ABSTRACT

FACTORS PREDICTING ANXIETY AND DEPRESSIVE SYMPTOMS AMONG ADOLESCENTS IN INDIA

by Anjali Tanya Jain

The tripartite model (Clark & Watson, 1991) helps explain co-occurring anxiety and depression by proposing components that are shared (negative affect, NA) and unique (positive affect, PA; and physiological hyperarousal, PH) to each syndrome. Though this model is supported across youth and adults, these studies exclusively comprise of samples from Western countries. Research demonstrating cultural variation in the salience and expression of affect and physiology suggests that tripartite components may function differently for individuals in Asia. Among 282 adolescents and one of their parents from India, we examined whether the tripartite model was supported, and whether academic stress moderated tripartite pathways. Dyads reported on adolescent symptoms twice, five months apart. Concurrently, the tripartite model was supported with regard to affective components, though not with PH. Longitudinally, the tripartite model was supported with regard to PH, though not with respect to affective components. There were main effects for academic stress on each symptom cluster, and two significant interactions between academic stress and adolescent PA as well as NA, though the effects were not in the expected directions. Findings are interpreted in the context of existing literature regarding the tripartite model, as well as cultural scripts about emotion. Clinical implications are discussed.

Keywords: tripartite model, anxiety, depression, academic stress, culture, adolescents
FACTORS PREDICTING ANXIETY AND DEPRESSIVE SYMPTOMS AMONG ADOLESCENTS IN INDIA

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Factors Predicting Anxiety and Depressive Symptoms among Adolescents in India

Mental health difficulties affect the quality of life and life expectancy of people worldwide. Depressive and anxiety disorders and symptoms are the most commonly experienced mental illnesses, and they frequently co-occur both concurrently and sequentially in children and adolescents (Garber & Weersing, 2010). The prognosis for this comorbidity is worse than either condition alone as comorbidity is associated with higher risk for recurrence, longer duration, substance abuse, attempted suicide, and less favorable treatment gains (Ezpeleta, Domenech, & Angold, 2006; Masi et al., 2004; Rowe, Liddle, Greenbaum, & Henderson, 2004). In particular, depression and anxiety represent the most frequent combinations of comorbidity among adolescents, posing the highest disease burden for this age group worldwide (Mehta, Pattanayak, & Sagar, 2015; Ollendick et al., 2005). To help explain both the high comorbidity and the unique components of the two syndromes, Watson and Clark (1991) proposed that negative affect (NA; general psychological distress, negative mood) is a shared component of anxiety and depression, whereas low positive affect (PA; lack of pleasure, apathy, hopelessness) is uniquely associated with depression, and physiological hyperarousal (PH; somatic tension, panic, nervousness) is uniquely associated with anxiety. Evidence supporting this tripartite model has been found in youth and adult samples from Western countries (i.e., Canada, United States, United Kingdom, and those in Western Europe) (Jacques & Mash, 2004; Joiner, 1996; Laurent, Catanzaro, & Joiner, 2004; Lonigan, Carey, & Finch, 1994; Turner & Barrett, 2003). However, it is unclear whether the tripartite relations hold in samples from other parts of the world.

Understanding factors associated with anxiety and depression in samples from outside the Western world is important because the burden caused by depression and anxiety is highest in the most populous regions of the world such as Asia and Africa (Collins et al., 2011). As the second most populous country in the world, India is home to 22% of the world’s adolescent population (Mehta, Pattanayak, & Sagar, 2015). Epidemiological studies from India demonstrate rates of depression and anxiety that are comparable to global prevalence rates (Deb, Chatterjee, & Walsh, 2010; Nair, Paul, & John, 2004; Poongothai et al., 2009), along with high comorbidity (Sahoo, & Khess, 2010), and yet, surprisingly little research attention has been paid to understanding potential factors that may contribute to anxiety and depression among Indian youth. Thus, the purpose of the current study was to examine the relations of three factors (PA, NA, and PH) to anxiety and depression concurrently and longitudinally in a sample of adolescents from India. Further, given the salience of academic achievement for India adolescents, academic stress was examined as a moderate of tripartite relations.

Depressive and Anxiety Disorders and Symptoms

In The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), depressive disorders and anxiety disorders include a variety of diagnostic categories (American Psychiatric Association, 2013). In the current study, self-reported symptoms of major depressive disorder (MDD), generalized anxiety disorder (GAD), social phobia, and panic disorder are considered. Symptoms of MDD include feelings of general discontent, sadness, and hopelessness, fatigue and decreased energy, changes in eating patterns, loss of interest or pleasure in hobbies or activities once pleasurable, and thoughts of suicide (American Psychiatric Association, 2013). In contrast, anxiety disorders share a common component of fear, dread and physical symptoms such as a rapid heartbeat and sweating (American Psychiatric Association, 2013). GAD involves excessive worry along with physical symptoms, whereas panic disorder

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entails unexpected episodes of intense fear accompanied by physical symptoms such as chest pain, heart palpitations, shortness of breath, dizziness, or abdominal distress (American Psychiatric Association, 2013).

Globally, depression is the most common psychiatric disorder with lifetime prevalence estimates of 2 to 15% (Mousavi et al., 2007), followed by anxiety disorders with current prevalence estimates of 5 to 10% (Baxter, Scott, Vos, & Whiteford, 2013; Trivedi & Gupta, 2010). The onset of depression typically occurs following puberty in adolescence (Thaper, Collishaw, Pine, & Thaper, 2012), whereas the age of onset of anxiety disorders varies with generalized and social anxiety occurring between 10 to 14 years (Costello et al., 2005) and panic disorder between 20 to 24 years (Kessler et al., 2005). Despite this variation, subthreshold symptoms of both depressive and anxiety disorders occur throughout adolescence. Moreover, girls and women are twice as likely as boys and men to experience depression, generalized anxiety disorder, and panic disorder (Alpert, 2015; McLean, Asnaani, Litz, & Hofmann, 2011), and this gender disparity is particularly evident in adolescence.

Studies from India have shown similar patterns. For example, self-reported depressive symptoms are found to be as high as 15% to 18.5% (Nair, Paul, & John, 2004; Poongothai et al., 2009) and self-reported anxiety 18% to 20% among adolescents and colleges students (Deb, Chatterjee, & Walsh, 2010; Sahoo, & Khess, 2010). Rates of depressive and anxiety symptomatology are similar across gender in childhood, but adolescent girls are twice as likely as boys to experience depression and anxiety related symptoms (Mehta, Pattanayak, & Sagar, 2015). Importantly, 87% of adolescents reporting depressive symptoms also report anxiety (Sahoo, & Khess, 2010). Given this high comorbidity, understanding factors that contribute to anxiety and depression among adolescents in India is critical.

**Tripartite Model of Depression and Anxiety**

An important theoretical framework to understand the shared and differential factors associated with depression and anxiety is the tripartite model (Clark & Watson, 1991). The model posits that depression and anxiety share a common dimension of heightened NA, accounting for the comorbidity and symptom overlap (Hope & Anderson, 2008). The two groups of disorders can be distinguished by two constructs specific to each syndrome: PA and PH. Low PA is considered to be uniquely predictive of depression, whereas high PH is uniquely associated with anxiety disorders (Clark & Watson, 1991). More recent research suggests that although PH is somewhat characteristic of all anxiety disorders, it is particularly related to panic disorder (Mineka, Watson, & Clark, 1998). Additionally, while low PA is mostly specific to depression, it has also shown to be associated with social phobia (Brown, Chorpita, & Barlow, 1998).

The tripartite model has driven substantial research in the field, with important implications for designing interventions and identifying individuals at risk for depression and anxiety. Though studies involving clinical and non-clinical youth and adult samples yield support for the tripartite model (Jacques & Mash, 2004; Joiner, 1996; Laurent, Catanzaro, & Joiner, 2004; Lonigan, Carey, & Finch, 1994; Turner & Barrett, 2003), such support is largely based on White middle-class samples from the United States, Canada, and the United Kingdom, and the assessment tools utilized are also largely designed with samples from these countries (Safren et al., 2000). Moreover, much of this research has examined the tripartite relations concurrently. Examining these constructs longitudinally allows for a better understanding of the development or change in anxiety and depressive symptoms. Available cross-cultural research suggests that the salience of specific constructs (i.e., PA) for psychological well-being may differ
across cultures (Kitayama, Markus, & Kurokawa, 2000; Mesquita & Karasawa, 2002; Miyamoto & Ma, 2011; Miyamoto & Ryff, 2011), and thus, it is important to examine the relations of PA, NA, and PH to anxiety and depression in non-western cultures.

Affect and Arousal in a Cultural Context

It is well recognized that cultural values and beliefs impact human functioning. Cross-cultural research concerning the relation between NA and depression has shown findings consistent with studies from Western cultures. In their study of White American, Asian American, and Asian emerging adults, Leu and colleagues (2011) showed that NA was associated with internalizing symptoms among all three groups. Other studies have also found associations between NA and internalizing symptoms among Asian samples (Leong, Okazaki, & Tak, 2003; Singh, Junnarkar, & Sharma, 2015). Overall, these findings suggest that the relation between NA and internalizing symptoms may be consistently found across cultures.

Cross-cultural research indicates the folk understanding, socialization, and definition of PA (i.e., happiness) differ across cultures which directly influences the subjective experience and regulation of these emotions (Hinton et al., 2009; Koh et al., 2007; Uchida & Kitayama, 2009). Positive and negative emotions are less negatively correlated in Asia compared to White-middle class groups in the United States, Canada, and the UK (Perunovic, Heller, & Rafaeli 2007; Shiota, Campos, Gonzaga, Keltner, & Peng, 2010), suggesting that they are more likely to co-occur. This finding can be understood through cultural scripts. In Western cultures, there is an inherent value of positive emotions, and the dominant cultural script is to maximize positive emotions while minimizing or discouraging negative emotions (Kitayama, Markus, & Kurokawa, 2000; Eid & Diener, 2001). In contrast, for families in Asia, Africa, the Middle East, and South America, individuals experience emotions dialectically (Miyamoto & Ma, 2011). The dominant cultural script is to seek a balance between positive and negative emotions, as reality is constantly changing (Miyamoto & Ma, 2011).

Consistent with the dialectical script, in a study where Japanese students were asked to describe happiness, they referred to both positive and negative aspects of happiness noting the transitory nature of happiness and negative social consequences of happiness (Uchida & Kitayama, 2009). Studies have shown that people in Asian cultures experience positive emotions less frequently than Americans (Eid & Diener, 2001; Mesquita & Karasawa, 2002; Scherer, Matsumoto, Wallbott, & Kudoh, 1988; Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002). However, Oishi (2002) found that Asian Americans do not actually experience fewer positive emotions than European Americans, but rather recall experiencing fewer positive emotions than Europeans Americans. The emotional goal towards positive emotions in many Asian cultural contexts is of moderation instead of maximization (Leu, Wang, & Koo, 2011). Individuals from Asian countries (e.g., Korea, China) view the feeling and expression of PA to be less desirable than individuals from Western countries such as the United States (Diener, Suh, Smith, & Shao, 1995). Given the cultural difference in the appraisal of emotions, the dialectical cultural script may be adaptive in nature, and low PA may not have negative health consequences such as depression or social phobia for individuals in Asia. Not surprisingly, Leu, Wang, and Koo (2011) found that lower PA was associated with depressive symptoms among White American and Asian American college students, but not among immigrant Asian college students. Taken together, these findings suggest that the relation between low PA and depression may not hold in Asian cultural groups.
Cross-cultural research in mental health also suggests that individuals in Asian cultures tend to express their distress in physical forms in contrast to those in Western cultures who prefer psychological idioms of distress (Dere et al., 2012; Klienman & Kienman, 1985; Saint Arnault & Kim, 2008). Consistent with this body of work, adolescents in India have been found to report multiple physiological complaints (e.g., difficulty breathing, increased heart rate, headaches, pain) and these symptoms are associated with both depressive and anxiety symptoms (Trivedi & Gupta, 2010). Indian adolescents are more likely to report physiological complaints or physical health problems as a way to express their internalizing experience in comparison to reporting affective symptoms (Grover, Dutt, & Avasthi, 2010). Studies from India also demonstrate associations between physiological symptoms and other anxiety disorders such as social phobia (Chambers, Yeragani, Keshavan, 1986). For individuals in Western cultures, physiological symptoms such as eating and sleeping problems are a feature of depression, whereas PH and related symptoms (i.e., increased heart rate) are characteristics of anxiety. Specifically, research with White American samples show PH to be characteristic of panic disorder (Anderson & Hope, 2008). Studies comparing individuals with depression in India and USA report physiological symptoms (i.e. dry mouth, difficulty breathing, chest pain) being more common amongst those in India (Derasari & Shah, 1988). Given the salience of physical distress for Indian adolescents, it is reasonable to expect PH to not be uniquely related to anxiety as predicted by the tripartite model, but rather PH would be associated with both depression and anxiety syndromes.

**Academic Stress as a Moderator of Tripartite Pathways**

Like many countries in Asia, adolescents in India experience significant academic pressures related to a highly competitive state-wide examination system that determines their future careers and success (Verma, Sharma, & Larson, 2002). There is immense pressure to excel on board exams as these grades influence college and university admissions. In fact, psychiatric professionals in East Asian countries including India use verbiage such as “entrance examination symptoms” when describing mental health problems (Lee & Larson, 2000). In India, many adolescents are referred to psychiatric care for school-related distress, experiencing symptoms of both depression and anxiety (Bhasin, Sharma, Saini, 2010; Mehta, Pattanayak, & Sagar, 2015). Moreover, academic stress has been associated with physiological symptoms, NA, lack of PA, and depressive and anxiety symptoms (Augustine et al., 2011; Deb, Strodl, & Sun, 2014; Rao, 2008; Verma, Sharma, & Larson, 2002). High academic expectations and pressure to succeed poses an increase in stress amongst students (Mehta, Pattanayak, & Sagar, 2015).

The relation of academic stress to mental health difficulties can be understood within the diathesis-stress framework. This model posits psychological symptoms such as depression or anxiety surface as a result of an interaction between a predisposed vulnerability and a stressor (Alloy et al., 1999; Luten, Ralph, & Mineka, 1997). Stress disrupts an individual’s psychological equilibrium, activating one’s vulnerability. An individual’s vulnerability (diathesis) is thought to be based on genetic and biological factors, which varies from one person to another, as does the severity of symptoms. Incorporating the components of the tripartite model, factors considered to be diatheses are NA, PA, and PH. The relation of these factors to anxiety and depression may be amplified under high academic stress. Thus, it was expected that the interaction between one’s vulnerability and academic stress would strengthen select tripartite pathways among Indian adolescents.
NA is characterized by a disposition to be distressed, generally upset, and self-critical (Cook et al., 2004). A disposition to NA influences one’s cognition, self-concept, and world view (Watson & Clark, 1984). With the added component of academic stress and the pressure to succeed, Indian adolescents may become especially self-critical, worry, and experience more depressive symptoms. As such, academic stress would likely moderate all pathways between NA and each cluster of internalizing symptoms (MDD, GAD, panic disorder and social phobia symptoms).

Given cross-cultural literature suggesting lower relevance of PA for well-being in Asia, low PA may not be associated with depression and social phobia among adolescents in India. It is unclear whether conditions of high academic stress along with low PA may contribute to higher likelihood of depression. Given lack of previous research, the interaction of academic stress and low PA in the prediction of each symptom cluster was examined in an exploratory manner.

The third component of the tripartite model, PH may be associated with both anxiety and depressive symptoms among adolescents in India given the preference for physical expression of distress. With the added component of academic stress, it was expected that the associations between PH and anxiety and depressive symptoms would be stronger. Among Asian groups, many physiological symptoms generate catastrophic ideas about body depletion, which has been associated with both depression and anxiety disorders (Hinton et al., 2009). These worries can pose a risk for the development of anxiety symptoms, and particularly worsen panic disorder (Hedley et al., 2000). Individuals with anxiety are generally apprehensive about their future, and when experiencing academic stress, it is reasonable to be especially apprehensive about the future. Given the nature of complaints pertaining to physiological symptoms, it is plausible for adolescents to form negative cognitions about experienced PH that result from academic stress, which may exacerbate depressive symptoms. Thus, it was hypothesized that academic stress would moderate all pathways between PH and each cluster of internalizing symptoms. That is, these pathways would be stronger under the condition of high academic stress.

Current Study

The current study examined potential factors associated with anxiety and depressive symptoms both concurrently and longitudinally in a sample of adolescents from India. The first aim of this study was to examine the relations of three factors (NA, PA, and PH) to depressive and anxiety symptoms. Consistent with the tripartite model, it was hypothesized that NA would be significantly positively correlated with each of the symptom clusters (MDD, GAD, social phobia, panic disorder) in our Indian adolescent sample both within and across time. Given previous work showing that NA correlates more strongly with distress-based disorders such as MDD and GAD, compared to social phobia or panic disorder which are thought to have modest distress components (Watson et al., 2005), it was hypothesized that the effects would be strongest for MDD and GAD compared to social phobia and panic disorder.

According to the tripartite model, low PA is uniquely associated with depression. Given the findings suggesting lower frequency of PA (Kitayama et al., 2000; Mesquita & Karasawa, 2002) and no relation between PA and depression (Leu et al., 2011) among Asian samples, it was hypothesized that there would be a non-significant relationship between low PA and MDD symptoms and low PA and social phobia symptoms in our Indian adolescent sample both concurrently and longitudinally. Consistent with the tripartite model, there would be a non-significant relationship between low PA and GAD and panic disorder.
According to the tripartite model, PH is uniquely associated with anxiety and panic symptoms. Given the studies showing higher frequency of somatic complaints among Indian adolescents (Derasari & Shah, 1988; Grover, Dutt, & Avasthi, 2010), it was hypothesized that PH would be significantly positively related to each of the symptom clusters (MDD, GAD, social phobia, and panic disorder) both concurrently and longitudinally. In addition, it was hypothesized that the positive correlation would be strongest between PH and panic disorder.

The second aim of this study was to examine the moderating role of academic stress in the relations between the three factors (NA, PA, PH) and depressive and anxiety symptoms. It was hypothesized that there would be a main effect of academic stress on each symptom cluster. It was also hypothesized that the positive association between NA and each symptom cluster (MDD, GAD, social phobia, and panic disorder) would be stronger under the condition of high academic stress than when academic stress is low. With respect to PA, a non-significant relation between PA and depression was hypothesized. Given lack of previous work, no specific hypotheses were put forth and the moderating role of academic stress in the relation between PA and depression and PA and social phobia was examined in an exploratory manner. Finally, it was hypothesized that the positive relation between PH and each symptom cluster would be stronger under the condition of high academic stress than when academic stress is low.

Method

Participants

Participants included 282 adolescents ranging in age from 13 to 18 (84% female; $M = 16.45$ years, $SD = 2.84$) and one parent (60% mothers; $M = 42.58$ years, $SD = 5.45$) from Bangalore, India. Participants were recruited through letters sent home with students in standards (i.e., the Indian equivalent of grade) 9 through 12 at two high schools in Bangalore, India. Of those providing data ($N = 282$), a majority of parents indicated that they were married (85.1%), Hindu (65.1%), and had a bachelor’s degree (34.3%). Families represented a wide range of monthly household income with 24.6% less than Rs. 20,000, 37.3% between Rs. 21,000–40,000, 24.2% between Rs. 41,000–60,000, and 13.9% above Rs. 61,000. For a majority, household income was higher than per capita income for the state of Karnataka (monthly Rs. 13,321; Government of Karnataka, 2017).

Procedure

The study was approved by the institutional review board at the first author’s academic institution. At the beginning of the school year, participants were recruited through a packet sent home with adolescents in standards 9 through 12 at two high schools in Bangalore, India (a total of 4160 families were reached). The packet included a recruitment letter, parent consent form, and questionnaires to be completed by the parent. Parents who agreed to their own and their child’s participation were instructed to read and sign a consent form and complete questionnaires and return them to their child’s school in a sealed envelope provided. Offspring of parents who sent signed consent forms were contacted at school and were invited to group sessions. During this session, assent was obtained from the adolescents, and subsequently, they completed questionnaires. Five months later, 93% of adolescents and 90% of parents from time 1 completed questionnaires for time 2. Each participating family received educational supplies worth Rs. 150 (US $2.29).

Consent forms and questionnaires were translated in Kannada, a South Indian language most commonly spoken in Bangalore, and back translated in English. Parents and adolescents
were given the option of completing questionnaires in Kannada or English. All participants completed questionnaires in English.

Parents completed a demographics questionnaire, and the Revised Children’s Anxiety and Depression Scale (RCADS-P; Chorpita et al., 2000). Adolescents completed PANAS-C (Watson et al., 1988), RCADS (Chorpita et al., 2000), Physiological Hyperarousal subscale of the Affect and Arousal Scale (AAS; Chorpita et al., 2000), and three subscales of the Adolescent Stress Questionnaire (ASQ; Byrne, Byrne, & Reinhart, 1995; Byrne & Mazanov, 2002).

**Measures**

**Time 1**

**Demographics.** Parents completed a demographics questionnaire reporting on parent gender, parent age, parental education, adolescent age, adolescent grade, adolescent gender, number of individuals in the house, religion, and monthly family income.

**Time 1 and 2**

**Adolescent positive and negative affect.** Adolescents completed the Positive and Negative Affect Schedules - Short Form (PANAS-SF; Watson et al., 1988) at both time points. The PANAS-SF is a 10-item questionnaire that consists of two 5-item subscales to measure both PA and NA. Adolescents rated the extent to which they felt a variety of mood states in the past few weeks using a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Example items include “happy” and “mad.” The PANAS-SF has moderately good internal consistency (αs = 0.86 to 0.90 for the positive affect scale and αs = 0.84 to 0.87 for the negative affect scale) and test-retest reliability over 8 weeks (rs = 0.47 to 0.68 for the PA and rs = 0.39 to 0.71 for the NA; Watson, 1998). In this sample, the PANAS-SF internal consistency values were adequate for the PA scale (α = .70 and .71) and slightly lower for the NA scale (α = 0.65 and .67) at time 1 and time 2 respectively.

**Adolescent physiological arousal.** Adolescents completed the Physiological Hyperarousal subscale of the Affect and Arousal Scale (AAS; Chorpita et al., 2000) at both time points. The PH subscale is a 9-item self-report measure in which adolescents rate items based on how true each item applies to themselves, using a 4-point Likert scale ranging from 0 (never true) to 3 (always true). Example items include “Often I have trouble getting my breath” and “My hands get shaky.” Both the full scale AAS and the PH subscale have good internal consistency (α’s = .81; Chorpita et al., 2000; Lu et al., 2010). In this sample, the PH subscale had good internal consistency (α = .80 and .86 for time 1 and time 2, respectively).

**Adolescent academic stress.** The Adolescent Stress Questionnaire (ASQ; Byrne, Davenport, Mazanov, 2007) is a 56-item scale with 10 subscales in which participants indicate on a scale from 0 (*not at all stressful*) to 5 (*very stressful*) the extent to which each item has been stressful for them within the past year. In the current study, adolescents reported on three subscales: school performance (seven items; e.g., “Having to study things you do not understand”), future uncertainty (three items; e.g., “Concern about your future”), and school/leisure conflict (five items; e.g., “Not getting enough time for leisure”). A mean composite score of the three subscales was used to assess academic stress. The ASQ has been positively related to measures of anxiety and depression. The ASQ has demonstrated to have good internal consistency, with good test-retest reliability (Byren, Davenport, & Mazanov, 2007). In this sample, the ASQ demonstrated good internal consistency (α = .78 and .80 for school performance, α = .83 and .87 for future uncertainty, and α = .78 and .81 for school/leisure conflict at time 1 and 2, respectively).
Adolescent anxiety and depression. The Revised Children’s Anxiety and Depression Scale (RCADS; Chorpita et al., 2000) and its parent version (RCADS-P) were used to assess adolescent anxiety and depression. The RCADS-P instructions and items are the same as those of the RCADS, with the wording of RCADS-P item stems adapted to suit parent informants (e.g., “I feel sad or empty” adapted to “My child feels sad or empty”). Both are 47-item scales that consist of 6 subscales assessing Major Depressive Disorder, Generalized Anxiety Disorder, Separation Anxiety Disorder, Social Phobia, Obsessive-Compulsive Disorder, and Panic Disorder. Respondents rated items based on how often each item applies to the adolescent, using a 4-point Likert scale ranging from 0 (never) to 3 (always). The current study uses the Major Depressive Disorder (MDD; ten items), Generalized Anxiety Disorder (GAD; six items), Social Phobia (nine items), and Panic Disorder (nine items) subscales. Example items include “I worry about things” (adolescent version) and “My child feels worthless” (parent version). The RCADS has demonstrated to have good internal consistency, high convergent and discriminant validity, and an adequate factor structure in both clinical and community samples of children and adolescents (Chorpita et al., 2000; Chorpita et al., 2005). This measure has sound cross-cultural validity and suitability for cross-cultural comparisons in adolescent anxiety and depressive symptoms (Stevanovic et al., 2017). In this sample, the RCADS-C and RCADS-P both demonstrated good internal consistency (For RCADS-C, α = .81 and .82 for MDD, α = .79 and .80 for GAD, α = .83 and .83 for social phobia and α = .81 and .83 for panic disorder. For RCADS-P, α = .75 and .76 for MDD, α = .70 and .78 for GAD, α = .80 and .83 for social phobia and α = .80 and .83 for panic disorder, at time 1 and 2, respectively. Across time via adolescent report, clinical rates of psychopathology ranged from 1.5% for GAD and 18.5% for panic disorder, while via parent report, clinical rates ranged from 0% for GAD and 9% for panic disorder. Given that intercorrelations between parent and adolescent reports of each subscale were moderately positively correlated, a mean composite of both parent and adolescent subscales were created for each time point.

Results

Preliminary Analyses

Missing data. Overall, 12.1% of data were missing. Variables with the highest amounts of missingness included the time 2 composite scores for all symptom clusters (MDD, GAD, social phobia, panic disorder). As mentioned, total mean item scores for analyses were only calculated if participants completed 75% of items. Little’s MCAR test ($\chi^2(763) = 858.99, p = .05$) suggests that the pattern of missingness in this dataset significantly differs from a missing completely at random pattern. For bivariate analyses, missing data were handled with the recommended multiple imputation ($n = 40$ imputed datasets using all primary variables and demographic variables in estimating algorithm; Graham, 2009). Bivariate correlations were derived from the results of the 40 datasets that were combined to create the “pooled” results. Pooled results are generally more accurate than those provided by single imputation methods. For path analyses estimated in AMOS, missing data were handled with full-information maximum likelihood.

Descriptive statistics and distribution. Prior to examining hypotheses, descriptive analyses were conducted to examine the distribution of scores and to test for outliers. Table 1 presents intercorrelations, means, and standard deviations among all study variables. The effects of demographic variables (adolescent age, adolescent gender, parent age, parent gender, and monthly income) were examined as possible covariates. Relations between potential covariates
and any variable of interest are presented in Table 1. Of possible covariates, gender was considered in further analyses, though models produced the same results. As such, gender was not included as a covariate. Given the small correlation between grade and all symptom clusters, grade was also not included as a covariate. All variables of interest were normally distributed and within normal limits (skew < |2.00| and kurtosis < |4.00|).

Bivariate relations. Several important bivariate relations warrant mention (See Tables 1, 2, 3, and 4). Within both time 1 and 2, all adolescent symptom clusters were positively correlated with one another. Within both time points, adolescent and parent reports of adolescent MDD, GAD, social phobia, and panic disorder symptoms were all positively correlated with one another (See Table 4 and 5), thus parent and adolescent ratings for each symptom cluster were averaged within each time point as a composite. These composites were used for primary analyses.

Main Analyses

Study Aim One (a): Test of the Tripartite Relations Concurrently

The tripartite model was tested using path analyses via AMOS (Version 23.0) within time points. Specifically, time 1 composites of adolescent MDD, GAD, social phobia, and panic disorder symptoms were regressed on time 1 PA, NA, and PH (See Figure 1). The same process was applied for time 2 variables (See Figure 2).

Positive Affect. Contrary to the hypotheses, but somewhat consistent with the tripartite model, at both time points, low adolescent PA was significantly associated with symptoms of MDD as well as social phobia, over and above NA and PH (See Figures 1 and 2). One exception was that at time 2, low adolescent PA was also significantly associated with symptoms of GAD ($B_{T2} = -0.49$), over and above NA and PH.

Negative Affect. Consistent with the hypotheses and the tripartite model, at both time points, adolescent NA significantly predicted all symptom clusters, over and above PA and PH. Replicating the tripartite model, NA was associated with both anxiety and depressive symptoms in the current sample.

Physiological Hyperarousal. Consistent with the hypotheses, though contrary to the tripartite model, at both time points, adolescent PH significantly predicted all symptom clusters, over and above other affective symptoms. Thus, in contrast to the tripartite model, PH was not associated solely with anxiety symptoms in the current sample.

Study Aim One (b): Test of the Tripartite Relations Longitudinally

The tripartite model was also tested longitudinally (See Figure 3). Rather than control for all time 1 forms of psychopathology on each time 2 symptom cluster, to isolate specific changes in like symptoms, time 2 composites of MDD, GAD, social phobia, and panic disorder symptoms were individually regressed on their time 1 counterpart. For example, time 2 MDD was regressed on time 1 MDD. Then, the unstandardized residuals of these regressions were used as endogenous variables to account for changes in symptoms for each symptom cluster. These residuals were then regressed on time 1 PA, NA, and PH to answer the primary question of interest.

Positive Affect. Consistent with the hypotheses, though contrary to the tripartite model, across time, PA was not uniquely predictive of changes in MDD or any other symptom cluster.

Negative Affect. Partially consistent with the hypotheses and the tripartite model, adolescent NA significantly predicted changes in MDD symptoms over and above PA
and PH. However, adolescent NA did not significantly predict changes in GAD, social phobia, or panic disorder symptoms.

**Physiological Hyperarousal.** Contrary to the hypotheses, though somewhat consistent with the tripartite model, adolescent PH significantly predicted changes in social phobia and panic disorder symptoms, over and above affective states. PH did not predict changes in either GAD or MDD.

**Study Aim Two: Testing Academic Stress as a Moderator**

The second aim of this study was to examine whether academic stress moderated the associations between components of the tripartite model (PA, NA, PH) and anxiety and depressive symptoms. The moderating effect of time 1 academic stress (ASQ) on the pathways between NA, PA, and PH and changes in anxiety and depressive symptoms were tested. To do so, four hierarchical multiple regression analyses were run with NA, PA, PH, and ASQ as predictors of changes in the individual symptom clusters (MDD, GAD, social phobia, panic disorder). To avoid potentially problematic high multicollinearity with the interaction term, each of the predictor variables were mean centered and interaction terms between NA and ASQ, PA and ASQ, and PH and ASQ were created. Interaction terms were added to the regression model, and any non-significant interactions were dropped from respective models. In cases where there were non-significant interactions, main effects were assessed with NA, PA, PH, and ASQ.

**Changes in MDD symptoms.** When looking at all possible interactions between ASQ and affective/somatic components in the prediction of changes in MDD symptoms, the only significant interaction that emerged was PAxASQ. The interaction term between PA and ASQ accounted for a significant proportion of the variance in changes in MDD symptoms, $\Delta R^2 = .04$, $\Delta F(1, 9767) = 395.28, p = .000$. This interaction was probed by testing the conditional effects of academic stress at three levels - one standard deviation below the mean, at the mean, and one standard deviation above the mean (see Figure 4). Results revealed that PA was significantly related to changes in MDD symptoms when academic stress was one standard deviation below the mean, but not when academic stress was at the mean, or one standard deviation above the mean. At low levels of academic stress, consistent with the expectation, greater PA was associated with decreases in MDD symptoms.

**Changes in GAD symptoms.** There were no significant interactions between any of the interaction terms in predicting changes in GAD symptoms. All interaction terms were dropped from the model, and the model was rerun without interaction terms. Results revealed significant main effects for NA ($b = .43$, $t = 11.21, p = .00$), PA ($b = .18$, $t = 5.38, p = .00$), PH ($b = .41$, $t = 8.02, p = .00$), and ASQ ($b = .06$, $t = 4.90, p = .00$), indicating greater NA, PA, PH, and ASQ at time 1 were associated with increases in GAD symptoms over time.

**Changes in social phobia symptoms.** When looking at all possible interactions between ASQ and affective/somatic symptoms, the only significant interaction that emerged was NAXASQ. The interaction term between NA and ASQ accounted for a significant proportion of the variance in changes in social phobia symptoms, $\Delta R^2 = .02$, $\Delta F(5, 9767) = 111.01, p = .000$. This interaction was probed by testing the conditional effects of academic stress at three levels - one standard deviation below the mean, at the mean, and one standard deviation above the mean. Results revealed that NA was significantly related to changes in social phobia symptoms when academic stress was one standard deviation above the mean, but not when academic stress was at the mean, or one standard deviation below the mean. Specifically, at high levels of academic stress, greater NA was related to decreases in changes in social phobia symptoms.
Changes in panic disorder symptoms. There were no significant interactions between any of the interaction terms in predicting changes in panic disorder symptoms. All interaction terms were dropped from the model, and the model was rerun without interaction terms. Results revealed significant main effects for NA ($b = .21$, $t = 4.18$, $p = .00$), PH ($b = .78$, $t = 11.44$, $p = .00$), and ASQ ($b = .19$, $t = 11.795$, $p = .00$), indicating that higher levels of NA, PH, and ASQ were associated with increases in panic disorder symptoms over time.

Discussion

The current study was the first to investigate the tripartite model of anxiety and depression in an Asian sample. Overall, the findings provided mixed support for the tripartite model for both concurrent and longitudinal relations in our sample of adolescents in India. Concurrently, affective components of the tripartite model yielded support, while physiological components did not distinguish anxious and depressive symptoms. In predicting changes in internalizing symptoms across time, the tripartite model did not yield support with regard to affective components, though yielded support for physiological components. Academic stress moderated select tripartite pathways, though limited meaning can be derived from these pathways. Of note, there were significant main effects for academic stress, both within time and in predicting changes in internalizing symptoms over and above tripartite components.

Test of the Tripartite Model within Time

NA. Concurrently, the associations between NA and each of the anxious and depressive symptoms are consistent with previous studies that have tested these relations with White American (Lu et al., 2010) and East Asian samples (Leong et al. 2003; Varma, 2017), supporting the conceptualization of the NA component within the tripartite model.

PA. Per the Tripartite model, PA is uniquely associated with depressive symptoms. However, previous research with individuals in the US showed that low PA was present amongst those with social anxiety in the US, above and beyond what could be attributed to co-occurring depression (Brown, Chorpita, & Barlow, 1998; Chorpita, Plummer, Mofitt, 2000; Kashdan, 2002, 2004, 2007). Consistent with this research, current findings demonstrate inverse relation between PA and MDD as well as social phobia at both time points in our Indian adolescent sample. These patterns of results are also consistent with models of the tripartite model amongst both adults (Brown, Chorpita & Barlow, 1998) and children (Hope & Anderson, 2008). People with social phobia tend to have elevations in fear of positive emotions and lower expression of positive emotions, compared to people without these disorders (Roemer, Salters, Faffa, & Orsillo, 2005). When people with social phobia have opportunities to pursue activities that could generate PA, regardless of how much they may value social activities, they tend to avoid those opportunities and are preoccupied by attempts to conceal or suppress feelings of anxiety (Kashdan & Steger, 2006) and subsequently, PA fails to emerge. Concurrently, our findings also demonstrated an inverse relation between PA and GAD, which was unexpected, though this effect was smaller in magnitude in comparison to social phobia and MDD.

PH. Concurrently, there were positive associations between PH and each symptom cluster at both time points, contradicting the conceptualization of PH as uniquely associated with anxiety symptoms, particularly panic disorder. These findings are sound given that Indian adolescents may be more likely to report somatic complaints as a way to express their internalizing experience (Grover, Dutt, & Avasthi, 2010). It is possible those in this sample tend to describe their experience in terms of their physiological experience. Alternatively, adolescents
in this sample may experience PH in response to stressors that exceed their tolerance, or adolescents do not utilize or know of regulatory strategies to manage or lower the impairments resulting from PH. PH in this sample may reflect a culturally-informed heightened response to normative levels of stress or a normal response to excessive stress (Lupien et al, 2009).

In sum, at the concurrent level, the tripartite model was replicated with regard to affective components (NA and PA), but not physiological components. Affective components are important symptoms that help describe adolescent experiences in the moment, while reports of PH symptoms in this cultural context may be a non-specific correlate of all symptom clusters. In this way, symptoms of PH appear to be transdiagnostic.

**Test of the Tripartite Model Longitudinally**

Based on concurrent findings it is clear that there are important features of the tripartite model, most notably PH, that are informed by the cultural context. Less is known about whether features of the tripartite model are risk factors for the development and maintenance of internalizing symptoms, and thus, the tripartite model was examined longitudinally.

**NA.** Contrary to expectations, NA uniquely predicted increases in MDD symptoms only, which is inconsistent with the conceptualization of NA as a shared component of anxiety and depression. It is unclear whether the lack of longitudinal association between NA and anxiety symptoms in the present study reflects sampling or methodological issues related to the current study (e.g., a predominantly female adolescent sample), a culturally salient pattern in Asia, or a more universal finding suggesting lack of predictive utility of NA for anxiety over time. NA seems to represent a distressing experience in the moment which can ultimately motivate the employment of adaptive regulation strategies preventing the maintenance or development of GAD, social phobia, and panic symptoms over time. Additionally, those with symptoms of GAD, social phobia, and panic symptoms might have had repeated exposure to sources of NA, preventing the maintenance and development of symptoms over time. With respect to MDD, where there is diminished motivation, adolescents in this sample might have lacked the motivation to regulate NA, resulting in increases in MDD symptoms.

**PA.** PA did not predict changes in any symptom cluster over and above the other tripartite components. The lack of a longitudinal association between PA and depression is consistent with previous work based on East Asian samples (Leu et al, 2011), suggesting that low PA may not be relevant for the development of depression over time in the Indian context. While it is possible that the absence of PA may not be maladaptive in the Indian context given the cultural dialectical script of accepting that reality will change (Leu et al., 2011; Miyamoto & Ma, 2011), it is unclear to what extent individuals in this sample are influenced by such a script.

No study, to our knowledge, has directly tested how tripartite components predict the development or changes in internalizing symptoms in an Asian sample. The way in which PA was measured in the current study may not reflect an appropriate marker of change of internalizing symptoms, given that there are other avenues to express internalizing symptoms beyond trait-level affect (Grover, Dutt, & Avasthi, 2010; Lonigan, Phillips, & Hooe, 2003). The use and development of more theoretically refined measures of tripartite dimensions, particularly for PA may be warranted (Chorpita, Plummer, Mofitt, 2000; Jacques & Mash, 2004), especially in differing cultural contexts.

**PH.** PH was not uniquely predictive of panic disorder symptoms, though generally was uniquely predictive of anxiety symptoms, consistent with the Tripartite model. While PH was also predictive of changes in social phobia symptoms, this finding is consistent with US samples.
in which PH was associated with separation anxiety, which is often intertwined with social phobia (Anderson & Hope, 2008; Ferdinand et al., 2006). Adolescents who experience social anxiety symptoms may not reappraise their physiological experience, and/or do not implement strategies to regulate PH. These adolescents may also continue to avoid feared situations, limiting their ability to acquire and engage in adaptive coping strategies that buffer against the maintenance and development of social phobia and panic disorder. The exact reasons for why PH was a predictor of change are unclear given the lack of literature that focuses on PH as a risk factor for the development of anxiety symptoms over time.

Overall, both concurrent and longitudinal findings suggest that components of the tripartite model may function differently in diverse cultural contexts. Affective components of the tripartite model were replicated within time though not across time. Affective components can help differentiate symptoms, though do not predict changes in symptoms. The physiological component of the tripartite model was not supported within time, though it was supported across time. Nonetheless, the salience of PH in this sample was clear, suggesting the importance of assessing symptoms of PH in the context of adolescent internalizing symptoms, particularly as PH symptoms pose a risk factor for panic disorder and social phobia. Although much of the research supporting tripartite model has been cross-sectional, tripartite components were conceptualized as not only correlates of anxious and depressive symptomatology but also as risk factors. With this conceptualization, the tripartite model has been thought to be prescriptive in nature, helping to increase diagnostic accuracy and eliminate issues with comorbid anxiety and depression (Kendall et al, 1992). However, the present concurrent and longitudinal findings suggest that the tripartite model may instead only offer a description of co-occurring symptomatology and related affective experiences, particularly in diverse cultural groups.

**Academic Stress as a Moderator**

Of the interactions tested both within and across time, academic stress moderated only two pathways. Academic stress moderated the relation between PA and changes in MDD, as well as the relation between NA and changes in social phobia.

Low levels of PA at time 1 only related to increases in MDD across time when academic stress at time 1 was low. These findings are not supported by theory, particularly within the diathesis-stress framework, where the low PA diathesis should be exacerbated by academic stress. One possible explanation for this unexpected finding is that for adolescents in India, academic performance in high school is of utmost importance as it determines future occupational success (Verma et al., 2002), and the presence of academic stress may overwhelm the diathesis such that it does not interact with PA at higher levels of academic stress.

At high levels of academic stress at time 1, greater NA at time 1 was associated with decreases in social phobia symptoms across time. When adolescents in this sample are academically stressed, NA impacts social phobia symptoms, though not in the anticipated direction. It is possible that adolescents who report high academic stress and NA at the beginning of the school year (time 1) may be engaging in adaptive worry about their academic performance, which may lead to mobilizing resources to perform well later in the school year. However, it is unclear why of all the interactions tested, the significant interaction that emerged was with regard to social phobia and no other internalizing symptoms.

Taken together, these interactions are not to be over interpreted given that these were two out of 36 possible interactions. Of note, although academic stress only moderated two pathways, there was a main effect of academic stress on each of the four symptom clusters (MDD, GAD,
social phobia, panic disorder) within and across time, over and above NA, PA, and PH. Adolescents who reported high levels of academic stress at the beginning of the school year also reported increases in MDD, GAD, social phobia and panic disorder symptoms five months later. This finding is consistent with findings from India and other East Asian countries (Bhasin, Sharma, Saini, 2010; Li, Martin, & Yeung, 2017; Mehta, Pattanayak, & Sagar, 2015; Verma, Sharma, & Larson, 2002) demonstrating that academic stress contributes to psychopathology. Overall, these findings suggest the relevance of academic stress for adolescent functioning in Asia and suggest the need for interventions targeted at reducing this stress. It is possible that other measures of academic stress (self-report, parent-report, observational) or other types of stressors (e.g., family, health, relational) may be more relevant moderators interacting with PA, NA, and PH in predicting anxiety and depression in Indian adolescents. 

Limitations and Future Directions

In the current study, we utilized adolescent reports of adolescent affect, and physiological arousal, and both adolescent and parent reports of adolescent depressive and anxiety symptoms at two time points five months apart. Although the current study provided useful information on depressive and anxiety symptoms in Indian adolescents, it was not without limitations. While composite parent and adolescent reports for psychopathology were utilized, the independent variables (PA, NA, PH, academic stress) were only collected via adolescent self-report. Though self-report measures are commonly used to report affective and physiological symptoms, these reports are limited by response biases such as social desirability. Further, utilizing adolescent reports may introduce the problem of shared method variance. Future studies should incorporate behavioral observations of affective states and psychophysiological measures of arousal (Laurent & Ettelson, 2001) in conjunction with multi-informant questionnaires at multiple time points to increase our understanding of the validity of the tripartite model constructs. As less is known about tripartite factors in other parts of the world (e.g., Africa, East Asia) where norms may differ from both Western and South Asian contexts, future research may also examine these factors amongst other diverse cultural groups.

To reduce participant burden, we utilized selected subscales from the Adolescent Stress Questionnaire, which did not allow us to compare adolescents’ responses to varying types of stressors, beyond academic stress (e.g., interpersonal, financial, health). Future research may delve deeper into specific components of academic stress and examine both adolescents’ and parents’ reports of adolescent stress across situations, and their implications for different domains of adolescent functioning. Moreover, future research incorporating measures of emotion valuation and regulation strategies, individualism, collectivism, and other culturally relevant contextual factors may elucidate the conditions in which tripartite associations are salient.

India is an immensely diverse country with regard to lifestyle, language, socio-economic class, religious views and practices, neighborhood setting, population density, and geographic region. The current sample primarily consisted of girls and their parents from two schools (one of which was an all-girls school) in a metropolitan city in South India, and the entire sample preferred to complete questionnaires in English versus in Kannada. Thus, these data limit the generalizability of the findings to the subset of adolescents from urban, middle-class, English speaking families and cannot be considered representative of the entire country. Future research may examine the form and function of affective and physiological states in the prediction of anxiety and depressive symptoms across different communities in India, in particular, where the preference is for local language use.
Despite these limitations, the current study was the first to examine the tripartite model in an Indian adolescent sample, and found mixed-support for the tripartite model. Concurrently, affective components of the tripartite model yielded support, while physiological components did not distinguish anxious and depressive symptoms. Longitudinally, a reverse pattern as found such that the affective components did not yield support, though physiological components did. Overall, our findings demonstrate the salience of physiological symptoms as a non-specific correlate of anxiety and depression, as well as highlight the relevance of affective states for Indian adolescents, with implications for informing intervention and prevention programs.

Clinical Implications

Examination of the tripartite model in a non-western sample has theoretical and clinical implications. The findings of this study may inform theories pertaining to factors contributing to anxiety and depression in diverse cultural groups. These findings also suggest that NA, PA and PH may play a different role in contributing to the experience, development and maintenance internalizing symptoms. High NA and PH in the moment appear to represent generalized distress that may be shared transdiagnostically for Indian adolescents as they experience these symptoms, with NA predicting depression and PH predicting anxiety symptoms over time.

The current findings, pending replication, may help inform intervention and prevention approaches for adolescent anxiety and depressive symptoms in India. Given that low PA was associated concurrently with depression and social anxiety symptoms, intervention strategies that focus on enhancing PA (i.e., behavioral activation) may be relevant in reducing current internalizing symptoms among adolescents, however, these strategies may not necessarily buffer against individuals experiencing depression in the future.

Given that high NA and PH were associated concurrently with depression and anxiety symptoms, intervention strategies that focus on learning to effectively regulate NA and PH may help reduce depression and anxiety symptoms in the moment. Effective regulation of NA may also buffer against depression over time and effective recognition and regulation of PH may buffer against the development of panic disorder and social phobia symptoms over time.

The longitudinal influence of PA and NA in this sample may provide rationale for prevention efforts to prioritize strategies to decrease or regulate NA and PH effectively in lieu of prioritizing behavioral activation strategies to increase PA among Indian youth.

Finally, the main effect of academic stress suggests prevention efforts targeted at teaching effective coping strategies to manage academic stress for these youth. Additional research is needed to ensure such intervention and prevention efforts are culturally sensitive, based in evidence generated from adolescent samples in India, and are sustainable.
References


Table 1.

Intercorrelations, means, and standard deviations of all study variables

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<td>3.13</td>
<td>2.39</td>
<td>0.71</td>
<td>9.43</td>
<td>7.47</td>
<td>5.36</td>
<td>9.82</td>
</tr>
<tr>
<td></td>
<td>(5.45)</td>
<td>(0.50)</td>
<td>(2.64)</td>
<td>(0.33)</td>
<td>(1.12)</td>
<td>(1.23)</td>
<td>(0.77)</td>
<td>(0.84)</td>
<td>(0.65)</td>
<td>(2.56)</td>
<td>(4.10)</td>
<td>(3.12)</td>
<td>(4.89)</td>
<td>(4.24)</td>
</tr>
<tr>
<td></td>
<td>Observed Range</td>
<td>31-60</td>
<td>0-1</td>
<td>13-18</td>
<td>0-1</td>
<td>9-12</td>
<td>1-6</td>
<td>1-5</td>
<td>1-4.8</td>
<td>0-3</td>
<td>3-15</td>
<td>0-21</td>
<td>0-15</td>
<td>0-26</td>
</tr>
</tbody>
</table>

Note. Bottom left half of table = Time 1, Top right half of table = Time 2. PA = Positive Affect. NA = Negative Affect. PH = Physiological Hyperarousal. ASQ = Academic Stress. Adol. = Adolescent. Letters in parentheses indicate reporter: P = parent, A = adolescent, and C = mean composite of adolescent and parent reports. For parent gender, 0 = male, 1 = female. Values for variables are pooled estimates from 40 imputed datasets, N = 282.
*p < .05. **p < .01
Table 2.
Intercorrelations of all study variables across time

<table>
<thead>
<tr>
<th>Time 1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adol PA</td>
<td>0.27**</td>
<td>-0.02</td>
<td>-0.09</td>
<td>-0.09</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.03</td>
</tr>
<tr>
<td>Adol NA</td>
<td>-0.17**</td>
<td>0.47**</td>
<td>0.29**</td>
<td>0.40**</td>
<td>0.42**</td>
<td>0.28**</td>
<td>0.36**</td>
</tr>
<tr>
<td>Adol PH</td>
<td>-0.02</td>
<td>0.33**</td>
<td>0.65**</td>
<td>0.38**</td>
<td>0.33**</td>
<td>0.31**</td>
<td>0.48**</td>
</tr>
<tr>
<td>Depression (C)</td>
<td>-0.15*</td>
<td>0.36**</td>
<td>0.46**</td>
<td>0.57**</td>
<td>0.48**</td>
<td>0.39**</td>
<td>0.42**</td>
</tr>
<tr>
<td>Generalized Anxiety Disorder (C)</td>
<td>-0.14**</td>
<td>0.33**</td>
<td>0.33**</td>
<td>0.40**</td>
<td>0.54**</td>
<td>0.41**</td>
<td>0.29**</td>
</tr>
<tr>
<td>Social Phobia (C)</td>
<td>-0.19**</td>
<td>0.35**</td>
<td>0.28**</td>
<td>0.44**</td>
<td>0.49**</td>
<td>0.59**</td>
<td>0.38**</td>
</tr>
<tr>
<td>Panic Disorder (C)</td>
<td>-0.07</td>
<td>0.32**</td>
<td>0.49**</td>
<td>0.47**</td>
<td>0.44**</td>
<td>0.41**</td>
<td>0.52**</td>
</tr>
</tbody>
</table>


*p < .05. **p < .01
Table 3. Adolescent and parent reports of internalizing symptoms at time 1.

<table>
<thead>
<tr>
<th>Adolescent Report</th>
<th>Parent Report</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1. MDD</td>
<td>0.54**</td>
</tr>
<tr>
<td>2. GAD</td>
<td>0.34**</td>
</tr>
<tr>
<td>3. Social Phobia</td>
<td>0.37**</td>
</tr>
<tr>
<td>4. Panic Disorder</td>
<td>0.28**</td>
</tr>
</tbody>
</table>

** p < .01
Table 4. Adolescent and parent reports of internalizing symptoms at time 2.

<table>
<thead>
<tr>
<th></th>
<th>Parent Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescent Report</td>
<td>1</td>
</tr>
<tr>
<td>1. MDD</td>
<td>0.46**</td>
</tr>
<tr>
<td>2. GAD</td>
<td>0.34**</td>
</tr>
<tr>
<td>3. Social Phobia</td>
<td>0.36**</td>
</tr>
<tr>
<td>4. Panic Disorder</td>
<td>0.48**</td>
</tr>
</tbody>
</table>

** p < .01
**Figure 1.** Examination of the Tripartite Model within Time 1.

*Note:* Adolescent reports included as exogenous variables; Composites of parent and adolescent reports for adolescent psychopathology included as endogenous variables. Dotted lines are non-significant paths, and solid lines are significant paths. Unstandardized path coefficients and standard errors (in parentheses) shown before the slash, with standardized path coefficients shown after.
Figure 2. Examination of the Tripartite Model within Time 2.

Note: Adolescent reports included as exogenous variables; Composites of parent and adolescent reports for adolescent psychopathology included as endogenous variables. Dotted lines are non-significant paths, and solid lines are significant paths. Unstandardized path coefficients and standard errors (in parentheses) shown before the slash, with standardized path coefficients shown after.
Figure 3. Examination of the Tripartite Model longitudinally.

Note: Adolescent reports included as exogenous variables; Residuals of regressed time 2 on time 1 composites of parent and adolescent reports for adolescent psychopathology included as endogenous variables. Dotted lines are non-significant paths, and solid lines are significant paths. Unstandardized path coefficients and standard errors (in parentheses) shown before the slash, with standardized path coefficients shown after.
Figure 4. Interaction plot of adolescent positive affect, academic stress and changes in major depressive disorder.
**Figure 5.** Interaction plot of adolescent negative affect, academic stress and changes in social phobia

- High Academic Stress: $b = -0.19, \ p = 0.02^*$
- Mean Academic Stress: $b = -0.29, \ n.s.$
- Low Academic Stress: $b = -0.12, \ n.s.$