannenbaum, Forehand, & Thomas, 1992). Because the RCMAS and the CDI are supposed to measure different constructs, the authors concluded, "anxiety and depression, when measured by self-report, constitute one category" (p. 69). A separate study (Hodges, 1990) concluded that depressed children scored higher on the RCMAS than anxious children and that the RCMAS was more highly correlated to the

CDI than to other measures of anxiety like the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973). The author of this study concluded that the RCMAS seemed to be tapping *both* symptoms of anxiety and depression.

The poor discriminate validity between measures of anxiety and depression are not limited to the RCMAS and CDI, however. Wolfe et al. (1987) used multiple regression analysis to indicate that scores on the CDI, STAIC, and RCMAS all predicted the internalizing factor of the Child Behavior Checklist--Teacher Report Form (CBCL-TRF; Achenbach, 1991) better than the individual scale of anxiety/depression on the CBCL-TRF. This suggests that each of these instruments is more useful in identifying broad-band constructs (e.g., such as internalized general distress) than narrow-band constructs (e.g., depression and anxiety). Similar findings lead Chorpita et al. (1998) to state, "Unfortunately, many measures of childhood negative emotions contain a large number of non-specific items, which can strain the specification of a definitive structure of negative emotions" (p. 76).

In deference to self-report measures, it should be noted that many of them were not specifically intended to measure one construct to the exclusion of all others. These measures are most useful when they are used: (a) to differentiate between those who are feeling internalized symptoms of psychologically suffering and those who are not; and (b) to determine the extent of the suffering. The finding that most self-report measures assess internalized general distress supports the function for which the measures were originally designed.

However, the ability of self-report measures to distinguish between anxiety and depression has merit because the recommended treatments for these two conditions are

different. For instance, relaxation training is rarely part of the treatment program for a client that is primarily experiencing depression. Furthermore, many populations have special issues when it comes to communicating differences in affective experience. For instance, children generally have more difficulty than adults in expressing themselves and providing a complete picture of their current psychological experience. Therefore, a critical need in psychological testing seems to be the development of instruments that assess a specific construct to the exclusion of others.

Nevertheless, general internalized distress in both disorders seems to be responsible for the high amount of overlap and lack of discriminant power in most self-report measures. Finch, Lipovsky, and Casat (1989) referred to this problem when they stated, "evidence from empirical studies suggests that respondents [on self-report measures] either are unable to differentiate between anxiety and depression, or that current assessment instruments and procedures are invalid—that is, that they lack the necessary discriminant validity" (p. 194). Establishing discriminant validity using traditional self-report measures seems to be an illusive goal.

In fact, the results of anxiety and depression self-report measures have been used to purport the idea that the two constructs are not as different as initially believed. Dobson (1985b), for instance, administered nine self-report scales, four standardized trait anxiety scales, and five depression scales to male and female undergraduates. A principal component factor analysis was conducted for each sex with a single factor emerging for both genders. This factor accounted for 74.4% of the total variance for males and 85% of the total variance for females. The other factors derived from this analysis accounted for amounts of variance that were considered by the author to be

insignificant. Other studies have replicated the finding that a single, large general factor accounts for the majority of the variance in anxiety and depression self-report measures (Mayer & Gaschke, 1988; Watson & Tellegen, 1985). However, Dobson did not conclude that self-report measures failed to discriminate the two constructs. Instead he suggested that such results implied the symptoms of anxiety and depression were experienced in almost an identical fashion and were thus a unitary construct (Dobson). In line with this thinking, Joiner et al. (1996) stated that "the problems with discriminant validity have led several researchers to question whether anxiety and depression represent unique disorders, or instead, are demonstrative of a more general level of emotional distress" (p. 401).

Summary

Anxiety and depression seem to share a common set of symptomatic features that have been referred to as internalized general distress. It would appear that one of two alternatives is accurate. First, the concept of internalized general distress by itself adequately explains the structure of affect for both anxiety and depression. Any difference in symptoms is simply two different manifestations of conceptually the same thing (after all, different manifestations of a common psychological diathesis are not uncommon in the mental health profession). Second, self-report measures have not advanced to the point that they can distinguish between the syndromes because of the internalized distress in both constructs. Therefore, greater item specificity is needed in self-report measures to make the ability to distinguish the constructs possible. If the latter theory is true, then the data cited thus far not only make sense conceptually, but

also demonstrates the necessity for further measurement tools in this area.

However, how does one go about making items on self-report measures more specific? A comprehensive understanding of the factors and criteria that have been proposed to distinguish anxiety from depression is needed first. A number of theoretical approaches have been proposed. This discussion will be the next area of emphasis in this paper.

The Relationship Between Anxiety and Depression: A Theoretical Overview

There is a great deal of debate regarding the theoretical relationship between anxiety and depression. Clark (1989) concisely summarized the different perspectives that have been proposed on this relationship when she said:

> The solutions offered have included viewing them [anxiety and depression] as (1) different points along a single continuum; (2) sharing a common underlying diathesis, which manifests itself in different ways depending on other unknown factors; (3) phenomenologically distinct but temporally associated, with initial anxiety turning to depression when relief is not forthcoming; (4) heterogeneous within themselves, such that some subtypes are more differentiable than others; and (5) conceptually and empirically distinguishable on the basis of course, family history, associated symptoms, and so on. (pp. 83-84)

Clark's statement delineates several different theories that have been proposed to explain the relationship between anxiety and depression. For the purposes of this paper, these theories will be summarized into one of three models: the unitary model, the temporal model, and the dual construct model. Evidence will be examined supporting each of these models.

The Unitary Model

As its name suggests, the unitary model theorizes that anxiety and depression are different expressions of a single unitary construct. Consequently, any measured difference between anxiety and depression should be seen more as an artifact of measurement than as "proof" of the existence of separate disorders. Several studies have either directly or indirectly supported this conceptualization. One study compared the occurrence of generalized anxiety disorder (GAD) and major depression (MD) in 1,033 pairs of female twins. These data provided the authors opportunity to compare familial environmental and common genetic factors. The results of the study suggested that both depression and anxiety develop from a similar genetic/biological predisposition, but the manifestation of it may be more of a reflection of environmental factors (Kendler et al., 1992). Additionally, Johnstone et al. (1980) found what is now common clinical knowledge; namely, that subjects with either anxiety or depression react similarly to anxiolytic or antidepressant medications. Some believe that this finding is yet another indication that a biological or neurological etiology underlies both disorders (Gittelman-Klein & Klein, 1973).

Some studies have attempted to identify the specific biological system or systems that are supposedly to "blame" for both anxiety and depression. For instance, Bradley (1991) presented a theory based on the notion that the subjective experience of anxiety and depression were both specifically modulated by the reticular, limbic, and frontal systems of the brain. Two prominent pieces of evidence that Bradley cites in support of this theory are (a) a high incidence of pathology, such as the symptoms of anxiety and depression, among brain disordered individuals; and (b) the idea that many

therapies are effective because they identify and remediate affect modulation as a central cause of psychopathology. Bradley's allegation of the specific systems that cause the symptoms of anxiety and depression is debatable; however, her argument, and the evidence cited thus far, highlights the notion that biological systems of affect regulation are the "cause" of both constructs. Hence, both anxiety and depression can be traced to similar, if not the same, etiological roots. However, even if anxiety and depression are caused by a similar biological diathesis, it does not justify concluding that the constructs are necessarily the same. Certainly more evidence is needed.

Several factor analytic studies support the unitary model by providing indirect evidence that the symptomology of anxiety and depression, especially as measured by self-reports, are more similar than different (Dobson, 1985b; Mayer & Gaschke, 1988; Watson & Tellegen, 1985). These studies were discussed earlier in the section describing measurement issues. They suggest that a single factor takes up the majority of the variance for both anxiety and depression. Some have not seen these findings as evidence supporting the unitary model but as evidence that self-report measures need to be designed to be more sensitive to the distinguishing characteristics of anxiety and depression (Clark et al., 1990).

The Temporal Model

In contrast to the unitary model, the temporal model indicates that anxiety and depression are distinct phenomenon; however, anxiety turns into depression when it is continually experienced without relief. The eventual result of perpetual anxiety is that negative thought patterns are formed and a negative image of the world and of the self

is created. Looking at it this way, depression can be conceptualized as "burnt out" anxiety (Dobson, 1985b). Dubovsky (1990) proposed that a similar phenomenon happens at the physiological level when the stress usually associated with anxious symptoms acts adversely on the limbic, autonomic and vegetative systems. Stress on these symptoms is often associated with a dysregulation in the body that could lead to symptoms of depression. It is difficult to tell, however, if this dysregulation is the result of preceding anxiety or merely a natural co-occurrence of depression.

A number of longitudinal studies have supported the temporal model by demonstrating how anxiety often predates depression in adolescents and children. In one study, for instance, researchers administered anxiety and depression questionnaires every six months to elementary school children for three years. They found that high levels of anxiety at one point in time were highly correlated to depressive symptoms at a later date. The same pattern, however, did not hold true for depression predicting anxiety (Cole, Peeke, Martin, Truglio, & Seroczynki, 1998). In another study, 385 children were assessed for the symptoms of depression and anxiety at the ages of 5, 9, 15, and 18 (Reinherz et al., 1993). Results of the study indicated that anxiety in boys at age 15 predicted major depressive disorder at age 18 and anxiety in girls at age 9 predicted major depression at age 15.

These conclusions are similar to those of Kovacs, Gatsonis, Paulauskas, and Richards (1989). These researchers used semistructured interviews to reassess a depressed group (n = 142) and a nondepressed psychiatric comparison group (n = 49) of 8- to 13-year-old children at two 5-year follow-up time periods. As suspected, Kovacs and colleagues found that anxiety disorders usually predated the onset of depression.

These results, however, seemed to be especially true for those children assessed with major depressive disorder, less true for those children with dysthemia, and hardly true for those children with a simple depressed mood. In other words, as the intensity of the depression increased, the likelihood that anxiety preceded the depression also increased.

The relationship between the intensity of depression and preceding symptoms of anxiety is interesting given the fact that anxiety does not *always* precede depression. Perhaps the temporal model is only a valid way to conceptualize anxiety and depression when the depression is intense enough to warrant diagnostic classification. Until further studies are done, however, such a notion is speculative. Another problem with the temporal model is that people routinely have anxiety without it necessarily turning into depression. Nevertheless, the longitudinal studies that have been cited generally support some aspects of the temporal model and the conclusions of other researchers. These conclusions state that: (a) the age of onset for anxiety disorders is younger than the age of onset for depressive disorders (Orvaschel, Lewinsohn, & Seeley, 1995); and (b) depressed children are more likely to endorse the symptoms of anxiety than anxious children are likely to endorse the symptoms of depression (Stavrakaki, Vargo, Boodoosingh, & Roberts, 1987). Evidences such as these may indicate that, in some cases, anxiety and depression are simply two different points along the same developmental course. Perhaps the presence of anxiety predisposes a child to be depressed later in life because the symptoms of anxiety inhibit a child's functioning to the point that he or she "gives up."

The Dual Construct Model

The final model, the dual construct model, proposes that anxiety and depression are different constructs that happen to have some overlapping symptoms. Interestingly, some researchers have claimed to find validation of this model through the same methodology that was used to support the unitary model- factor analysis. Clark et al. (1994) administered self-report measures, such as the Beck Depression Inventory (BDI; Beck & Steer, 1987) and Beck Anxiety Inventory (BAI; Beck & Steer, 1990), to 844 psychiatric outpatients and 420 undergraduate students. Principle factor analysis of the items from the BAI and BDI indicated the presence of two correlated factors in both samples. When a second-order factor analysis was performed, a large second-order factor that accounted for over 40% of the variance was identified. However, after this factor was held constant, the authors found that the two first ordered factors continued to explain unique amounts of variance. One factor, specific to depression, was made up of specific motivational symptoms and cognitive items on the BDI related to pessimism, sense of failure, self-dislike, and dissatisfaction. The factor specific to anxiety was well represented by the physiological symptoms measured by the BAI, including symptoms of nervousness and worry.

Another study of Clark et al. (1990) contained similar findings. These researchers did an Exploratory Factor Analysis (EFA) on the relationship between symptoms of anxiety and depression using symptom-based measurements (BAI and BDI) and the more specific Cognitions Checklist (CCL; Beck, Brown, Steer, Eidelson, & Riskind, 1987) on a sample of 470 inpatient participants. They found that even though a one-factor solution accounted for a significant portion of the variance (55.9%

of the total variance), a two-factor solution was a much better fit for the data. In discussing the two-factor solution, the authors stated that the two-factors, "clearly represent depression and anxiety. Both factors were internally consistent; all depressive cognition and symptom measures loaded on Factor 1, and all anxiety measures loaded on Factor 2" (p. 151).

Both of these studies indicate that when items from depression and anxiety measures are analyzed, a large factor that takes up the majority of the variance appears. This would seem to be in accordance with the unitary model. However, they also indicate, in accordance with the dual construct model, that smaller factors appear that are specific to anxiety and depression, respectively. Clark et al. (1994) stated, "In sum, our findings suggest that motivational...and cognitive symptoms are specific markers of depression, though they are by no means unrelated to general stress [the larger factor]" (p. 652). Interestingly, both studies also found items that tapped the specific aspects of anxious or depressed maladaptive cognitions, loaded less heavily on the larger factor, and could be construed as specific indicators for depression or anxiety. The evidence supporting cognitive symptom markers seems to validate Beck's original contention, mentioned previously, that anxiety and depression can be distinguished by the content of the maladaptive cognitions associated with the symptoms (Beck, 1976). It is also interesting to note that in all of these studies the large factor that accounts for the majority of the variance was made up of items seeming to assess the concept of internalized general distress.

The studies presented thus far rely on exploratory factor analysis as a basis for their claims. However, this methodology is often considered less stringent than other

analytic techniques. What do studies that utilize more stringent methods, such as confirmatory factor analysis (CFA), find in relationship to this issue? A study by Feldman (1993) used CFA techniques to determine whether or not data derived from self-report scales of anxiety and depression supported a one-factor or two-factor model of affect. Feldman obtained her data from the correlational matrixes of several well-known studies of affect using clinical and nonclinical adult participants (Dobson, 1985a; Gotlib, 1984; Mendels, Weinstein, & Cochrane, 1972; Tanaka-Matsumi & Kameoka, 1986). Using the Comparative Fit Index, Feldman found that the two factor models did not fit the data better than the one-factor model in two of the data sets. Although the two-factor models fit the data better in the other two sets of data, Feldman indicated that this finding was not very strong and that "a two-factor model may fit the data better...simply because one additional parameter is being estimated" (p. 634). Furthermore, analysis of all four data sets revealed large correlations between .82 and .96 representing the latent constructs of anxiety and depression.

Another study using CFA methods by Crowley and Emerson (1996) refutes some of these findings. These investigators administered self-report measures of anxiety and depression to 273 fourth- and fifth-grade students. The LISREL 7 program was used to determine if a one-factor or two-factor model represented the data the best; however, the researchers in this study used the subscale scores on the measures as a basis of their data analysis. These researchers also found that the measures of anxiety and depression were highly correlated (r = .74); however, the goodness-of-fit (GFI) and adjusted goodness-of-fit (AGFI) indexes were significantly higher for the two-factor model than the one-factor model (one-factor: GFI = .778, AGFI = .651; two-factor:

GFI = .926, AGFI = .881). In explaining why their results differed from that of Feldman (1993), Crowley and Emerson stated:

> First, the limited number of degrees of freedom (6 or 7 for all analysis) in the analyses by Feldman may have artificially inflated the fit statistics. Second, the level of analysis in the two studies was different (i.e., subscale-score vs. summary-score data), which may have impacted the results. Finally, some of Feldman's analyses were conducted with clinical samples, *whereas the present research used only a nonclinical sample.* (p. 144, italics added)

The results of confirmatory factor analytic studies, while by no means conclusive, seem to support the notion that two-factors can be extracted from self-report measures of anxiety and depression. Furthermore, there seems to be evidence indicating that these findings can be generalized to nonclinical samples.

Summary

The evidence presented in this section indicates that, of the three models that were discussed, the dual construct model seems to explain the data the best. The dual construct model has the most support because data indicates that two factors with a large amount of overlapping symptoms can be detected using the stringent requirements of CFA methodology. The evidence also demonstrates that self-report measures can, in fact, be useful in distinguishing anxiety and depression in both clinical and nonclinical samples. Data taken from these measures reveals the existence of a larger factor tied to the notion of general distress and at least two other factors that are specifically associated with either anxious or depressed symptoms, but not with both. This corroborates the claims made earlier that there are, in fact, components unique to the structure of anxiety and depression and that traditional self-report items lack the specificity necessary to identify these components. Clark and Watson (1991) proposed

a model for anxiety and depression, described below, which synthesizes these conclusions. Furthermore, their model labels and conceptualizes how the components unique to the structure of anxiety and depression relate to one other.

The Tripartite Model: Explanation and Evidence

The following section will explain the features of Clark and Watson's (1991) Tripartite model of affect. It will also delineate the evidence that has been found supporting the use of this model in adult populations. Self-report instruments, like the Positive and Negative Affect Scale (PANAS), will be introduced. These measures claim to be able to assess the components of the Tripartite model. Data will be presented regarding their validity. Finally, results discussing the limitations of the Tripartite model in adults will be presented.

The Tripartite Model: Explanation

The Tripartite Model (Clark & Watson, 1991) proposes that the common component of anxiety and depression, referred to as internalized general distress, can be conceptualized as a single factor called negative affectivity or NA. Anxiety and depression diverge, however, in relationship to two other factors. According to the model, high levels of PH are specific to anxiety, and low levels of PA or anhedonia are specific to depression. Therefore, NA can be seen as the common negative emotional state or factor of generalized distress that both constructs have in common, while PH and PA can be seen as two factors that distinguish anxiety from depression. For example, a person who is primarily depressed would score relatively high on NA,

relatively low on PA, and not particularly high on PH. The primarily anxious person would also score high on NA but, in contrast, would score in the "normal" range on PA and have an elevated PH score. Consequently, the Tripartite model makes allowances for both a large internalized general distress factor (now designated as NA) that seems to support the unitary model, and the smaller factors (PA and PH) that were alluded to in support of the dual construct model.

The Tripartite Model: Evidence

Not surprisingly, the Tripartite model has been the focus of a number of studies with adult populations that are designed to investigate the relationship between many of its principle components. The results have been generally supportive of Watson and Clark's theory. For instance, Watson et al. (1995) administered the Mood and Anxiety Symptom Questionnaire (MASQ; Watson & Clark, 1991) to undergraduate, adult, and patient samples for a total of five sample groups. The MASQ was explicitly designed to test the components of the Tripartite model. In analyzing the resulting data, Watson found three factors in each of the five different samples that correlated with the factors hypothesized by the Tripartite model. Watson concluded that "the MASQ Anxious Arousal [PH] and Anhedonic Depression scales [PA] both differentiated anxiety and depression well and also showed excellent convergent validity" (p. 12).

These findings built on the previous work of Watson et al. (1988a), which was conducted by administering the anxiety and depression sections of the Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughan, & Ratcliff, 1981) to a clinical twin sample ($N = 60$). Subjects also completed trait NA and PA scales from the

Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982): trait NA was assessed using the 14-item Negative Emotionality Scale, and trait PA was assessed using the 11-item Positive Emotionality Scale. The results indicated that NA was positively correlated with both anxious and depressive diagnoses, but PA was inversely correlated with all the diagnoses of depression and with only one of the diagnoses of anxiety--social phobia. This exception is not surprising because other studies have shown that PA is correlated positively with social engagement (Watson, 1988). Watson and colleagues stated, "...PA was consistently related (negatively) only to symptoms and diagnosis of depression, indicating that the loss of pleasurable engagement is a distinctive feature of depression" (p. 346).

Researchers other than Watson and Clark have found similar results. Brown et al. (1998) compared the components of Watson and Clark's model with the presence or absence of depression or anxiety disorders in 350 outpatients. They concluded that high levels of NA were related to both sets of disorders while low levels of PA and high levels of NA were specifically associated with diagnoses of depression. In comparison, high levels of PH and NA were specifically associated with diagnoses of anxiety.

Brown et al. (1998) used the PANAS (Watson & Clark, 1988). This instrument is relatively unique among self-report measures because it proposes to assess the three components of the Tripartite model: PA, NA, and PH. CFA was used to see which of three models would fit the data the best: a three-factor model, a two-factor model, or a one-factor model. The three-factor model provided an excellent fit to the data and was the best fit for all the structural models evaluated.

The PANAS was also used to assess the components of the Tripartite model in a

study by Jolly et al. (1994). These researchers, however, sought to validate not only aspects of the Triparite model but also the idea that anxiety and depression could be distinguished based on cognitive content, as measured by the Cognition Checklist. The measures of PA, NA, and cognitive content were correlated with results from the Symptoms Checklist 90--Revised (SCL-90-R), the BDI, and the BAI for 159 depressed or anxious outpatient adults. The results indicated that NA did not distinguish the symptoms of anxiety and depression. However, high levels of NA in combination with cognitions specific to anxiety identified those with anxious symptoms. Low levels of PA, cognitions specific to depression, and high levels of NA identified depressive symptoms. In summarizing their findings, they stated,

> The integration of the affect and cognition models improved the discrimination of anxious and depressive symptoms. Clearly, negative affectivity and anxiety cognitions contributed to the prediction of anxiety symptoms, whereas NA, low PA, and depressive cognitions significantly predicted depressive symptoms. (Jolly et al., p. 548)

This statement implies a need for the revision of anxiety and depression measures because most instruments do not include items specifically measuring PA. Watson and Kendall (1989) emphasized the weakness when they stated, "Because low PA appears to be more specific to depression, strengthening its contribution should improve the discriminant validity of depression measures and enhance the differential diagnosis of depression from anxiety and other disorders" (p. 21).

There are some limitations to the Tripartite model, however. Burns and Eidelson (1998) used structural equation modeling (SEM) on data provided from self-report measures (BDI, BAI, and SCL-90) of three different samples: outpatients seeking treatment for either mood or anxiety disorders, outpatients seeking treatment for

substance abuse, and college students. PA was assessed using a combination of items from the BDI and SCL-90 Anhedonia scales. PH was assessed using the Burns Anxiety Inventory and SCL-90 Somatic Arousal scales. The best model fits occurred when PH and PA were allowed to correlate with more than just anxiety and depression respectively. A significant portion of the variance on PH and PA were taken up by nonspecific anxiety and nonspecific depression factors. In other words, they found that their measures of PA and PH were not as specific to anxiety and depression as other results had indicated. This finding was true for all three samples that were evaluated. Burns and Eidelson concluded that, "measures of anhedonia and somatic arousal *do contain* substantial negative affect or general distress variance" (p. 471, italics added). It could be argued that the measures Burns and Eidelson's chose to use to assess PA and PH were not as specific as would be indicated by the Triparite model. However, researchers using other measures to assess of PA and PH have also found that they contain a small, yet substantial, overlap with the construct NA (Clark et al., 1990, 1994).

Despite such limitations, the Tripartite model seems to explain a variety of results. For instance, Clark et al. (1990) noted that the concept of NA alone explains: (a) the emergence of a single primary factor with high loadings from anxiety and depression measures, (b) the high comorbidity between anxiety and depression, (c) the overlap in diagnostic criteria for the disorders, (d) studies suggesting that anxiety and depression share a common underlying genetic diathesis, and (e) the nonspecific drug response in both anxious and depressed patients. In addition to these results, the concept of PA explains the subjective loss of interest or anhedonia reported by most

depressed (but not anxious) patients. Although there is some data suggesting that the concept of PA may not be completely free from the variance accounted for by NA; this overlap between PA and NA seems to vary substantially by study (Burns & Eidelson, 1998; Clark et al., 1990, 1994) and does not appear to be large enough to indicate that low PA and NA are measuring the same thing.

Summary

The Tripartite model seems to be a parsimonious and empirically valid way to conceptualize the relationship between anxiety and depression because of its ability to explain a wide variety of findings. The studies in this section also indicate that self-report measures, like the PANAS, can be useful in discriminating anxiety from depression because they tap the specific constructs of PA and NA cited by the Tripartite model. Many researchers seem willing to concede that the assessment of low levels of PA and high levels of NA is all that is necessary to distinguish between those who are depressed from those who are anxious (Krueger et al. 1996; Trull & Sher, 1994).

Testing the Validity of the Tripartite Model in Children: Factor Analytic and Direct Support

The next section will discuss how components of the Tripartite model, specifically NA and PA, have been tested in children. Studies have found general support for these components. However, some of the studies have supported the model through the use of factor analytic techniques where PA and NA are latent factors, while other studies have found support for the model by using measures that directly assess

PA and NA as observed variables. The data supporting the results of both types of studies will be presented. The measures that are commonly used to assess the components of the Tripartite model in children will also be discussed.

The Validity of the Tripartite Model in Children: Factor Analytic Support

Obviously, findings supporting the validity of the Tripartite model need to be investigated in children. Such replications are critical because many believe that depression and anxiety are even more difficult to separate in children than in adults. For instance, Finch et al. (1989) stated,

> [R]esearchers should give serious consideration to the possibility that anxiety and depression are not separate in children and that it is futile to attempt to separate the disorders. We found little evidence from any area to support their separation. Perhaps we should put the distinction to rest. (p. 196)

Such pessimism seems to be due, at least in part, to the poor discriminant validity found among self-report anxiety and depression measures discussed earlier. Some believe childhood depression and anxiety should be conceptualized as either identical constructs or as constructs that are so similar as to make differentiation meaningless (Finch et al.).

However, recent studies not only indicate that anxiety and depression can be separated from one another in children, but that they can be separated as the Tripartite model suggests. For example, Lonigan et al. (1994) examined the responses to self-report measures (CDI and RCMAS) of 233 inpatient children between the ages of 6 and 17 who were diagnosed with either an anxiety disorder or a depressive disorder. Total scores on these measures were compared to the children's diagnostic classification. Furthermore, individual items that made up each measure were factor analyzed for both

the anxious and depressed groups. Item analysis of the resulting factor structures allowed them to conclude the following:

> Despite the overlap of self-reported anxious and depressive symptoms, scores on measures of both depression and anxiety distinguished between children diagnosed with a depressive disorder and those diagnosed with an anxiety disorder. Depressed children reported significantly more problems *related to loss of interest and motivation* than their anxious counterparts. In contrast, anxious children reported significantly more worry about the future, their well-being, and the reactions of others. (p. 1,005. italics added)

These conclusions are noteworthy for two reasons: (a) what differentiated depressed children from anxious children was very similar to the definition of low PA--a loss of interest and motivation; and (b) the study demonstrates that it is possible for self-report measures to differentiate anxiety and depression. However, why do self-report measures differentiate anxiety and depression in some studies, such as the one just cited, but not in others?

There are a few possible answers to this question. First, the children in this study had more severe psychological symptoms. It is possible that as pathology increases the influence of PA may become more pronounced. In order to test this idea, Boyd and Gullone (1997) administered the RCMAS and the Reynold's Adolescent Depression Scale (RADS; Reynolds, 1986) to 783 nonreferred adolescents. While anxiety and depression were highly correlated, exploratory factor analysis revealed that anxiety and depression items loaded onto distinct factors. In fact, items representing depressed mood did not overlap with items that measured heightened anxiety. These findings indirectly demonstrate evidence for the validity of aspects of the Tripartite model in adolescents. They also indicate that anxiety and depression can be differentiated in nonreferred populations (see also Crowley & Emerson, 1996) and that

the distinguishing power of PA is not necessarily a function of more severe pathology.

A second possible reason why self-report measures discriminate anxiety from depression in some studies but not in others is based on the finding that the children in the Lonigan and colleagues (1994) study were, on average, older. Perhaps older children are able to differentiate the concepts of anxiety and depression better than their younger counterparts. This second hypothesis has not received a great deal of research attention and will be discussed in the developmental section to follow.

The Validity of the Tripartite Model in Children: Direct Support

The studies that have been cited thus far have used factor analysis as evidence that depression and anxiety could reasonably be construed as different constructs in children and adolescents. Furthermore, many of the factors that have provided such discriminant power are similar to the concepts of anhedonia or low PA initially conceptualized by the Tripartite model. Although many measures reliably assess generalized distress or NA, none of the studies mentioned thus far have included reliable measures whereby the Tripartite constructs of PA and PH can be directly assessed as observed variables.

An exception includes a recent study conducted by Chorpita, Daleiden, et al. (2000). These researchers developed an Affect and Arousal Scale (AFARS) for a study conducted with children and adolescents. The AFARS was developed to directly measure the three components of the Tripartite model. The measure was composed from items selected from well known self-report measures (RCMAS, CDI) that had been previously identified as being relevant to the Tripartite model (e.g., "Often I feel

sick in my stomach," from the RCMAS Physiological Anxiety Scale). It was also intended, unlike many self-report measures, to assess affective dimensions as purely as possible rather than the specific symptoms of anxiety and depression. Items were not used that appeared to be symptoms of particular DSM anxiety and mood disorders (e.g., "I feel sad and depressed"). In other words, items were only included if they assessed affective dimensions rather than symptomology (e.g., "Nothing is very fun," and "I feel afraid").

First, an exploratory factor analysis was conducted to determine whether or not the AFARS could be used as a measure of PA, NA, and PH. As part of this process, the AFARS was administered to 704 girls and 585 boys between the ages of 7 and 18. Three rotated factors consistent with the Tripartite model were found. These scales had relatively high internal consistencies (Cronbach alphas for the three scales: NA = .80, PA = .77, and PH = .81) and the factors accounted for 10.94%, 10.71%, and 9.57% of the variance, respectively. A confirmatory factor analysis demonstrated that PA was not correlated with either PH or NA, and NA was positively correlated with PH. These results provide evidence that: (a) the components of the Tripartite model can be validly applied to children and adolescents, (b) the AFARS may be a promising tool for differentiating anxious and depressive affective states, and (c) the specificity of items that are intended to tap anxiety and depression are greatly aided by focusing item content on affective dimensions rather than symptoms that both constructs tend to have in common.

Of course the AFARS is not the only instrument that has been effectively used to measure the components of the Tripartite model in children. Joiner and Lonigan

(2000) used the Positive and Negative Affect Scale for Children (PANAS-C; Laurent, Potter, & Catanzaro, 1994) to measure levels of PA and NA in 74 child and adolescent psychiatric inpatients between the ages of 7 and 17. The PANAS-C contains 12 positive descriptors intended to measure PA and 15 negative descriptors intended to measure NA. Joiner and Lonigan compared the level of PA and NA with scores on the RCMAS, CDI, and the chart diagnosis of participants. These researchers found that "children with a depressive disorder diagnoses were distinguishable from other youth psychiatric patients on the basis of low PA and high NA" (p. 378). Furthermore, they concluded, "children with low PA and high NA were more likely than children who had higher PA (or lower NA) to continue experiencing symptoms of depression two months after their initial assessment" (p. 378). These conclusions not only support the claim that the PANAS-C can be effectively used to assess the components of the Tripartite model in children, but that low PA represents a risk factor for continued depressive symptoms.

Joiner et al. (1996) conducted a similar study; however, these researchers compared child and adolescent inpatient scores on the CDI and RCMAS with the PANAS, which was the original, adult version on which the PANAS-C was based. Similar results were found. NA was strongly correlated with both the CDI and the RCMAS scores, while PA was negatively correlated more with CDI than with the RCMAS. Several of these findings were replicated in a later study (Chorpita, Plummer, & Moffit, 2000). Results such as these are important because they give credibility to: (a) using the PANAS system as a tool to differentiate anxiety and depression, and (b) using the CDI and RCMAS as dependent measures of depression and anxiety, if for no

other purposes than for research.

Summary

These findings support the utility of the Tripartite model as a valid way to conceptualize anxiety and depression in children. Furthermore, some of the components of the Tripartite model can be assessed in child and adolescent populations through the use of self-report measures. Measures, like the PANAS-C, seem to differentiate anxiety and depression in some studies better than others. Specifically, some findings indicated that support for the Tripartite model seemed to mount as the average age of the participants increased (Lonigan et al., 1994). Therefore, it is possible that the discriminating power of PA (along with other components of the Tripartite model) increases as children become older. Perhaps the variability of results is a function of the developmental level of the children under consideration. This idea will be given further scrutiny in the following "Developmental Considerations."

Developmental Considerations: Changes in the Structure of Affect Over Time and the Consequence of These Changes on the Validity of the Tripartite Model

The next section begins with a general overview of what is understood regarding how cognitions and emotions change over the lifespan of childhood. Next, ideas related to how older and younger children experience anxiety and depression differently will be discussed. The topic of developmental change in affect structure will be considered by looking at studies that have specifically examined how aspects of the Triparite model

are influenced by participant age. Although many studies indicate that there are no differences in how older and younger children structure affect, the findings of studies by Cole et al. (1997) and Lonigan et al. (1999) refute these claims. Each of these studies will be examined in light of what information they provide regarding age as a mediating factor in affect structure. The limitations of each study will also be discussed.

Developmental Considerations: Changes in the Structure of Affect

Relatively few studies have directly investigated whether or not younger and older children endorse aspects of the Tripartite model in a similar fashion. It has been well documented that older and younger children vary on a host of cognitive and emotional variables. Some of these differences relate specifically to affective functioning. As has been already mentioned, many studies have indicated that children with anxiety disorders tend to be younger than children with depressive disorders (Kovacs et al., 1989; Reinharz et al., 1993). For instance, Stavrakaki el al. (1987) noted that older children in a clinical sample (ages 6 to 16) tended to manifest the symptoms of both anxiety and depression while younger children tended to only be anxious and not suffer from concurrent depression. The older children were also more likely to be rated more highly than younger children on observer ratings of depressive symptoms. Other researchers have noticed that two thirds of adolescents studied with an anxiety disorder later developed a depressive disorder. In comparison, only 6.5% of the adolescents with a major depressive disorder developed an anxiety disorder (Orvalschel et al., 1995). These findings support the general notion that children with both disorders tend to be older than children with anxiety alone (Strauss, Last, Hersen,

& Kazdin, 1988; Strauss, Lease, Last, & Francis, 1988). There seems to be two ways to understand such studies. First, as discussed earlier, these results could be an indication that anxiety leads to depression. Second, these results could indicate that younger and older children experience the phenomenon of anxiety and depression differently.

There is reason to believe that the latter of these hypotheses is true. One of Piaget's original suggestions was that a child's ego-centrism makes it difficult for him or her to attend to internal psychological process. If this were true, it would obviously be more relevant for younger children than older children. Glasberg and Abound (1982) tested this idea by conducting two experiments. In the first, 31 kindergarteners and 34 second graders were shown six pictures of a boy experiencing an emotional continuum from neutral to sad. The children were asked, "Have you ever felt like the boy in the picture?" Kindergarteners, on average, reported that they had not experienced the negative or sad emotion while the older subjects were more likely to report sadness as part of their past experience. In the second experiment, kindergarten and second grade children had nine pictures of a boy laid out in front of them: three of the pictures showed different states of happiness (smiling to laughing); three of the pictures showed different states of sadness (frowning to crying); and the final three pictures showed different states of anger (pouting to rage). All children were instructed to choose the feelings they often experience. They were allowed to choose as many pictures as they wanted. In reporting their results these researchers stated, "...the second graders saw happy and sad as equally prevalent in their emotional makeup where as the kindergarteners drew their emotional portraits as largely happy ones" (p. 292). These results indicate that the younger children in the study did not have as

great of an ability to see themselves as possessing socially undesirable or negative affect.

Other studies also indicated that younger children and older children are different in what they perceive as being the *source* of sadness. Weisz (1981), for instance, found that younger children between the ages of six and ten regarded outcomes of random activities as being controllable. This age group believed that outcomes were all related to age, intelligence, effort, and practice. Older children between the ages of eleven and fourteen, on the other hand, correctly regarded the outcomes as being the result of pure luck. It appeared that younger children failed to recognize noncontingency when they saw it.

Therefore, it seems that younger and older children vary in a number of ways related to affect. Despite these differences, many studies examining the validity of the Tripartite model have lumped school age, pre-adolescent, and young adolescent participants into the same subject pool (Chorpita, Daleiden, et al., 2000; Joiner et al., 1996; Lonigan et al., 1994). There is critical need for studies that specifically examine whether or not age plays a factor in the way depression and anxiety relate to each other.

Developmental Considerations: Are Aspects of the Tripartite Model Valid for Both Younger and Older Children?

If a child's development can account for the variations in psychosocial development cited earlier, how do such changes impact the validity of the Tripartite model? In other words, even if the Tripartite model is valid for older children (a claim that is still considered tentative), it may not be applicable to younger children. Perhaps

depression is, in fact, present in younger children, but simply manifests itself in ways that are similar to anxious symptomology. Or perhaps young children simply lump anxiety and depression together under a common negative affect factor similar to a unitary model, while older children exhibit the symptoms of anxiety and depression in a manner similar to their adult counterparts.

Few studies, to our knowledge, directly test whether or not older and younger children both support the Tripartite model. However, some studies have provided evidence, albeit indirectly, regarding this issue. Chorpita et al. (1998), for instance, used structural equation modeling techniques to determine whether or not a three-factor solution similar to the Tripartite model (e.g., each factor represented PA, NA, or PH) would be validated by multisource data obtained from 216 clinically diagnosed children between the ages of 6 and 17. They concluded that a three-factor model fit the data much better than a one- or two-factor model. This was especially true once child and parent method variance was controlled. These investigators then compared data obtained from older (12 to 17 years of age) and younger (6 to 11 years of age) children. Estimates for both groups were nearly identical to the three-factor solution mentioned earlier. Furthermore, in both groups correlations between PA and PH factors, as predicted by the Tripartite model, were the lowest of all factors being compared. Consequently, this study demonstrates a substantial amount of evidence regarding the validity of the Tripartite model in both older and younger children.

Other studies have confirmed these findings in samples not drawn specifically from a clinical population. Epkins and Meyers (1994) examined multisource data obtained from a sample of 8- to 11-year-old elementary school children. They

concluded that although a strong association between depression and anxiety was present in the sample, overall discriminate validity was obtained. Similarly, Murphy et al. (2000) examined data obtained from 6- to 11-year-old children whose mothers had been tested as HIV-positive. The rationale for choosing this sample was that the children would be somewhat distressed, but not to the same extent as those taken from a clinical population. The data obtained from this sample indicated that both a 2-factor model that allowed for overlap and a model that allowed for two first-order and one second-order factor were good fits for the data. In the latter of these models, the authors labeled the second-order factor negative affectivity and the two first-order factors were designated as one that was specific to depression and one that was specific to anxiety. A one-factor model was not a good fit for the data.

Finally, a recent study by Turner and Barrett (2003) used confirmatory factor analysis to test whether or not data taken from older and younger children similarly endorsed the Tripartite concepts. In one of the models that were tested these researchers specifically loaded data from self-report measures on to three specific factors representing the Tripartite constructs of PH, PA, and NA. They also tested models where the data was only allowed to load on one factor or on two correlated factors. For both older and younger children, the model that produced the BFIs was the model representing the Tripartite constructs. It would appear, based on these studies, that the Tripartite model is equally valid in both older and younger children.

A study conducted by Cole et al. (1997), however, refutes the notion that the Tripartite model has equal validity across age ranges. Cole administered anxiety and depression measures to two nonclinical age groups: children in the third grade (n =

280), and children in the sixth grade ($n = 211$). They also administered anxiety and depression measures to the children's parents, peers, and teachers. Each of these groups rated the children according to their depression and anxiety, allowing the authors to access data regarding childhood affect by using four different methods: self-report, teacher ratings, parent report, and peer nomination. Cole and his colleagues then ran a multitrait-multimethod (MTMM) confirmatory factor analysis for both the third- and sixth-grade groups. After completing the analysis, the authors were concerned that item overlap may influence the results; therefore, common items in each of the scales were deleted and then the factor analysis was conducted again.

Cole and colleagues' (1997) findings were interesting. First, they noted that the variance of each measure could be divided up three ways: trait (referred to as anxiety and depression), method, and random error. Although they noted that trait factor loadings were "considerably" smaller than method factor loadings for both the third- and sixth-grade samples, they also indicated that trait factor loadings in the sixth-grade group appeared larger than those found in the third-grade group. More importantly, however, Cole and colleagues found that the correlation between the trait factors (anxiety and depression) in the third-grade sample was .90. This finding motivated the authors to test a model with only one trait factor. The results indicated a good fit for the data and allowed Cole and colleagues to conclude, "In the third-grade sample, depression and anxiety factors appear not to be distinguishable" (p. 114). Conversely, the correlation between the trait factors was considerably less in the sixth-grade ($r = .72$) allowing the authors to conclude that, "the factors (anxiety and depression) would appear to be distinguishable, albeit substantially overlapping, constructs" (p. 114).

These findings indicate that a more unified model was consistent with the data derived from the younger sample while a more differentiated model (similar to the Tripartite model) was a better fit for the data derived from the older sample. This lends indirect evidence to the notion that anxiety and depression begin to differ from one another as a child matures. Cole et al. (1997) concluded that depression and anxiety were indistinguishable in the younger age group because the majority of the variance for the symptoms of anxiety and depression could be lumped together into one factor even after deleting similar items. In other words, a small, but substantial, amount of the overall variance was accounted for by the specific factors of anxiety and depression in older children, and almost none of it was accounted for by specific factors in the younger sample. Cole and colleagues considered these findings to be "preliminary support for the *emergence* of a Tripartite model" (p. 116, italics added).

Cole and colleagues' (1997) study is intriguing for several reasons. It potentially provides insight regarding the differentiation process that children go through as related to anxiety and depression. It even gives us a glimpse of the general timeframe this differentiation process may take place (between third and sixth grade). The study is also important because it raises the question as to whether or not clinicians should expect anxiety and depression in older and younger children be assessed similarly. According to the results of the study, a model consistent with the Tripartite model can be effectively applied to older children, and a more unitary model should be applied to younger children.

Cole and colleagues' (1997) study, however, does contain some problems. The study does not attempt to make any comment regarding anxiety or depression as actual

disorders. These constructs are operationalized from a more dimensional perspective using pencil and paper reports--not clinical diagnosis. Another major weakness, especially for the purposes of the current study, is that Cole and colleagues did not attempt to include measures that specifically assess anhedonia (low PA); in other words, he did not directly attempt to assess aspects of the Tripartite model. It could be argued that the Cole and colleagues' findings were an artifact resulting from using general measures of anxiety and depression rather than more specific measures (e.g., those assessing PA or NA).

A more recent study, however, by Lonigan et al. (1999) examined the utility of the Tripartite model in comparable age groups of children using a specific measure that assessed PA and NA. The results of this study partially supported the findings of Cole et al. (1997). Lonigan and colleagues used the extended version of the PA and NA schedule (PANAS-X) to measure two of the Tripartite model's components, NA and PA, in school children between the fourth and eleventh grades. Lonigan and colleagues also administered to these children the CDI to measure depressive symptomology and the RCMAS to assess anxiety. The pattern of correlations between these self-report measures was analyzed. Confirmatory factor analyses were conducted to determine which model (one-, two-, or four-factor models of PA and NA) was the best fit for the data. Finally, Lonigan investigated how these correlations and fit indexes varied according to the age of the subjects by comparing a sample between the ages of 9 and 11 and a sample between the ages of 12 and 17.

The pattern of correlations in both age groups was similar to those expected based on the Tripartite model. In both age groups, PA was negatively correlated with

depressive symptomology but not with anxiety, and NA demonstrated a strong positive correlation to both anxious and depressed symptoms. However, a few of the findings of Lonigan et al. (1999) are pertinent to the developmental issues implied by Cole and colleagues' (1997) results. Although Lonigan and colleagues concluded that "the pattern of correlations between the older and younger samples were very similar" (p. 377), PA had a stronger negative correlation with the measure of depression in the older sample than in the younger sample. This may indicate that the construct of PA had less differentiating power in the younger population (mean age = 10.3 years) than in the older population (mean age = 14.2 years).

Results of the confirmatory factor analyses were also interesting. A two-factor model was the best fit for the data in both age groups; however, an orthogonal model was a better fit for the data derived from the older sample, while an oblique model was a better fit for data obtained from the younger sample. In other words, data taken from the older sample implied that two unrelated factors, called NA and PA by the authors, were evident; yet, data taken from the younger sample found two factors that were highly related. Therefore, the two factors in the younger sample were less distinct from one another as the two factors in the older sample. A significant limitation of Lonigan's study, which has particular applicability given the current discussion, is that these researchers did not have access to a large enough sample that allowed them to test their findings across age ranges by subdividing into narrower age groups.

A recent study by Turner and Barrett (2003), however, accounted for the limitations of Lonigan's study by examining data taken from three narrow-band age groups of children. Turner and Barrett administered the RCMAS and the CDI to three

groups of nonreferred children (third-, sixth-, and ninth-grade children) and rationally selected item sets from these measures that were similar to the concepts of PA, NA, and PH. Using confirmatory factor analytic methods Turner and Barrett tested the fit of several models: a one-factor model, multiple two-factor correlated models, and a three-factor model. Each of the factors in the three-factor model represented one of constructs of the Tripartite model. The model that demonstrated the best fit across samples was the three-factor model, which indicated that the Tripartite model accurately described the data regardless of age. Nevertheless, Turner and Barrett did not specifically test a two-factor uncorrelated model. Therefore, it is unclear whether Turner and Barrett's data would have confirmed Lonigan's findings, which indicated that PA and NA are relatively separate constructs in older children but not in younger children.

Summary

There seems to be a great diversity of opinion regarding whether or not older and younger children structure affect in the manner prescribed by the Tripartite model. Studies using confirmatory factor analysis seem to indicate that younger children endorse a two-factor solution similar to their older counterparts (Chorpita et al., 1998; Epkins & Meyers, 1994; Turner & Barrett, 2003). However, the findings of Cole et al. (1997) indicate that the two-factor solution is correlated in the younger children and uncorrelated in the older children. The Lonigan et al. (1999) findings also support these data, although with different age groups. The conclusions of these studies indicate that the PA and NA factors, which the Tripartite model is based upon, are less distinct in

younger children. Furthermore, Lonigan and colleagues' results indicated that PA was less negatively correlated with depression in the younger age group; therefore, giving it less distinguishing power than in the older age group.

The current literature on this subject seems inadequate to determine whether or not older and younger children structure affect similarly. For instance, only a handful of studies have attempted to look at results supporting or disconfirming the Tripartite model as a function of participant age. Lonigan et al. (1997) stated, in talking about their inability to further divide their subject pool into smaller age ranges for analysis, "...future studies should address a more fine-grained examination of potential age differences" (p. 384). Even fewer studies (Lonigan et al.; Turner & Barrett, 2003) have looked at age differences while also using measures, like the PANAS-C, that have been specifically designed to assess aspects of the Tripartite model. Using such measures would be critically important if any statement regarding the utility of NA and PA in younger children is to be made.

Synopsis, Controversies, and Research Questions

The final section will summarize what is known about the relationship between anxiety and depression. It will also delineate current controversies regarding the validity of aspects of the Tripartite model in younger and older children. The importance of making this distinction will also be discussed. Finally, this section will focus on how the current study will add to the body of knowledge regarding this subject by addressing several research questions in ways that are distinct from the methods found in the rest of the literature.

Synopsis

One key method to assess anxiety and depression is through the use of self-report measures. However, the high amount of symptom overlap due to shared internalized distress in both anxiety and depression has made distinguishing the two constructs based solely upon these measures difficult. The Tripartite model of Clark and Watson (1991) helps to clarify this issue by labeling the internalized general distress that both anxiety and depression have in common NA. In contrast, symptoms specific to depression are labeled low PA, and symptoms specific to anxiety are labeled high PH. There is a good deal of evidence supporting the validity of this model in both adults and children. In fact, many believe that assessing PA and NA is all that is necessary, because low levels of PA combined with high levels of NA adequately determine if someone is depressed rather than anxious. Therefore, for the majority of the studies that were previously reviewed, the construct of PH was not included in the analyses.

Despite evidence supporting the utility of the concepts of PA and NA, there are key developmental differences between older and younger children in how they conceptualize issues related to anxiety and depression. These include differences in the level of egocentricity, differences in locus of control, and differences in perceived sources of sadness. If such differences exist, how will they influence the structure of affect related to anxiety and depression? One key way this could be answered is to determine if aspects of the Tripartite model, specifically NA and PA, are equally valid for both older and younger children. If so, it would indicate that developmental concerns should factor more heavily into how childhood internalizing disorders are

conceptualized. A similar sentiment was articulated by Cole et al. (1997) who stated:

> If the dimensions of depression and anxiety are actually indistinguishable in younger children, perhaps we should begin thinking in terms of 'negative affectivity' instead of labels like *depression* and *anxiety*, which imply the existence of separate conditions. If the dimensions of depression and anxiety diverge with age (yet fail to separate completely), perhaps a Tripartite model of depression, anxiety, and negative affectivity should be adopted for older children, as has been proposed for adults.... (p. 116)

Therefore, considering the impact of developmental change on affect structure seems to be of critical importance in determining how we conceptualize and assess childhood depression and anxiety.

Controversies

Unfortunately there seems to be a great deal of controversy in the literature regarding this important developmental question. Although many studies using confirmatory factor analytic techniques have found support for a two-factor model similar to the Tripartite model in children, the studies of Cole et al. (1997) and Lonigan et al. (1999) indicated that these two factors are correlated in younger children and uncorrelated in older children. As mentioned previously, this would seem to indicate that two of the factors of the Tripartite model (NA and PA) are less distinct or less valid in younger children. Additionally, the findings of Lonigan et al. indicated that PA had less distinguishing power in younger samples.

The current literature does not provide adequate evidence to support or refute these findings. Few studies examine the validity of NA and PA by age. Even fewer studies examine NA and PA with measures (like the PANAS-C) that were specifically designed to assess these components. Using such measures allow PA and NA to be

treated like observed variables rather than factors that are derived through statistical analysis. Even when they do include the Tripartite constructs, such as the Turner and Barrett (2003) study, a two-factor correlated versus two-factor uncorrelated design is not specifically tested. Therefore, the present study will add to the body of literature by: (a) comparing results from the PANAS-C to traditional self-report measures of anxiety and depression, and (b) using confirmatory factor analytic techniques to test the validity of PA and NA in two developmentally distinct populations of children.

By answering these questions, the results of this study could prove beneficial in several respects. For instance, these results could potentially give clinicians additional information needed for a more accurate conceptualization and assessment of childhood anxiety and depression. Developmental psychologists could also benefit from this study because it would help elucidate potential differences in the emotional structure of children across the developmental lifespan. Finally, the results of this study could help researchers be either more confident or more suspicious of the assessment methods they are using to label children in their studies as either "depressed" or "anxious."

Research Questions

The current study will compare data taken from child self-report measures of PA and NA with measures designed to assess depressive and anxious symptomology. PA and NA will be assessed using the PANAS-C. As implied previously, PH will not be assessed in these analyses because many researchers believe measurement of PA and NA are all that are needed to differentiate depression from anxiety. Depression and anxiety will be assessed using the CDI, RCMAS, and the Multidimentional Anxiety

Scale for Children (MASC; March, 1997). Unlike depression, two measures of anxiety will be employed as a means of: (a) better clarifying the construct of anxiety; and (b) comparing a well used, yet highly criticized (Hodges, 1990; Ollendick & Yule, 1990), instrument (RCMAS) with a newer, and perhaps more precise (Dierker et al., 2001), measure of anxiety (MASC). The procedures used in this study are similar to those used in Lonigan et al. because they (as opposed to Cole et al.'s [1997] procedures) include a way to directly measure two of the components of the Tripartite model. However, unlike Lonigan and colleagues' study, data in the current study will be taken from children in only the third and sixth grades. Focusing data collection to these two grades will reduce the number of participants overall, yet will increase the number of participants who may, according to the results that have been cited, structure affect differently. Examining data in these two age groups, as opposed to examining data taken from a wider age range of children (e.g., third- and ninth- grade children), will allow us to examine developmental differences in the structure of affect without the potentially confounding influences that tend to be associated with the onset of adolescents (Weisz, Weiss, Alicke, & Klotz, 1987; Weisz, Weiss, Han, Granger, & Morton, 1995). Furthermore, examining data from these particular groups will provide a way to determine if the Cole and colleagues' findings regarding these ages of children can be replicated.

The structure of affect will be determined by utilizing CFA in both age groups to determine if a one-factor, two-factor correlated, or two-factor uncorrelated model is the best fit with the data. Furthermore, the pattern of correlations between PA, NA, and the dependent measures of anxiety and depression will be calculated for both age groups.

When comparing older and younger age groups, correlations can then be analyzed to determine if there are any statistically significant differences. Nevertheless, the primary question of this study will be the examination of affect structure using CFA methods because these methods are generally regarded as being more empirically rigorous than calculating simple correlations. Therefore, the following questions are of interest to this study.

1. (Primary question) Will a one-factor, two-factor oblique (correlated), or two-factor orthogonal (uncorrelated) model provide the best fit for self-report data from the PANAS-C for third- and sixth-grade samples?

2. What is the relationship between the PANAS-C subscales, PA and NA, and measures of childhood psychopathology (total scores on the CDI, MASC, RCMAS) in third- and sixth-grade children?

Regarding the first research question, it is hypothesized that either a one-factor or two-factor, oblique (correlated) solution will be the best fit for the data in the third-grade sample and that a two-factor, orthogonal (uncorrelated) solution will be the best fit for the data in the sixth-grade sample. Regarding the second question, it is hypothesized the pattern of correlations in both age groups will be generally similar to what is expected by the Tripartite model: PA will be negatively correlated with the depression measure but not the anxiety measures, and NA will be positively correlated with both depression and anxiety measures. Furthermore, it is hypothesized that in the third-grade sample PA will account for less variance in the measure of depression (total score of the CDI) than in the sixth-grade sample. In the sixth-grade sample, PA will explain greater amounts of variance in the CDI total score than in the anxiety measures

(total scores of the MASC and RCMAS). This will indicate that PA has less power to distinguish anxiety from depression in the younger sample. In contrast, NA will explain similar amounts of variance in depression and anxiety measures in both samples. The confirmation of these hypotheses will support the idea that the Tripartite model is a valid way to conceptualize anxiety and depression in older children but a less valid way to conceptualize anxiety and depression in younger children. Hence, the notion that developmental differences exist between the structure of anxious and depressive affect in third- and sixth-grade children will be supported.

CHAPTER III

METHODS

Participants

Participants of this study were third- and sixth-grade children enrolled in public elementary and middle schools in northern Utah and southern Idaho. Participants lived in both rural (< 3,000 city population; Idaho census, 2000) and mid-sized cities (between 40,000 and 60,000 city population, Utah census, 2000). Data were collected in a rural setting in 44.6% of the third-grade sample (n = 45) and 41.1% of the sixth-grade sample (n = 60). Consent was obtained from school districts and parents of participating children between March 2002 and May 2003. The author passed out consent forms (see Appendix A) in the participants' classrooms. Participants were promised a small reinforcer (e.g., pencil, pen) if they returned the consent form, regardless of whether or not their parents agreed to have them participate in the study. Each child's teachers collected the consent forms in the classroom.

Children were excluded from participating if: (a) parents and children did not sign the consent/assent form and demographic sheet, (b) children refused to participate, or (c) measures were not fully completed. Consent forms were given to 144 third-grade children in 10 different classrooms and 203 sixth-grade children in nine classrooms. Approximately 72% and 73% of the parents of third- and sixth-grade children, respectively, returned the demographic sheet and consent/assent form and stated that they wished their child to participate in the study. The remaining parents either did not return the consent form with their child or explicitly stated that they did not want their

child to participate. Two children that returned consent forms were dropped from participating in the third-grade group because they were called out of class during administration and did not complete the measures. Another child was dropped from participating in the sixth-grade group because she declined to complete some of the measures. Other than this child, no other participant that brought back a consent form refused to participate. In the end, 101 children were sampled in the third grade and 146 children were sampled in the sixth grade.

Participating children in the third-grade sample ranged in age from 8 to 9 (mean age = 8.51). Participating children in the sixth-grade sample ranged in age from 11 to 13 (mean age = 11.34). The demographic sheet required parents to indicate their child's gender and ethnicity as well as parent education level. Other than the age variable, the third- and sixth-grade samples seemed comparable across a variety of demographic variables (see Table 1).

It should be noted that 4% of the third-grade sample and 6.9% of the sixth-grade sample did not complete the parental education variable on the demographics sheet. It is also interesting to note that relatively few parents indicated that one of the child's parents was no longer living in the home, as indicated by the number of parents who listed degree status for only one parent. Consequently, it would appear that there are relatively few single-parent households in each sample. It is more likely that parents simply did not understand the demographic form instructions and included parent education status for those no longer living with the child. Despite these omissions, these data indicate that there is no reason to believe that the third- and sixth-grade

Table 1

Demographic Variables for Third- and Sixth-Grade Samples

	Third grade ($N = 101$)		Sixth grade ($N = 146$)		
Demographic variables	*n*	% of sample	*n*	% of sample	Difference
Mean age (*SD*)	8.51 (.50)	100	11.34 (.49)	100	2.83
No. of males in sample	52	51.5	68	46.6	4.9
No. of females in sample	49	48.5	78	53.4	4.9
No. of Caucasians in sample	82	81.2	131	89.7	8.5
No. of Hispanics in sample	15	14.9	11	7.5	7.4
No. of "other" ethnicity in sample[a]	4	4	4	2.8	1.2
Parent education:					
At least one parent has advanced degree	22	21.8	36	24.7	2.9
At least one parent has BA degree	25	24.8	29	19.9	4.9
At least one parent has vocational training or some college	36	35.6	46	31.5	4.1
At least one parent has high school degree	23	22.8	24	16.4	6.4
Neither parent has high school degree	8	7.9	12	8.2	.3
Degree status listed for only one parent[b]	7	6.9	10	6.8	.1
Degree status not completed for either parent	4	4.0	11	6.9	2.9

[a] These include African Americans, Asian/Pacific Islander, and Native American.

[b] Parents were instructed on the demographics sheet to mark this selection if only one of the parents was living in the home.

samples differed significantly in regard to such variables as gender, ethnicity, and parent educational level.

Measures

Children's Depression Inventory

The Children's Depression Inventory (CDI; Kovacs, 1992) is a 27-item self-report measure assessing affective, cognitive, and behavioral symptoms of depression. Each item consists of three statements listed in order of severity from 0 to 2. Participants are asked to select the item that most nearly matches their level of psychological functioning for the previous 2 weeks. The CDI was normed on both male and female populations between the ages of 7 and 17 (Kovacs, 1985); therefore, there is empirical evidence to believe that it can be read and understood by children in both the third and sixth grades. Although the CDI provides for the interpretation of different factor structures in the scale, the CDI total score reflects a considerably unified measurement of the child's psychological functioning (Cronbach's alpha = .89; Jordan & Cole, 1996), the measure also provides for the interpretation of five factorially derived subscale scores: negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem.

The CDI has been shown to demonstrate an acceptable level of stability. For example, in a sample of community subjects, Finch, Saylor, Edwards, and McIntosh (1987) found that the total score of the CDI had a test-retest reliability of .67 at a 6-week interval and .82 at a 2-week interval. The scale has also demonstrated adequate to good convergent validity with such things as clinician rated depression (Kovacs, 1992).

Although far from conclusive, there is limited evidence to suggest that the CDI has discriminate validity as well. For instance, one study found that depressed children (as identified by a diagnostic interview) scored significantly higher on the CDI than other psychiatric inpatients, such as those with conduct disorder or anxiety disorder (Hodges, 1990). However, such findings are few and far between. As indicated in the literature review, many studies report high correlations between the CDI and self-report measures of anxiety (Smith, Mitchel, McCauley, & Calderon, 1990). Furthermore, the CDI is the most reliable and valid instrument of depression available given the age range of the population under examination.

Revised Children's Manifest Anxiety Scale

The Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985) is a 37-item self-report measure that assesses frequency and severity of anxiety symptoms in children. Children taking the measure mark each item true or false depending on whether or not the symptom described is accurate for them. The RCMAS also includes nine social desirability (or "lie") items and has been normed for use between the ages of 6 and 19; consequently, children as young as those in the second grade can read the items. Studies have indicated that three factors reliably appear in a distribution of RCMAS scores. These factors are listed as subscales of the measure and are listed as worry-overconcern, concentration anxiety, and physiological anxiety (Reynolds & Richmond). Previous studies have indicated that the RCMAS has good internal consistency regarding the total score (K-R 20 = .83) and low to adequate internal consistency on the subscale scores (.60 to .80; Reynolds, 1982). There is also

reason to believe that the RCMAS is a valid measure since it correlates highly with other measures designed to assess anxiety in children (e.g., $r = .85$ with the Trait scale of the State-Trait Anxiety Inventory for Children; Reynolds & Paget, 1981; Reynolds & Richmond, 1985).

Positive and Negative Affect Schedule for Children

The Positive and Negative Affect Schedule for Children (PANAS-C; Laurent et al., 1994) is a self-report measure that requires respondents to indicate how they feel by marking their level of agreement with a series of adjectives. Responses range from 1 (very slightly/not at all) to 5 (extremely). There are 12 positive descriptors included (e.g., happy, proud, joyful) as well as 15 negative descriptors (e.g., sad, upset, scared). The PANAS-C is very similar in format and content to the original scale used with adults, the PANAS (Watson, Clark, & Tellegen, 1988). Although the PANAS-C was designed to derive three factors that correspond to the Tripartite model, only the PA and NA scales will be administered in the current study because of time constraints. Furthermore, only the assessment of PA and NA are needed to meet the purposes of this study.

Watson and Clark (1988) reported that on the PANAS, the NA and PA scales had high internal consistency coefficients (e.g., Cronbach alphas in the range of .80 to .90) and moderate 2-month test-retest correlations (i.e., $r = .59$ to .71 for NA, $r = .68$ to .70 for PA). Furthermore, studies with adults have indicated that PA is negatively correlated with depressive symptomology while NA has been highly correlated with both anxious and depressive symptomology (Watson et al., 1988a). Similar results have

been found for the PANAS-C. For instance, Laurent et al. (1994) reported coefficient alphas of .91 for the PA scale and .88 for the NA scale. A more recent study using the PANAS-C by Joiner and Lonigan (2000) found coefficient alphas for the PA and NA scales of .92 and .95, respectively. These coefficient alphas were obtained from a sample of children between the ages of 7 and 17. Furthermore, the Joiner and Lonigan study indicated that the PA scale had a negative correlation with the CDI in two different samples (r = -.55 and -.67), while the NA scale was positively correlated with both the CDI and the RCMAS in both samples (sample one r = .65 and .59, respectively; sample two r = .45 and .63, respectively). These intercorrelations correspond with the Tripartite model and are similar to those reported for adults (Watson, Clark, & Tellegen, 1988). Therefore, there is reason to believe that scores from the PANAS-C are reliable and valid for the age range of children that will be tested in the current study. Nevertheless, Laurent et al. (1994) reported that the items "Alert," "Fearless," and "Daring" did not correlate highly with the scale they were intended to measure. Consequently, these items were excluded from data analysis due to poor psychometric properties. In the end, a total of 27-items from the PANAS-C were used in the current study.

Multidimensional Anxiety Scale for Children

The Multidimensional Anxiety Scale for Children (MASC; March, 1997) was included in the test battery as an additional measure of anxiety because some researchers have argued that self-report measures, like the RCMAS, lack the capacity to distinguish between anxiety and depression (Hodges, 1990; Ollendick & Yule, 1990).

Therefore, both measures of anxiety will be included in this study in order to more fully assess the construct. The MASC is a 39-item self-report measure designed to assess a variety of anxiety dimensions in children and adolescents. The child or adolescent is presented with a variety of items ("I feel tense or uptight," "I get shaky or jittery") and is asked if the statement is "never," "rarely," "sometimes," or "often" true about them. The MASC was normed on children as young as 8; therefore, most third-grade children were able to understand and respond to its items. Four basic scales are assessed on the MASC: physical symptoms, harm avoidance, social anxiety, and separation/panic scales. The Total Anxiety scale is the summation of all four scales.

The internal consistency for the total anxiety scale was found to be quite high for 8- to 11-year-old children (Cronbach alphas of .876 and .870 for boys and girls, respectively) and 12- to 15-year-old children (Cronbach alphas of .878 and .876 for boys and girls, respectively; March, 1997). Test-retest coefficients for the total anxiety scale was also high (intraclass correlation coefficient of .933), even though there was a 3-month delay between administrations (March; March, Parker, Sullivan, Stallings, & Conners, 1997). Regarding tests of validity, the total anxiety scale on the MASC was found to effectively differentiate children diagnosed with an anxiety disorder from controls and children with ADHD (March). Furthermore, MASC total score and total score on the RCMAS correlate .63, while MASC total score and CDI total score only correlate .30 (March). These data not only indicate the existence of convergent validity with another anxiety measure but also represent some evidence of divergent validity with a measure of depression. In comparison, other studies have found the RCMAS is correlated at a considerably higher level with the CDI (r = .56; Wolfe et al., 1987).

A more recent study compared the ability of the RCMAS, MASC, and one other dimensional rating scale to discriminate anxiety and depressive disorders. This study was conducted by administering these measures and a diagnostic interview to 632 ninth-grade youths. Using the results of the interview as their criterion, the authors concluded that the "MASC scores were most strongly associated with individual anxiety disorders," and the "RCMAS was least successful in discriminating anxiety and depression" (Dierker et al., 2001, p. 929). The results of these studies tentatively indicate that the MASC may be a better measure of anxiety than the RCMAS--hence its inclusion in this study.

Procedures

Consent for conducting the study was received from the Institutional Review Board (IRB) at Utah State University during March of 2002. Consent for testing was obtained from the school district superintendents, the school principals, and the teachers of the individual classrooms between the spring of 2002 and the spring of 2003. All the third- and sixth-grade classrooms were sampled in each school where consent was received. Classroom teachers were contacted individually regarding the time requirements necessary to complete the study (approximately 60 minutes). Consent forms and demographic sheets (Appendix A) were then sent home with the children in each teacher's class. The consent forms explained issues of confidentiality and participant rights. The demographic sheets requested background information regarding variables including age, ethnicity, gender, and highest education level completed by each parent. To motivate completion of these forms, small reinforcers (e.g., pencils,

stickers) were given to each child who returned the forms signed by their parents, regardless of whether or not the parents agreed to have them participate in the study. Their classroom teacher gave these reinforcers to the children once the forms were returned to the classroom.

After consent forms were received, the measures were administered in the participants' classrooms. Before administration began, it was explained that the children's answers would remain confidential and that participation was not mandatory. Children who still wished to participate were then asked to sign their assent form. Children who did not wish to participate or who did not receive consent from their parents had the opportunity to work silently on another assignment, provided by their teacher, while their classmates completed the measures. Participants were instructed to skip one item on the CDI, related to suicidal ideation (item #9), because school personnel expressed concerns about including the item.

For the sixth-grade classrooms, the instructions for the measures were read to the group before each measure was administered. The administrator was available during measure completion to clarify instructions and answer questions regarding the definitions of words. For the third-grade classrooms, the administrator read each item to the class because many of the third-grade teachers expressed concern regarding participant reading abilities. Reading items to children who are suspected of having reading problems is common practice when administering all of these measures (Kovacs, 1992; Laurent et al., 1994; March, 1997; Reynolds & Richmond, 1985). The order of measure administration for the groups of children was counter-balanced so that the same measure was not consistently completed before the other measures. After

administration, participant's names in both age groups were changed to a five-digit code to ensure confidentiality.

CHAPTER IV

RESULTS

This section will begin with a discussion of how missing data was handled. Next, descriptive statistics will be presented and comparisons will be made between the subscale and total scores derived from each sample. Specifically, data will be presented regarding statistically significant differences (*t* tests) between the samples. Effect size differences will also be presented as a way to compare meaningful differences. Data on the first research question will then be presented to determine if an orthogonal or oblique two-factor solution best fits the data taken from each sample. Data regarding the second research question will then be presented. This will include *t* test comparisons of subscale intercorrelations between the samples. Data regarding the comparative amount of variance accounted for by the PA and NA subscales will then be presented as a means of determining effect size of these two constructs of the Tripartite model.

Descriptive Statistics

Several children failed to complete every item on every scale. Most children only skipped one item ($n = 36$); however, some children skipped two ($n = 11$) or three items ($n = 5$). No participant included in data analysis skipped more than three items. Missing values for any item were replaced with the mean response for that item in each particular grade sample. For example, missing data from a protocol taken from a third grader would be replaced with the mean response for that item of all third graders.

After missing data were replaced, means and standard deviations for the subscales of the measures were calculated for each sample and are listed in Table 2. While the total scores on the subscales of the MASC are reported, the subscores that make up these total scores (e.g., tense/restless, somatic/autonomic = total score of physical symptoms) are not reported due to their poor psychometric properties (March, 1997). The means of the samples were compared using independent *t* tests to determine if there were any statistically significant differences between the mean responses of the samples. Effect sizes were calculated to compare the means. The effect size was calculated by finding the mean difference and dividing it by the average of the standard deviations of both samples. It represents the difference in the mean scores expressed in terms of standard deviation units.

A review of Table 2 indicates that third graders scored higher on all the subscale and total scores, with the exception of the PA and perfectionism (MASC) subscales. On many of these subscales, the difference between the groups was large enough to demonstrate statistically significance and moderate effect sizes. For instance, statistically significant differences were found between third- and sixth-grade samples on all of the subscales of the RCMAS (total score: $t = 4.01, p \leq .01$) and many of the subscales of the MASC and CDI. A statistically significant difference was indicated between samples on MASC items related to physical symptoms of anxiety ($t = 4.66$, $p \leq .01$), separation/panic ($t = 4.32, p \leq .01$), and the total score ($t = 3.69, p \leq .01$). On the CDI, statistically different means were found between third- and sixth-grade samples on all subscales except those items related to ineffectiveness. Consequently, the total score on the CDI was statistically significantly different between samples

Table 2

Mean, Standard Deviations, t-Test Scores, and Effect Sizes for Subscales: Third- and Sixth-Grade Samples

	Third grade (n = 101)		Sixth grade (n = 146)			
Measure/subscale	Mean	*SD*	Mean	*SD*	*t*	*ES*
Multidimensional Anxiety Scale for Children						
Physical symptoms—total score	13.83	7.28	9.64	6.69	4.66**	.60
Harm avoidance—total score	18.02	4.85	16.95	4.46	1.80	.23
Social anxiety—total score	11.94	6.23	11.51	6.19	.54	.07
Separation/panic	10.07	5.69	7.14	4.88	4.32**	.55
Anxiety disorder index	14.51	4.98	13.61	4.68	1.44	.19
Total score	53.86	18.59	45.24	17.66	3.69**	.48
Reynolds Children Manifest Anxiety Scale						
Physiological anxiety	4.59	2.59	3.35	2.29	3.99**	.51
Worry/over-sensitivity	4.90	3.23	3.76	2.87	2.92**	.37
Social concerns/concentration	3.30	2.05	2.30	2.07	3.74**	.49
RCMAS total anxiety	12.79	6.89	9.41	6.25	4.01**	.51
Children Depression Inventory						
Negative mood	2.41	2.41	1.82	1.78	2.19*	.28
Interpersonal problems	1.21	1.67	.49	.99	4.25**	.54
Ineffectiveness	1.51	1.68	1.15	1.51	1.73	.23
Anhedonia	4.15	3.61	2.40	2.35	4.60**	.59
Negative self-esteem[a]	1.43	1.93	.84	1.18	2.98**	.38
CDI total score[a]	10.69	8.95	6.70	6.20	4.14**	.53
Positive and Negative Affect Scale for Children						
Positive affectivity	44.94	10.53	45.75	7.68	-.70	.09
Negative affectivity	34.29	13.61	27.58	9.98	4.47**	.57

[a] Item assessing suicidal ideation (CDI item #9) excluded from calculation.

* $p \leq .05$

** $p \leq .01$

($t = 4.14, p \leq .01$). Finally, no difference was found between the mean totals on the PA scale; however, a statistically significant finding was indicated between mean sample totals on the NA scale ($t = 4.47, p \leq .01$).

Regarding effect size calculations, moderate differences (between .45 and .60) were noted on several subscales and total scores. For instance, MASC items related to physical symptoms of anxiety, separation/panic, and the total score demonstrated moderate differences between groups. A moderate effect size difference was noted between groups on all items of the RCMAS, except those loading on the worry/over-sensitivity subscale. Moderate differences were also noted on CDI items loading on the interpersonal problems, anhedonia, and total score scales. Finally, a moderate effect size was noted between group responses on the NA subscale. In other words, these findings indicate that the third-grade group scored approximately half a standard deviation unit higher than the sixth-grade group on the indices of anxiety and depression mentioned above.

The mean scores for both groups are largely similar to what is typically reported for nonclinical populations (Kovacs, 1992; March, 1997; Reynolds & Richmond, 1985). However, some of the subscale scores on the MASC were substantially higher than the mean totals reported in the MASC manual, particularly for the third-grade sample. Although the scores in the third-grade sample are not in the clinical range, the third-grade sample's mean score on separation/panic and the MASC total score are relatively elevated for a nonclinical population (t scores of 59, and 57 for males, respectively). Only the sixth-grade's mean score on separation/panic fell into the mildly elevated or "slightly above average" range (t score: 59). Finally, the PA scale for both samples was

close to the mean score reported by Laurent et al. (1994; PA = 43.40); however, the NA scale mean for the third-grade sample appeared markedly higher in the present sample than in Laurent et al.'s sample (NA = 26.97). Using the standard deviation of Laurent et al.'s sample (*SD* = 10.58) as a metric to compare the scores, this represents approximately .7 of a standard deviation unit increase between samples. The third-grade sample in this study scored above average on certain subtests of anxiety and negative affectivity as measured by the MASC and PANAS-C, respectively. Few such patterns were noted in the sixth-grade sample. Regardless of these findings, the data for the third- and sixth-grade samples are largely similar to what has been demonstrated in the normative group.

Question #1: Oblique and Orthogonal Model Comparisons

The first and primary research question asks if self-report data supports a one-factor, two-factor uncorrelated, or two-factor correlated model of affect in third and sixth-grade children. It was hypothesized that data in the third-grade sample would support either a two-factor correlated or uncorrelated solution; however, data from the sixth-grade sample would support a two-factor uncorrelated solution, thereby supporting the notion that the constructs of NA and PA were more distinct in the older sample. Confirmatory Factor Analytic methods were used to test models in each age group. Data for each sample was taken from the PA and NA subscales of the PANAS-C. For purposes of analysis, items from each subscale were grouped into "packets" of three to five items. Items were grouped based on similar item content. As a result, seven item packets were formed--three from the PA scale and four from the NA scale.

The packets were labeled Happy, Energetic, Strong, Sad, Afraid, Mad, and Nervous and are listed, along with the items that make them up, in Table 3.

Item packet means and standard deviations for the third and sixth-grade samples are presented in Table 4. Means in the third-grade sample ranged from 6.881 (Nervous) to 14.901 (Happy) in the third-grade sample and from 5.568 (Nervous) to 16.068 (Energetic) in the sixth-grade sample. Table 4 also includes *z*-scores representing skewness for each item packet. Corresponding *p*-values are also listed as an index of whether or not the skewness of the item packet can be considered statistically significant. As expected, almost all of the item packets in each sample have non-normal distributions, with the items taping positive affect (Happy, Energetic, Strong) being

Table 3

Item Packets and Corresponding Items From PANAS-C

PA packets	Items	NA packets	Items
Happy	Happy Cheerful Joyful Delighted	Sad	Sad Miserable Blue Gloomy Lonely
Energetic	Energetic Active Lively Excited	Afraid	Afraid Scared Jittery Frightened
Strong	Strong Calm Proud Interested	Mad	Mad Disgusted Upset
Nervous	Nervous Ashamed Guilty		

Table 4

Means, Standard Deviations, and Z-Scores Representing Skewness for Third- and Sixth-Grade Samples

Grade/item packet	Mean	*SD*	Z-score of skewness	*P*-value (skewness)
Third grade				
Happy	14.901	4.730	-3.505	0.000
Energetic	15.802	3.652	-3.259	0.001
Strong	14.238	3.707	-2.630	0.009
Sad	11.436	5.216	2.542	0.011
Afraid	8.376	4.545	3.378	0.001
Mad	7.594	3.462	1.549	0.121
Nervous	6.881	3.250	3.149	0.002
Sixth grade				
Happy	15.493	2.923	-3.518	0.000
Energetic	16.068	3.166	-4.414	0.000
Strong	14.192	2.846	-2.315	0.021
Sad	8.897	3.820	5.140	0.000
Afraid	7.034	3.258	5.337	0.000
Mad	6.075	2.579	3.975	0.000
Nervous	5.568	2.446	4.317	0.000

negatively skewed and items taping negative affectivity (Sad, Afraid, Mad, Nervous) being positively skewed.

Data were analyzed for third-grade participants and sixth-grade participants separately. The models specified and tested were the same for both samples. Three latent models were tested: a one-factor model, two-factor uncorrelated model, and two-factor correlated model. The data were analyzed using *Lisrel 8.30*. In all cases, a

covariance matrix was analyzed, no error terms of the observed variables were allowed to correlate, and the variance of the latent variable(s) were constrained to be 1.0. In the one-factor model, all of the item packets were constrained to load on the single latent variable of NA. In the two-factor uncorrelated model, four of the item packets (Sad, Afraid, Mad, and Nervous) were constrained to load on the latent variable of NA and the remaining three item packets (Happy, Energetic, Strong) loaded on the latent variable of PA. Furthermore, in this model, the relationship between the two latent variables of NA and PA was fixed to be 0 (i.e., no correlation). In the two-factor correlated model item packets were constrained to load onto the latent PA and NA factors as before; however, the correlation between NA and PA was freed to be estimated from the data. The covariance matrices for the item packets of each sample are listed in Tables 5 and 6.

Table 5

Covariance Matrix for Third-Grade Sample

Variable	Happy	Energetic	Strong	Sad	Afraid	Mad	Nervous
Happy	22.4						
Energetic	11.8	13.3					
Strong	11.1	7.8	13.7				
Sad	-8.9	-6.1	-2.7	27.2			
Afraid	0.9	-1.3	0.9	12.8	20.7		
Mad	-2.8	-0.8	-1.0	11.3	6.2	12.0	
Nervous	-1.7	-1.7	0.2	10.9	10.0	6.1	10.6

Note. Covariances rounded to the nearest tenth.

Table 6

Covariance Matrix for Sixth-Grade Sample

Variable	Happy	Energetic	Strong	Sad	Afraid	Mad	Nervous
Happy	8.5						
Energetic	5.6	10.0					
Strong	4.8	5.7	8.1				
Sad	-1.9	-3.6	-2.4	14.6			
Afraid	0.3	-0.2	-0.2	6.6	10.6		
Mad	-0.2	-0.6	-0.8	6.1	4.2	6.7	
Nervous	0.2	-0.5	-0.2	5.4	5.4	3.4	6.0

Note. Covariances rounded to the nearest tenth.

An Explanation of Fit Indices

A number of indices were used to assess the fit of the models to the data. Because different fit indices address different aspects of model fit, seven fit indices were selected across the family of fit indices developed: the goodness-of-fit chi-squared statistic (χ^2), the Goodness of Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI), the Bentler Comparative Fit Index (CFI), the Bentler-Bonett Non-Normed Fit Index (NNFI), the Root Mean Square Error of Approximation index (RMSEA), and the Standardized Root Mean Squared Residual (SRMR) index. The χ^2 statistic is a general test of model fit and is based on the difference between the data derived from the model in question and a theoretical data set where the data-model fit is perfect. Researchers interested in testing model fit generally would not want to find statistical significance when using this index because rejecting the null would indicate that the model data does

not "fit" the theoretical data set where model fit is perfect. Nevertheless, the χ^2 index is vulnerable to misinterpretation due to sample size and nonnormal data. In other words, if sample sizes are large enough or skewed significantly, a statistically significant finding is almost always obtained. Two fit indexes that take sample size into account are the GFI and AGFI. The values for both indexes theoretically range from 0 (poor fit) to 1 (perfect fit). The GFI functions like a squared multiple correlation: it indicates the proportion of the observed covariance that is explained by the model covariance. Because more complex models (those with more parameters) tend to fit the data better than do simpler ones purely by chance, the AGFI "adjusts" the value of the GFI for the parameters. Hence, the AGFI includes a "built-in" adjustment for model complexity. Joresko and Sorbom (1985) argued that the GFI and AGFI are robust to nonnormal data.

The CFI also seems to be less affected by sample size or nonnormal data; however, it is considered an incremental fit index. In other words, it indicates the improvement of the overall fit of the researcher's model with that of a null model calculated from the same sample data. This null model is generally an independence model where each observed variable is treated as its own latent variable. Hence, if the CFI is .70, then the researcher's model is a 70% better fit than the null model calculated with the sample data. The NNFI is also an incremental fit index, interpreted the same way as the CFI; however, it (like the AGFI) includes a correction for model complexity. Indexes such as the GFI and CFI should be greater than .9. Their counterparts (AGFI and NNFI, respectively), which are corrected for the number of parameters, should also be relatively high (Klien, 1998) demonstrating that values decrease only marginally

when model complexity is taken into account.

Certain fit indexes measure how great the difference is between the residuals (i.e., errors in measurement) indicated by the actual data and those predicted by the model. The RMSEA, for instance, takes into account how well the model, which has unknown parameter values, would fit the population covariances if such were available. Because it is a measure of discrepancy and is expressed per degree of freedom, it is an index that is also sensitive to sample size and model complexity. Values less than .05 indicate good fit, while values between .05 and .1 indicate moderate fit. RMSEA values greater than .1 indicate poor fit (Kline, 1998). The SRMR is a standardized representation of the covariance residuals. Kline described covariance residuals as "the differences between observed and model-implied residuals" (p. 129). Therefore, in describing the SRMR, Kline stated further, "when the model fit is perfect, the SRMR equals zero. As the average discrepancy between the observed and predicted covariances increase, so does the value of the SRMR" (p. 129). Another way to interpret the SRMR was provided by Burns (1989) when she said, "normalized residuals *[like the SRMR]* represent estimates of the number of standard deviations the observed residuals are from the zero residuals that would exist if the model were a perfectly fitting one" (p. 57, italics added). As a guideline, SRMR values less than .10 represent a reasonable residual average (Kline).

In addition to fit indexes that represent either residuals or the amount of covariance accounted for by the model, one other type of measurement was used to determine which model fits the data best. Because the two-factor correlated and two-factor uncorrelated models are nested (i.e., each model could be constructed by adding

or releasing constraints in the other model), one can statistically compare the adequacy of the models to each other using a chi-square difference test. In this procedure, a difference between the chi-squared values is calculated with one degree of freedom in a standard chi-squared table. This value is then evaluated to determine if the difference is large enough so that one of the models provides a statistically significant improvement over the other model.

Finally, for each model, standardized path values for each data packet will be presented. Each of these path values can be squared to determine how much variance of the latent structure the item packet in question explains. Hence, path values can be used as a metric to determine the strength of the association between the item packets and the latent constructs of NA and PA. Path values that are statistically significant and above .7 are generally considered fairly strong indicators that the item-packet has a relatively strong association with the latent construct.

In summary, each of the fit indexes assesses different aspects of overall model fit. For instance, the χ^2 statistic provides a fairly good estimate of overall model fit, but does not take into account sample size or nonnormal data. The GFI and AGFI are fit indexes that are robust to sample size and non-normal data and represent the proportion of the observed covariances that are explained by the model covariances, with the AGFI taking into account model complexity. The CFI and NNFI also are robust to sample size and nonnormal data and take into account the amount of observed covariance explained by the model; however, they compare this amount with a null model, thus giving the interpreter a relative basis to explain how the model "improves on" model fit. The RMSEA and the SRMR are indexes that measure the amount of residual

measurement (or error) in the model, with the SRMR translating this data into standard deviation units. Finally, path values indicate the strength of association between each packet and its theoretical underlying construct. Values that are considered "high" or good representations of model (or path) fit for each index are summarized in Table 7.

Table 7

Summary of Fit Index Descriptions and Values Representative of Adequate Fit

Index	Brief description	Value indicating adequate fit
Chi-squared (χ^2)	General test of model fit where data compared to theoretical "perfect fit." Not robust to nonnormal data.	No statistically significant finding
Goodness of fit index (GFI)	Functions like a squared multiple correlation. Indicates the proportion of the observed covariance explained by the model covariance.	$\geq .90$ (1 = perfect fit)
Adjusted goodness of fit index (AGFI)	Same as GFI but takes model complexity (models with more parameters) into account.	Not greatly lower than GFI
Comparative fit index (CFI)	Indicates "improvement" of the model fit compared to null model where each variable is treated as its own latent variable.	$\geq .90$
Non-normed fit index (NNFI)	Same as CFI, but takes model complexity into account.	Not greatly lower than CFI
Root mean square error of approximation (RMSEA)	Indicates the difference between the errors in measurement indicated by the actual data and those predicted by the model.	$< .05$ = good fit; .05 to .1 = adequate fit, +.1 = poor fit
Standardized root mean squared residual (SRMR)	Similar to RMSEA, but expressed in standard deviation units. Therefore, it is a standardized summary of residual covariances.	0 = perfect fit Value $\leq .10$
One-degree test for nested models	Determine if the difference in χ^2 values is large enough between nested models so that one is considered (in this application) to be a better fit than the other.	$\Delta\chi^2 \geq$ statistically significant

Third-Grade Sample Results

One-factor model. The first model tested in the third-grade sample was the one-factor model. It is graphically represented in Figure 1. The factor loadings, R^2 values, and error values for the one-factor model are presented in Table 8. Factor loadings ranged from -.43 to .87. All path values were statistically significant ($p < .05$), except for the Afraid and Nervous packets. Additionally, four of the error values (Sad, Afraid, Mad, Nervous) were quite large (> .82). Fit statistics for the one-factor model are presented in Table 9. None of the fit statistics suggests that the model provides a good fit to the data. For instance, even generally poor-fit statistics (GFI = .61 and CFI = .43) were further reduced in value once fit indices that include model complexity were taken into account (AGFI = .225 and NNFI = .15). Additionally, indices that measure the difference between observed and expected residual scores indicated large differences

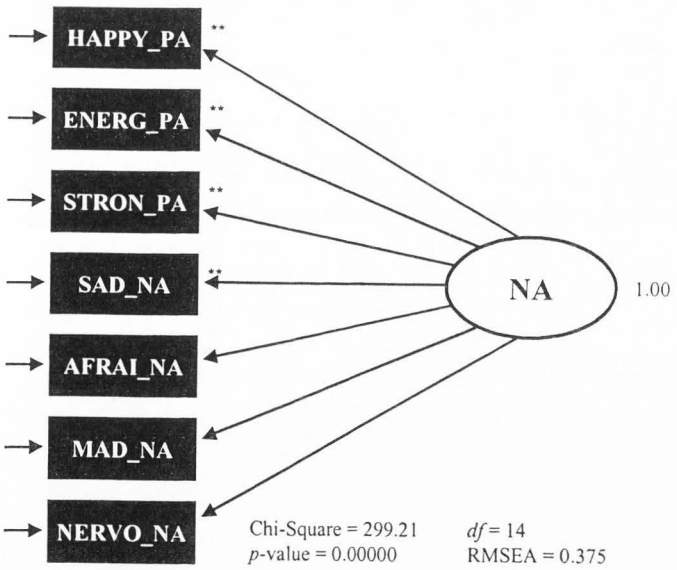

Figure 1. One-factor model (third and sixth grades).

Table 8

Factor Loadings, R^2 Values, and Error Values for Each Model in the Third-Grade Sample

Item-packet	Latent construct on which the packet is loaded	Loading value	R^2 value	Packet error value
One-factor model				
Happy	NA	.87**	.76	.24
Energetic	NA	.79**	.62	.38
Strong	NA	.70**	.49	.51
Sad	NA	-.43**	.18	.82
Afraid	NA	-.08	.01	.99
Mad	NA	-.22*	.05	.95
Nervous	NA	-.20	.04	.96
Two-factor uncorrelated model				
Happy	PA	.86**	.74	.25
Energetic	PA	.79**	.62	.37
Strong	PA	.73**	.53	.47
Sad	NA	.78**	.61	.39
Afraid	NA	.73**	.53	.46
Mad	NA	.66**	.44	.56
Nervous	NA	.86**	.74	.27
Two-factor correlated model				
Happy	PA	.87**	.76	.25
Energetic	PA	.79**	.62	.37
Strong	PA	.72**	.52	.48
Sad	NA	.81**	.66	.35
Afraid	NA	.72**	.52	.49
Mad	NA	.67**	.45	.55
Nervous	NA	.84**	.71	.30
NA/PA correlation	--	-.22*	.05	--

Note. All packet error values for all models were statistically significant at $p < .01$.

* $p < .05$

** $p < .01$

Table 9

Fit Statistics for Each Model in the Third-Grade Sample

Model	χ^2	GFI	AGFI	CFI	NNFI	RMSEA	SRMR	One-deg
One-factor	189.5*	.612	.225	.431	.146	.385	.252	--
Two-factor uncorrelated	45.61**	.89	.77	.90	.85	.15	.11	--
Two-factor correlated	42.32**	.89	.77	.90	.85	.15	.082	$\chi^2 = 3.29$

* $p < .05$
** $p < .01$

(RMSEA = .385, SRMR = .252); thus demonstrating a large amount of residual fluctuation not accounted for by the one-factor model. In essence, none of the fit statistics suggest an adequate fit.

Two-factor uncorrelated model. The next model tested in the third-grade sample was the two-factor uncorrelated model where the covariance between the latent constructs of PA and NA was set to 0. This model is represented in Figure 2. The factor loadings, R^2 values, and error values for each packet in this model are contained in Table 8. All factor loadings in this model were statistically significant ($p <$. 05) and ranged from .66 to .86, accounting for approximately 44% and 74% of the variance, respectively. This model also produced moderate error values in Strong, Afraid, and Mad packets (.47, .46, .56, respectively). Fit indexes for this model are presented in Table 9. Most of the fit indexes in this model demonstrate adequate or nearly adequate fit. For instance, the GFI score of .89 was not seriously affected when model complexity was taken into account (AGFI = .77). Furthermore, moderately high indexes measuring improvement in model fit were indicated (CFI = .90, NNFI = .85). Regarding indexes measuring the difference between observed and expected residuals,

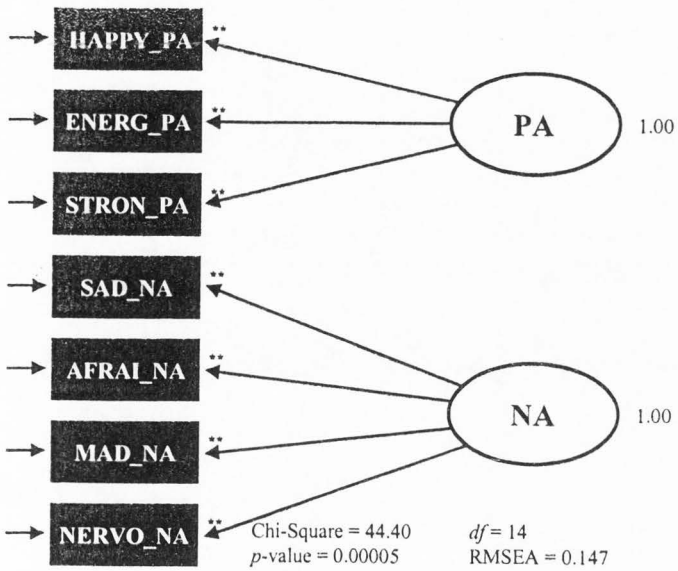

Figure 2. Two-factor uncorrelated model (third and sixth grades).

the findings were not as positive. Both the SRMR (.11) and the RMSEA (.15) indicated a substantial amount of residual fluctuation in the model.

Two-factor correlated model. The final model tested in the third-grade sample was the two-factor correlated model where the latent constructs of PA and NA were allowed to correlate. This model is represented in Figure 3. The factor loadings, R^2 values, correlation between PA and NA, and error values for each packet in this model are presented in Table 8. In this model all factor loadings were statistically significant ($p < .05$) and ranged from .67 to .87, accounting for 45% and 76% of the variance, respectively. Error values were also moderately elevated in the Strong, Afraid, and Mad packets (.48, .49, .55, respectively). The correlation between NA and PA was -.22 and was also statistically significant ($p < .05$). Fit indexes for this model are presented in Table 9. Similar to the previous model, the χ^2 (42.32), GFI (.89), AGFI (.77), CFI

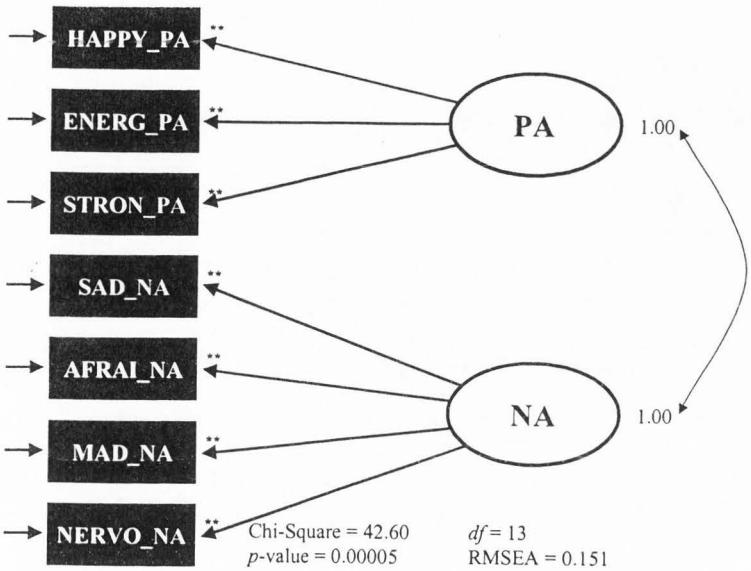

Figure 3. Two-factor correlated model (third and sixth grades).

(.90), and NNFI (.85) fit indexes all demonstrate adequate fit with the model data. Nevertheless, the RMSEA indicated a substantial amount of residual fluctuation (.15), which is also similar to the previous model. One major difference between the two-factor models was related to the SRMR. The SRMR indicated that the two-factor uncorrelated model had a larger difference between observed and expected residuals (.11) than the two-factor correlated model (.082). The SRMR value in the two-factor correlated model represents an acceptable amount of residual fluctuation.

To test if either of the two-factor models was a statistically significant improvement over the other model, a one-degree χ^2 test was calculated. Results were nonsignificant indicating that the two models are equally "good" in their fit to the data. Additionally, both models were better than the one-factor model regarding data fit. Although some minor differences exist when comparing fit statistics, there is no reason

to reject either of the two-factor models in relationship to the third-grade sample at this point in time. Nevertheless, a preference for the two-factor correlated model can be made because the correlation between NA and PA was statistically significant, which indicates that the correlation between the two constructs is statistically significant from zero and should not be dropped from the model.

Sixth-Grade Sample Results

One-factor model. Similar to the third-grade sample, the first model tested in the sixth-grade sample was the one-factor model (see Figure 1). The factor loadings, R^2 values, and error values for the one-factor model are presented in Table 10. Many of the factor loadings in this model were statistically significant ($p \leq .05$) and ranged from -.39 to .82; however, the Afraid, Mad, and Nervous packets were not statistically significant ($p \geq .05$). Error values in all but two of the item packets (Energetic and Strong) were moderate to highly elevated (.47 to .99). Fit statistics for the one-factor model are presented in Table 11. The fit statistics for this model suggest an overall poor fit to the data. For instance, the chi-square test was found to be statistically significant ($p < .05$, $x^2 = 244.28$, $df = 14$) and the other six indexes of model fit demonstrated poor fit. Even when the fit indexes produced already poor scores (GFI = .63 and CFI = .42), these scores were reduced even further once fit indexes that included model complexity were taken into account (AGFI = .26 and NNFI = .13). Indexes measuring the amount of residual fluctuation were also unacceptably high (RMSEA = .37, SRMR = .26).

Table 10

Factor Loadings, R^2 Values, and Error Values for Each Model in the Sixth-Grade Sample

Item-packet	Latent construct on which the packet is loaded	Loading value	R^2 value	Packet error value
One-factor model				
Happy	NA	.72**	.52	.47
Energetic	NA	.82**	.67	.32
Strong	NA	.77**	.59	.41
Sad	NA	-.35**	.12	.88
Afraid	NA	-.08	.01	.99
Mad	NA	-.16	.03	.98
Nervous	NA	-.12	.01	.99
Two-factor uncorrelated model				
Happy	PA	.75**	.56	.44
Energetic	PA	.81**	.66	.34
Strong	PA	.78**	.61	.39
Sad	NA	.74**	.55	.45
Afraid	NA	.77**	.59	.40
Mad	NA	.69**	.48	.52
Nervous	NA	.81**	.66	.35
Two-factor correlated model				
Happy	PA	.74**	.55	.45
Energetic	PA	.82**	.67	.33
Strong	PA	.78**	.61	.39
Sad	NA	.75**	.56	.43
Afraid	NA	.77**	.59	.41
Mad	NA	.70**	.49	.52
Nervous	NA	.80**	.64	.36
NA/PA correlation	--	-.14	.02	--

Note. All packet error values for all models were statistically significant at $p < .01$.

* $p < .05$

** $p < .01$

Table 11

Fit Statistics for Each Model in the Sixth-Grade Sample

Model	χ^2	GFI	AGFI	CFI	NNFI	RMSEA	SRMR	One-deg
One-factor	244.28*	.63	.26	.42	.13	.37	.26	--
Two-factor uncorrelated	35.41**	.94	.87	.95	.92	.10	.086	--
Two-factor correlated	33.57**	.94	.86	.95	.92	.11	.068	$\chi^2 = 1.84$

* $p < .05$
** $p < .01$

Two-factor uncorrelated model. The next model tested in the sixth-grade sample was the two-factor uncorrelated model (see Figure 2). The factor loadings, R^2 values, and error values for each packet in this model are contained in Table 10. All factor loadings in this model were statistically significant ($p <$. 01) and ranged from .69 to .81, accounting for approximately 47% and 65% of the variance, respectively. This model also produced moderate error values in the Happy, Sad, and Mad packets (.44, .45, .52, respectively). Fit indexes for this model are presented in Table 11. All of the fit indexes in this model demonstrate adequate to good fit. For instance, the GFI (.94) and AGFI (.87) both suggest an acceptable fit. Similarly the CFI (.95), NNFI (.92), RMSEA (.10), and SRMR (.086) all suggest adequate fit.

Two-factor correlated model. The factor loadings, *R*-squared values, correlation between PA and NA, error values, and fit statistics for the two factor correlated model (see Figure 3) are presented in Tables 10 and 11. All factor loadings were statistically significant ($p < .05$) and ranged from .70 to .82, accounting for 49% and 67% of the variance respectively. Error values were moderately elevated in the Happy, Sad, and Mad packets (.45, .43, and .52, respectively). .The correlation between NA and PA

(r = -.14) was not statistically significant ($p < .05$). All fit indexes regarding the two-factor correlated model were in the acceptable range and indicative of adequate model fit. Similar values across fit indexes were found between the two-factor uncorrelated and two-factor correlated models. The only notable difference between the models was in the values of the SRMR. Here there was less difference (.068) between the observed and expected residuals in the two-factor correlated model.

A one-degree test for nested models in the sixth-grade sample also demonstrated non-significant results ($\chi^2 = 1.84$, $df = 1$) indicating that both models are equally good regarding data fit. Nevertheless, there is some reason to believe that the two-factor uncorrelated model may be a better fit for the data in the sixth-grade sample because the correlation between the latent constructs of NA and PA was not statistically significant ($p \leq .05$). Both two-factor models, however, represent better data fit in comparison with the one-factor model.

Question #2: Intercorrelations Among Total and Subscale Scores

The secondary research question asked how the subscales PA and NA of the PANAS-C correlated with the other measures of child psychopathology. It was hypothesized that the pattern of correlations would generally confirm the Tripartite model (e.g., NA positively correlated with measures of both anxiety and depression, PA negatively correlated with measures of depression but not necessarily with measures of anxiety); however, in the third-grade sample, PA would account for less variance in the measure of depression (CDI) than in the sixth-grade sample. This is an indication that PA has less power to distinguish anxiety from depression in the younger sample.

Intercorrelations were calculated for the subscale and total scores of each sample separately. The complete listing of correlations between all subscale and total scores for both samples is found in Appendix B. However, for the sake of brevity, the correlations for the total scores, PA, and NA are reported in Table 12 for the third-grade sample and Table 13 for the sixth-grade sample. Most of the correlations in both samples fell in the small to moderate range (.03 to .60); however, a few correlations were higher than .6. Furthermore, the majority of the correlations that were calculated were statistically significant ($p \leq .05$).

Regarding the performance of the subscales of the PANAS-C in the third-grade sample, the negative affectivity subscale, as predicted, demonstrated small ($r = .34$) to strong ($r = .71$) correlations with most of the total and subscale scores in the third-grade sample. These findings are in line with what the literature indicates regarding the

Table 12

Intercorrelations Among Total Scores, PA, and NA for Third-Grade Sample

Measure	MASC total score	RCMAS total score	CDI total score	PA	NA
MASC total score	--				
RCMAS total score	.70**	--			
CDI total score	.41**	.61**	--		
PA	.07	-.2**	-.48**	--	
NA	.67**	.74**	.58**	-.18	--

MASC = Multidimensional Anxiety Scale for Children.

RCMAS = Reynolds Children Manifest Anxiety Scale.

CDI = Children Depression Inventory.

* $p \leq .05$

** $p \leq .01$

Table 13

Intercorrelations Among Total Scores, PA, and NA for Sixth-Grade Sample

Measure	MASC total score	RCMAS total score	CDI total score	PA	NA
MASC total score	--				
RCMAS total score	.72**	--			
CDI total score	.53**	.72**	--		
PA	-.15	-.24**	-.28**	--	
NA	.59**	.67**	.56**	-.13	--

MASC = Multidimensional Anxiety Scale for Children.

RCMAS = Reynolds Children Manifest Anxiety Scale.

CDI = Children Depression Inventory.

* $p \leq .05$

** $p \leq .01$

construct of NA. The correlations for PA in this sample demonstrated only weak (r = -.2) to moderate (r = -.49) negative associations with the total and subscale scores of the CDI and the RCMAS total score (r = -.2, $p < .05$). In this sample, PA was weakly associated with many of the subscale scores of the RCMAS and the MASC (with the exception of Harm avoidance). It also did not correlate strongly with the NA subscale of the PANAS-C.

Regarding the intercorrelations between the subscales of the PANAS-C with the other measures of psychopathology in the sixth-grade sample, the NA subscale demonstrated small (r = .26) to moderately large (r = .67) correlations with most of the total scores and subscales under investigation. The strength of these correlations does not appear to be as strong as in the third-grade sample; however, it would appear that NA is correlated with most measures of anxiety and depression in the sixth-grade

sample. The only exceptions to this rule seem to be the correlations with the PA scale (as expected), the interpersonal problems subscale of the CDI, and one of the harm avoidance subscales. In contrast with the third-grade sample, the correlations between PA and the other measures in the study seem larger and more numerous. The PA scale demonstrated small negative correlations ranging from -.17 to -.28. Nevertheless, the PA subscale demonstrated little to no association with the harm avoidance, social anxiety-performance fears, separation/panic, and total scores of the MASC. It also did not correlate with the worry/over-sensitivity subscale of the RCMAS or the interpersonal problems subscale of the CDI.

The NA subscale of the PANAS-C functioned as predicted in both samples. In other words, it demonstrated low to moderate correlations with most of the measures of anxiety and depression. PA functioned as predicted in the third-grade sample: statistically significant low to moderate (r = -.28 to -.49) correlations with the measures of depression and few statistically significant negative correlations with the measures of anxiety or NA. The role of PA in the sixth-grade sample, however, did not function as predicted. For instance, several statistically significant negative correlations (n = 9) were demonstrated between PA and the total and subscale measures of anxiety (r = -.19 to -.28). Furthermore, the negative correlations indicated between PA and the CDI total and subscale scores were not as strong as in the third-grade sample (r = -.09 to -.28).

Another way to examine the differentiating power of PA and NA is to compare certain correlations across samples. Consequentially, six correlational coefficients were identified, a priori, in each sample to represent PA and NA's relationship with anxiety and depression. Specifically, PA and NA were compared to the total scores of the

MASC, RCMAS, and CDI in each sample. As a way of demonstrating effect size the *R*-squared difference of these two values was calculated. Furthermore, an *r*-to-*z* transformation was used to compare correlation coefficients across samples (e.g., third grades CDI/PA correlation compared with sixth-grade CDI/PA correlation). The *z*-scores of these analyses are presented as a way to determine if the correlations between samples are statistically significantly different from each other. The results of these analyses appear in Table 14.

Table 14 demonstrates moderate to strong correlations between NA and the total scores of the measures of anxiety and depression in both samples (.56 to .74). For both third graders and sixth graders, NA is most strongly associated with the RCMAS; however, the correlations between NA and the other two indices are comparable across

Table 14

Correlations of PA and NA with Total Scores Across Samples

Construct	MASC total	RCMAS total	CDI total
PA			
Third grade	.07	-.2	-.48
Sixth grade	-.15	-.24	-.28
r^2 difference	4.8%	.2%	4%
z-score difference	1.69	.321	-1.79
NA			
Third grade	.67	.74	.58
Sixth grade	.59	.67	.56
r^2 difference	.6%	.5%	.04%
z-score difference	1.02	1.07	.27

* $p \leq .05$

**$p \leq .01$ (two tailed test used for r-to-z transformation analysis)

ages. PA, in contrast, demonstrated generally weak to moderate negative correlations with the total scores in both age groups (.07 to -.48). In fact, the only moderately strong correlation was between PA and the CDI total score in the third-grade sample. This finding indicates that PA is negatively associated with approximately 23% of the variance in CDI total scores for the third-grade sample compared with only 7.8% variance in the sixth-grade sample.

An attempt was made to compare the strength of correlations across samples using the *r*-to-*z* transformation method; however, no statistically significant findings resulted from using this procedure (although the comparison between the CDI and PA correlations approached statistical significance). The difference between correlations was also squared to demonstrate the amount of variance accounted for by the difference. These squared differences resulted in very small percentages. For instance, the largest differences produced 4% and 4.8% additional variance in the PA/MASC total and PA/CDI total correlations, respectively. This particular metric of effect size is considered very small.

Therefore, it appears that NA is moderately associated with the variance in the total scores of the MASC, RCMAS, and CDI. The pattern of associations appears similar in both age groups. However, the construct of PA (as measured by the PANAS-C) is associated with only a small amount of negative variance in the total scores of the CDI and the RCMAS, with slightly more variance being accounted for in the third-grade sample in relation to the CDI. PA did not seem to be correlated with total scores on the MASC in either sample.

CHAPTER V

DISCUSSION

This final chapter will summarize the study's findings related to the two research hypotheses proposed in this paper. Next, the results will be discussed in the context of the other research studies addressing the topics initially presented in the literature review. How the results relate to developmental theory and clinical implications will then be discussed. Finally, future directions for this line of research will be delineated.

Findings Related to the Hypotheses

Two methods were used to assess whether or not there are developmental differences in the way older and younger children structure anxious and depressive affect. These methods are represented by the two proposed research questions. The first or primary research question used confirmatory factor analytic methods to determine if a one-factor, two-factor correlated, or two-factor uncorrelated model fit data the best in older and younger children. It was hypothesized that a two-factor uncorrelated model would fit the data best in the older sample, but a two-factor correlated or one-factor model would provide superior fit in the younger sample. The secondary research question examined the intercorrelations among the PA and NA scales of the PANAS-C and the other measures of childhood anxiety and depression. It was hypothesized that PA and NA would relate to the other measures in a manner predicted by the Tripartite model of affect; however, PA would account for more

variance related to the depression measure (CDI) in the older sample than in the younger sample. Confirmation of these hypotheses would indicate that: (a) older and younger children, presumably due to developmental factors, structure depressive and anxious affect differently; and (b) the constructs of the Tripartite model (specifically PA) are less valid in younger children than in older children.

The results of this study indicate conflicting findings related to these hypotheses. While the one-factor model was generally disconfirmed in both third and sixth-grade samples, confirmatory factor analysis indicated that the two-factor correlated and two-factor uncorrelated models both demonstrated adequate fit across samples. The only major difference between samples occurred while testing the two-factor correlated model. In the third-grade sample the correlation between NA and PA was larger and statistically significant, while the same correlation was smaller and non-statistically significant in the sixth-grade sample. This finding suggests that the intercorrelation between the Tripartite constructs of PA and NA was a valid path in the younger sample but was of little utility and could be "dropped" in the older sample. Hence, it appears that in younger children PA and NA, although not unitary, are less distinct from each other than in their older counterparts. Thus, there is some support for the primary hypothesis that older and younger children structure affect differently as part of their psychological development.

The results related to the secondary research question, however, complicate these findings. For instance, in the third-grade sample the PANAS-C subscales of PA and NA related to the measures of anxiety and depression as predicted by the Tripartite model (e.g., NA moderately correlated with all measures, PA demonstrated a larger

negative correlation with the depression measure than either of the anxiety measures). The findings in the sixth-grade sample, however, were different from what was expected. In this sample, NA was also moderately correlated with anxiety and depression measures; however, the correlation coefficients between the measures and PA were nearly identical (MASC total = -.15, RCMAS total = -.24, CDI total = -.28). Furthermore, the strength of correlation between PA and the depression measure was stronger in the third-grade sample than in the sixth-grade sample. These results indicate that PA actually accounts for *more* variance in younger children than in older children, and that PA has less utility in older children than in younger children for differentiating between anxiety and depression.

Taken together these findings paint a confusing picture. The data indicates that PA and NA are more distinct constructs in the older sample, yet the correlation between PA and the depression measure is small. In contrast, PA and NA are less independent in the younger sample, yet they act in a manner that is more consistent with the tenants of the Tripartite model (e.g., PA more negatively correlated with depression measure than with anxiety measure). How do we make sense of such findings? Since the third-grade sample scored higher, in general, across all measures perhaps the utility of PA functions as a result of increased psychopathology? This assumption would contradict, however, previous findings that the Tripartite model could be adequately applied to nonclinical samples (Boyd & Gullion, 1997; Crowley & Emerson, 1996). Obviously, there is a need for additional studies that utilize different measures of the dependent (e.g., depression and anxiety) and independent (e.g., PA and NA) variables to determine if the findings related to the sixth-grade sample are idiosyncratic or can be generalized

to other sixth-grade children. While this issue will be discussed further in the limitations section, it is important to note that one can be more confident in the results taken from confirmatory factor analysis because they were derived using multiple data points (item packets) and had to endure the more stringent criteria of confirmatory analysis. Consequently, using CFA methods was the main purpose of the present study because such procedures are less likely to be impacted by sampling variance. For instance, CFA takes into account multiple potential relationships between the data (all of which may occur in rather complex ways) rather than simply finding a "one to one" relationship between two measures while ignoring all of the other data. Consequently, the primary research question of the study, which utilized a more robust statistical procedure, was confirmed.

Findings in the Context of Previous Research

The results of the current study confirm some of the findings discussed in the literature. For instance, these results are similar to Cole and colleagues' (1997) finding that the correlation between the constructs of NA and PA was statistically significant and of larger magnitude in the younger sample than in the older sample. Cole inferred that such results indicate that PA and NA are more unitary constructs in the younger sample. This claim may still be quite bold given that the correlation of the younger sample in present data set (.22) was demonstrated to be considerably more modest than the correlation coefficient demonstrated in Cole's study (.9); however, there is support for the finding that PA and NA have a higher degree of association in the younger sample. Furthermore, the current study, unlike Cole's findings, demonstrated this

relationship by using a measure (PANAS-C) specifically designed to assess the components of the Tripartite model in children rather than relying on factor analytic methods to derive the constructs of PA and NA.

The present data also confirm Lonigan and colleagues' (1999) finding that a correlated (oblique) model fits the data better in the younger sample, and that an uncorrelated (orthogonal) model provides a better fit in the older sample. However, the current study assessed two narrow-band age cohorts, unlike Lonigan's study. To briefly review, Lonigan et al.'s study also examined differences across ages; however, Lonigan collected data across age groups and, consequently, did not have a very high number of subjects in the third and sixth grades. In discussing this limitation, Lonigan suggested the need for further research in two narrow-band age groups, which were inferred to structure affect differently. The present study provides such a comparison.

It would appear that there is starting to be some consensus in the literature regarding the structure of affect in children. Specifically, it appears that younger children structure affect in a more unitary manner compared to their older counterparts regardless of whether: (a) the Tripartite components are not specifically assessed (as in Cole and colleagues' [1997] study); (b) the data is collected across various age groups (as in Lonigan and colleagues' [1999] study); or (c) the data is collected using two narrow-band age groups (as in the current study). The fact that these studies made use of confirmatory factor analytic methods adds further confidence to these conclusions because these methods are generally more robust to errors of sampling variance.

Nevertheless, there are several ways in which the findings of the current study conflicts with previous research. First, Lonigan et al. (1999) found that the negative

association between PA and depression was less strong in the younger sample than in the older sample. The opposite proved to be true in the current study; however, it should be noted Lonigan's "younger" sample was the same age as the older sample in this study. Therefore, it is not possible to say that the relationship between PA and depression indicated in this study directly contradicts Lonigan's findings. Nevertheless, the issue does suggest that investigating how the relationship between PA and measures of depression change across age needs to be investigated further.

Secondly, the findings of the current study appear to conflict with the results of Turner and Barrett (2003), which examined Tripartite dimensions across three narrow-band age cohorts: third-, sixth-, and ninth-grade children. To briefly review, these researchers also used CFA methods to determine if a one-factor model, three two-factor correlated models, or a model delineating all three dimensions of the Tripartite model provided a best fit for the data. Fit indexes in this study indicated that the Tripartite model fit the data best across all three age groups. While this finding indicates that Tripartite dimensions can be used successfully across all age groups, Turner and Barrett's study does not specifically test a two-factor uncorrelated model. In all of the models tested by these researchers, the constructs of PA and NA were always allowed to correlate. It is possible that a two-factor uncorrelated model, if tested, would have produced a superior or equivalent fit in some age groups but not in others. Turner and Barrett also failed to note the strength of the correlation between the two latent constructs and whether the correlation was statistically significant. Including such information, as well as a specific test of a two-factor uncorrelated model, may have illuminated whether or not PA and NA differentiated from one another according to

age. Therefore, it is not possible to tell if Turner and Barrett's findings specifically contradict the current study because dissimilar models were assessed. For instance, Turner and Barrett would need to include a two-factor uncorrelated model in their analysis, and the current study would need to integrate the construct of PH in the analysis for a fair comparison to be made.

Nevertheless, the results of the current study and many other studies indicate that a two-factor solution is the best fit for the data for children between the ages of 6 and 11 (Chorpita et al., 1998; Epkins & Meyers, 1994; Murphy et al., 2000). Even Turner and Barrett's study, which indicated that the Tripartite model produced a superior fit compared with the two-factor models that were tested, still supported the notion that, regardless of the age of the subjects, PA and NA were far from the unitary constructs implied by Cole and colleagues' (1997) study. Therefore, there is some indication that PA and NA become more independent from each other as a child matures; however, not to such an extent that the factors of the Tripartite model are seriously affected or influenced.

Developmental Considerations

Although the current study indicates that there is some reason to believe that there are developmental differences between older and younger children regarding the structuring of affect, the study did not specifically state why such differences exist. Longitudinal data indicates that anxiety is much more prevalent among younger populations than older populations. Some have theorized that anxiety turns to depression after time. However, other hypotheses can be suggested. According to the

literature presented earlier, a change in structure may be due to the demonstrated tendency of younger children to deny that they experience negative emotions (Glasberg & Abound, 1982). Obviously, such was not indicated in this study because one of the samples (third grade) scored higher than the normal population on several measures of childhood distress; however, the extent to which children identify negative emotions with their own experience may play a significant factor in how affect is structured over time. Several hypotheses can be proposed. Perhaps younger children are simply more prone to saying they are anxious rather than depressed because the constellation of symptoms that are typically thought of as being anxious are simply more identifiable and "acceptable" to admit. Younger children also frequently fail to recognize non-contingency when they see it (Weisz, 1981). In other words, they attribute circumstances that are "pure luck" to such personal attributes as intelligence and practice. Younger children may be more resistant to depression because they have yet to accept the premise that certain "bad things" can be out of their control--a hallmark feature of hopelessness, which plays a large part in depression. Unfortunately, each of these theories relies on speculation at best.

One way to understand the conflicting findings between older and younger children can be found in literature regarding temperament. Rothbart's model indicates that temperament is made up of reactive and self-regulatory traits (Ahadi, Rothbart, & Ye, 1994; Derryberry & Rothbart, 1997). PA and NA may be considered different facets of reactive traits. However, Rothbart also suggested that attention control makes up a significant portion of self-regulation. Younger and older children can be expected to differ according to the amount of attention they devote to affectively sensitive

stimuli. Because attention is not integrated into the Tripartite model, perhaps a child's developing skill to maintain attention may be the "missing link" that explains the discrepant findings between older and younger children.

A limited number of studies support a connection between attention and the expression of negative affect. For instance, one study demonstrated an inverse relationship between observations of distress and attentional processes. The authors concluded that preschool children who had higher levels of attentional control were more able to calm themselves (Rothbart, Posner, & Rosicky, 1994). Others have found that difficulties with attention regulation are associated with internalizing problems (Lengua, 2002). For instance, Lonigan and colleagues' (1999) demonstrated that RCMAS anxiety was correlated with difficulties in attention regulation. Consequently, younger children may vary from their older counterparts when it comes to the amount of attention they devote to depressive and negative affect. Younger children may not have the capability to allot enough attention to differentiate the two constructs. Thus, if such a theory were accurate, PA and NA (two constructs that are essential to such a distinction) would appear less independent in younger children- similar to the findings reported in the current study.

Clinical Implications

Although the results of this study lend some credence to the notion that older and younger children structure anxious and depressive affect differently, the clinical implications for such findings are relatively small. Based on these findings, there is no reason to think a necessary distinction needs to be made between older and younger

children, and clinicians can use the constructs of PA and NA to differentiate anxiety and depression in a manner similar to adults. If such a distinction indeed exists, it is unlikely that the distinction is large enough to alter the way children are diagnosed and assessed. In other words, low PA and high NA may not be as "pure" of a means of assessing depressive affect in younger children as in older children; however, the current data set indicates that PA is hardly associated with NA to the extent implied by Cole and colleagues' (1997) findings. Therefore, based on the current study's findings, there is little empirical reason to believe that PA in younger children will be appreciably influenced by the construct of NA. A good clinical history, a few measures of general distress (NA), and a reliable measure of PA should give a clinician a good sense of which disorder (anxiety or depression) is more dominant.

Finch et al. (1989) stated, "[R]esearchers should give serious consideration to the possibility that anxiety and depression are not separate in children and that it is futile to attempt to separate the disorders. We found little evidence from any area to support their separation. Perhaps we should put the distinction to rest" (p. 196). Far from being "put to rest," the current study (as well as the other studies discussed) appears to discount this claim. In fact, based on the data, there appears to be little reason to think that a unitary model should be used to conceptualize anxiety and depression in children as young as the third grade. Assumptions of a two-factor structure seem to be appropriate across the age ranges that participated in this study, as has been reported by previous research. At most there are tentative indications that anxious specific and depressive specific constructs are more unified in younger children; however, such constructs are significantly different from each other by the

third grade to use the concept of PA in distinguishing the disorders.

Limitations

Obviously, there are several limitations to the current study. The most crucial is the cross-sectional design utilized. If the structure of affect does "evolve" over time, the most powerful way to demonstrate such changes would be to utilize a longitudinal design. As with most issues related to human development, longitudinal research would be the best way to track developmental changes in the structure of affect. Using longitudinal designs is the next logical step in capitalizing on the information cross-sectional design research has provided.

Next, the current study would have benefited from using multiple measures of depression, PA, and NA. This way the utility of each construct could be compared to multiple indexes to determine if the relationships still "hold" when different measures are used. Unfortunately, PA, for instance, could only be compared to one index of depression (CDI) due to the design of the current study. The CDI, however, was not intended to measure PA and NA; therefore, using multiple measures of depression would have taken this into account by providing multiple "data points" whereon theoretical assumptions could be based with more confidence.

As mentioned previously, all three aspects of the Tripartite model were not assessed because of the limitations of the PANAS-C. Specifically, PH was not specifically identified as a factor to be integrated into the models that were tested. As was implied by the literature review, PH is often not included as a crucial aspect in differentiating anxiety from depression; therefore, it was left out of this study.

Nevertheless, for the purposes of looking at the presence or absence of a developmental difference, including PH in the analysis (similar to the study of Turner and Barrett) may have given the study a more specific model to test when looking at the validity of the Tripartite model over time. Unfortunately, the PANAS-C does not include a specific index of PH; therefore, other assessment methods would have to be used to include this construct. These other methods will be discussed in the Future Directions section below.

The current study also could have employed a multi-source design so that the data was not taken only from self-report measures. However, others have noted the dangers of including measures other than self-report in confirmatory factor analysis. For instance, a recent study by Philips, Lonigan, Driscoll, and Hooe (2002) used CFA techniques to determine the validity of the Tripartite model based on parent, peer, and self-report data. The analysis indicated that neither peer nor parent data correlated with self-report measures of NA. In fact, the model with the best-fit indices included separate factors for child and parent NA. Results such as these highlight the point made during the literature review: self-report measures can adequately assess anxiety and depression, while including multisource data may actually complicate findings. Not because multisource data is inherently inaccurate. It is more likely that parent, peer, and teacher-derived data simply present a different dimension or aspect of the same constructs.

A final limitation is related to the "real world" utility of using PA to differentiate anxiety from depression. Even in the case of the strongest correlation between PA and depression, only approximately 4% of the variance in depression was predicted from the

assessment of PA. These findings provide a humbling recognition of the limitations of our current assessment methods. In other words, the most accurate self-report measures available will still rely heavily on using multiple sources of data (e.g., clinical interview with different sources, using multiple self-report measures, etc.) to obtain accurate and reliable diagnoses and treatment recommendations, regardless of how empirically proven the theory is behind the measure.

Future Directions

There are several ways future researchers can build on this study. Including a longitudinal design seems like a logical "next step" that can be used to determine if structural changes in affect will evolve over time. Obviously, a great deal of controversy still exists regarding this issue, and such a design would go a long way to resolving these conflicts. Next, newer and more comprehensive measures have recently been used to assess the components of the Tripartite model (The Affect and Arousal Scales; Chorpita, Daleiden, et al., 2000; Physiological hyperarousal and Positive and Negative Affect Scale for Children [PH-PANAS-C]; Laurent & Ettelson, 2001). Researcher could use either of these measures to determine if the results of this study replicate where all aspects of the Tripartite model are tested—not just the constructs of PA and NA. Another step may be to utilize even younger children in the study. Because there is some indication that PA and NA are less distinct in younger children, looking to see if this trend continues with children in a few years younger in age would be profitable.

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APPENDICES

Appendix A

Consent/Assent Form

Date Revised: March 19, 2002

INFORMED CONSENT FORM

A Study on the Differences between the Structure of Feelings for Younger and Older Children

Introduction
Bryan Bushman, a master's level student at Utah State University, is conducting research to investigate whether or not younger and older children experience anxiety and depression similarly. The study your child's class is being asked to participate in will help to better understand children's feelings. Children participating in the study will be enrolled in public elementary schools in Northern Utah and Southern Idaho. Approximately 200 to 300 students in both the 3rd grade and 6th grade will participate.

Procedures
Four measures will be given to the children as a group in a setting of their teacher's choice. These measures contain such questions as (true or false) "I check things out first," "I have fun at school," and "Things will work out for me O.K." Answers will remain confidential and participation is voluntary. The principal investigator will have each child who wishes to participate sign an assent form before the measures are given. Children who do not wish to participate or who did not receive consent from their parents will have the opportunity to work silently on another assignment, provided by their teacher, while their classmates are completing the measures. The principal investigator of the study will be available to answer questions regarding the definitions of words. Administration time will take approximately 45 to 60 minutes. This administration will occur in April 2002.

Risks
There is minimal risk associated with participating in this study. The questions on the measures are phrased in such a way as to cause minimal psychological distress to children and adolescents. Furthermore, all of the measures that will be administered to children have been administered for years and the researchers are unaware of any adverse impact due to administration.

Voluntary Nature of Participation and Right to Withdraw
Participation in research is entirely voluntary. You or your child may refuse to participate or withdraw at any time without consequence.

Confidentiality
Information related to you and your child will be treated in strict confidence. Your child will be assigned a code number. This number will be used for data storage and will be destroyed soon after the data is entered. Furthermore, public presentations of this study will in not identify you or your child since presentations resulting from this data will be reported as a group. All data will be kept in a file cabinet that will be accessible only to the researchers (Bryan Bushman and Susan Crowley).

(over)

Date Revised: March 19, 2002

INFORMED CONSENT FORM

A Study on the Differences between the Structure of Feelings for Younger and Older Students

Benefits

Determining if younger and older children experience anxious and depressive emotions differently is important, not only to the understanding of childhood depression and anxiety, but also to the treatment of youngsters with these problems. There are no individual benefits. All benefits from the study are general; however, these results will assist in the development of future measures that will assess anxiety and depression before either condition becomes severe. If you would like a short explanation regarding the general findings of this study, these findings will be mailed to parents who check the blank listed below and provide their address on the attached demographics form.

_____ Yes, I would be interested in receiving a short explanation regarding the findings of this study

Explanation and Offer to Answer Questions

If you have other questions or research related problems you may contact either Bryan Bushman at (435) 797-7278 or Susan Crowley at (435) 797-1251.

IRB Approval Statement

The Institutional Review Board (IRB) for the protection of human subjects at Utah State University has reviewed and approved this research project. You may call the IRB at (435) 797-1821 with any questions regarding the approval of this project.

Copy of Consent

You have been given two copies of this Informed Consent Form. Please sign both, return one with your child in a sealed envelope that has been provided, and retain one copy for your files.

Signature of Principal Investigator and Research Supervisor

_____	_____	_____	_____
Susan Crowley, Ph.D. Research Supervisor (435) 797-1251	(Date)	Bryan Bushman, B.A. Principle Investigator (435) 797-7278	(Date)

Signature of Parent/Guardian (please sign and date **only one** of the two blank areas listed below)

"By signing below, I am stating that I have read and understood this consent form and **am willing** for my child _____(please print child's name) to participate in this study."

Signature of Parent/Guardian:_____ Date:_____

"I **do not** wish my child _____(please print child's name) to participate in the study."

Signature of Parent/Guardian:_____ Date:_____

Parents: Please do not sign below this line

Subject or Child Assent

I understand that my parent(s)/legal guardian is/are aware of this research study and that permission has been given for me to participate along with my parents. I understand that it is up to me to participate even if my parents say 'yes'. If I do not want to participate I do not have to. No one will be upset if I do not want to participate or if I change my mind later and want to stop. I can ask questions I have about this study now or later. By signing below I agree to participate.

Name/Signature:_____ Date:_____

Demographic Information

Please take a moment to answer these questions so your child may participate in the study. Please sign this form and the attached "Informed Consent" from and return both in the envelope that has been provided.

Gender of your child ____ Male ____ Female

Ethnicity of your child ____ Hispanic/Latino ____ White ____ Eskimo
____ African-American ____ Asian/Pacific Islander ____ Other: _____

The age of your child _____ (in years)

Highest educational level level of child's mother: (check only one)
_____: some high school education (but did not graduate)
_____: high school diploma
_____: some college education (but did not graduate)
_____: 2- year college degree (or specialty certification)
_____: Bachelors degree
_____: completed an advanced degree
_____: NA (if not living with child)

Highest educational level level of child's father: (check only one)
_____: some high school education (but did not graduate)
_____: high school diploma
_____: some college education (but did not graduate)
_____: 2- year college degree (or specialty certification)
_____: Bachelors degree
_____: completed an advanced degree
_____: NA (if not living with child)

Home Address* (Optional)

_____
Street

_____
City State Zip

Parent/Guardian Signature:

"I agree to provide demographic data (listed above) for my child."

_____ _____
Signature Date

*Fill the address portion of the demographic data in order to receive information regarding the results of the study

Appendix B

Complete Correlation Tables for Third- and Sixth-Grade Samples

Table B-1

Intercorrelations Among Subscale and Total Scores for Third-Grade Sample

Measure/Subscale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Multidimentional Anxiety Scale for Children																		
1. Physical symptoms—total score	--																	
2. Harm avoidance—total score	.39**	--																
3. Social anxiety—total score	.56**	.36**	--															
4. Separation/panic	.41**	.52**	.51**	--														
5. Anxiety disorder index	.61**	.68**	.69**	.69**	--													
6. MASC total score	.80**	.69**	.80**	.77**	.86**	--												
Reynolds Children Manifest Anxiety Scale																		
7. Physiological anxiety	.61**	.32**	.51**	.41**	.60**	.61**	--											
8. Worry/over-sensitivity	.56**	.36**	.67**	.52**	.64**	.70**	.68**	--										
9. Social concerns/concentration	.51**	.14	.54**	.25*	.47**	.50**	.65**	.60**	--									
10. RCMAS total anxiety	.64**	.33**	.67**	.47**	.66**	.70**	.89**	.90**	.83**	--								
Children's Depression Inventory																		
11. Negative Mood	.44**	.16	.42**	.35**	.33**	.46**	.46**	.57**	.57**	.61**	--							
12. Interpersonal problems	.09	-.22*	.06	-.16	-.11	-.05	.07	.01	.23*	.10	.30**	--						
13. Ineffectiveness	.34**	.05	.31**	.11	.24*	.28**	.31**	.30**	.52**	.41**	.42**	.47**	--					
14. Anhedonia	.45**	.11	.40**	.21*	.34**	.40**	.50**	.48**	.62**	.59**	.63**	.37**	.54**	--				
15. Negative self-esteem	.43**	.11	.37**	.18	.31**	.38**	.38**	.44**	.53**	.51**	.58**	.40**	.66**	.67**	--			
16. CDI total score	.47**	.08	.43**	.21*	.32**	.41**	.47**	.50**	.66**	.61**	.78**	.59**	.75**	.89**	.84**	--		
Positive and Negative Affect Scale for Children																		
17. Positive affectivity (PA)	-.04	.23*	-.08	.14	.10	.07	-.08	-.15	-.33**	-.20*	-.32**	-.28**	-.33**	-.43**	-.49**	-.48**	--	
18. Negative affectivity (NA)	.60**	.34**	.63**	.43**	.55**	.67**	.61**	.71**	.59**	.74**	.58**	.14	.42**	.47**	.59**	.58**	-.18	--

* $p < .05$

** $p < .01$

Table B-2

Intercorrelations Among Subscale and Total Scores for Sixth-Grade Sample

Measure/Subscale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Multidimentional Anxiety Scale for Children																		
1. Physical symptoms—total score	--																	
2. Harm avoidance—total score	.33**	--																
3. Social anxiety—total score	.66**	.45**	--															
4. Separation/panic	.50**	.53**	.50**	--														
5. Anxiety disorder index	.73**	.57**	.82**	.70**	--													
6. MASC total score	.83**	.68**	.85**	.78**	.90**	--												
Reynolds Children Manifest Anxiety Scale																		
7. Physiological anxiety	.73**	.21*	.49**	.37**	.51**	.60**	--											
8. Worry/over-sensitivity	.66**	.32**	.70**	.43**	.65**	.70**	.65**	--										
9. Social concerns/concentration	.57**	.19*	.56**	.31**	.51**	.55**	.59**	.62**	--									
10. RCMAS total anxiety	.76**	.29**	.68**	.44**	.65**	.72**	.86**	.90**	.83**	--								
Children's Depression Inventory																		
11. Negative Mood	.63**	.21*	.61**	.31**	.52**	.59**	.56**	.56**	.61**	.66**	--							
12. Interpersonal problems	.28**	-.13	.21*	.06	.10	.16*	.36**	.25**	.35**	.36**	.41**	--						
13. Ineffectiveness	.42**	.04	.42**	.12	.30**	.35**	.37**	.39**	.54**	.49**	.49**	.51**	--					
14. Anhedonia	.60**	.11	.48**	.17*	.40**	.47**	.58**	.50**	.62**	.64**	.57**	.44**	.61**	--				
15. Negative self-esteem	.48**	.06	.44**	.06	.35**	.37**	.47**	.44**	.61**	.57**	.57**	.29**	.50**	.61**	--			
16. CDI total score	.65**	.11	.58**	.21*	.46**	.53**	.61**	.57**	.72**	.72**	.80**	.62**	.79**	.88**	.75**	--		
Positive and Negative Affect Scale for Children																		
17. Positive affectivity (PA)	-.23**	.14	-.23**	-.07	-.17*	-.15	-.20*	-.16	-.28**	-.24**	-.21*	-.09	-.21*	-.27**	-.25**	-.28**	--	
18. Negative affectivity (NA)	.62**	.27**	.57**	.30**	.57**	.59**	.60**	.60**	.53**	.67**	.57**	.26**	.39**	.47**	.44**	.56**	-.13	--

* $p < .05$

** $p < .01$