PERSONALITY PREDISPOSITIONS IN CHINESE ADOLESCENTS: THE

RELATION BETWEEN SELF-CRITICISM, DEPENDENCY, AND PROSPECTIVE

INTERNALIZING SYMPTOMS

by

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ABSTRACT OF THE THESIS

Personality Predispositions in Chinese Adolescents: The Relation between Self-Criticism,

Dependency, and Prospective Internalizing Symptoms

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The present study examined the prospective relation between two personality

predispositions, self-criticism and dependency, and internalizing symptoms. Specifically,

it was examined whether self-criticism and dependency predicted symptoms of

depression and social anxiety, and if a *vulnerability-stress* or *stress generation* model

best explained the relation between the personality predispositions and emotional distress

in Chinese adolescents. Participants included 558 adolescents (310 females and 248

males) from an urban school in Changsha, and 592 adolescents (287 females and 305

males) from a rural school in Liuyang, both located in mainland China. Participants

completed self-report measures of self-criticism and dependency at baseline, and self-

report measures of negative events, depressive symptoms, and social anxiety symptoms

once a month for six months. Findings showed that self-criticism predicted depressive

symptoms, while dependency predicted social anxiety symptoms. In addition, support

was found for a stress generation model, as opposed to a vulnerability-stress model, with

achievement stressors mediating the relation between self-criticism and depressive

symptoms, and interpersonal stressors mediating the relation between dependency and social anxiety symptoms. Overall, these findings highlight new developmental pathways for the development of depressive and social anxiety symptoms in mainland Chinese adolescents. Implications for cross-cultural developmental psychopathology research are discussed.

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Introduction

Similar to the United States (Avenevoli, Knight, Kessler & Merikangas, 2008), adolescence represents a sensitive period for the onset and maintenance of depressive symptoms in mainland China (Tepper, Liu, Guo, Zhai, Liu & Li, 2008). For example, a recent study showed that close to half (44.3%) of adolescents throughout China reported experiencing depressive symptoms at the time of assessment or in the past week (Sun, Tao, Hao & Wan, 2010). Rates of depressive symptoms between Chinese and American adolescents are believed to be similar (Fong, 2006; Zhenghua, 2004) or even higher in Chinese adolescents (Greenberger, Chen, Tally, & Dong, 2000; Tepper et al., 2000) according to recent reports. In addition, depressive symptoms have been found to be associated with a host of deleterious psychological processes during Chinese adolescence, including risky behaviors (Chen, Dunne & Han, 2006), such as substance abuse (Jessor et al., 2003), delinquency (Bao, Haas, & Pi, 2004), and suicidal ideation and behavior (Cheung, Law, Chan, Liu & Yip, 2006; Liu, Tein, Zhao & Sandler, 2005). However, despite these disturbing trends, a paucity of research exists on the underlying factors which may be contributing to the development of psychopathology among this population (Bush, 2003; Bush, Peterson, Cobas, & Supple, 2002). Thus, the present study aimed to gain a better understanding of the onset and maintenance of internalizing symptoms in mainland Chinese youth.

A growing area of interest in psychological research is the relation between specific personality predispositions and mental health. Personality predispositions may be defined as cognitive, behavioral, and affective tendencies that are stable across time (Scheier & Bridges, 1995). Because recent research found convincing evidence for the existence of distinct, stable, and global personality characteristics (Goldberg, 1992; Tellegen, 1991), a greater emphasis has

been made to understand how these individual differences relate to psychopathology (Hankin, 2010). Although a majority of the research has been conducted on adults (see Krueger & Tackett, 2003 for a review), an emerging body of research also shows the deleterious effects of specific personality constructs in youth populations. In particular, high levels of neuroticism (or negative emotionality) have been found to relate to internalizing and externalizing symptoms in Western youth (Fergusson, Beautrais, & Horwood, 2003; Mufson, Nomura, & Warner, 2002; Tackett, 2006; Wetter & Hankin, 2009).

Two additional personality constructs, dependency and self-criticism, have also gained increased attention as vulnerabilities to depressive symptoms in youth (Abela, McIntyre-Smith, & Dechef, 2003; Abela, Sakellaropoulo, & Taxel, 2007; Abela & Taylor, 2003; Adams, Abela, Auerbach, & Skitch, 2009; Shahar, Blatt, Zuroff, Kuperminc, & Leadbeater, 2004). According to Blatt and Zuroff (1992) the two personality predispositions explain why some individuals are more likely than others to develop depression. Specifically, individuals high in self-criticism are preoccupied with achievement goals, and are especially susceptible to depression when they feel they are unable to meet high standards set by themselves and/or others. On the other hand, individuals high in dependency are preoccupied with interpersonal goals, and are at heightened risk for depression following interpersonal conflict, loss, or social rejection. Blatt and Zuroff's (1992) theory of personality predispositions is similar to interpersonal (Areti & Bemporad, 1980) and cognitive (Beck, 1983) theories of depression which also have interpersonal and achievement personality constructs.

The purpose of the present study was to examine the relation between dependency, self-criticism and internalizing symptoms in a Chinese adolescent cultural group. Specifically, we tested whether self-criticism and dependency predicted prospective depressive and social anxiety

symptoms in high school students living in mainland China. We aimed to extend research on the personality predispositions in two important ways. First, we studied whether dependency and self-criticism represented vulnerabilities in Chinese youth as previously found in North American samples (Adams et al., 2009; Shahar et al., 2004). Second, the present study was the first to examine whether dependency and self-criticism prospectively predicted symptoms of social anxiety during adolescence.

Dependency and self-criticism as vulnerabilities to emotional distress

A majority of past research concerning dependency and self-criticism has focused on adult populations (Bartlestone & Trull, 1995; Blaney & Kutcher, 1991; Nietzel & Harris, 1990; Santor & Patterson, 2004; Zuroff, Igreja, & Mongrain, 1990). However, because Blatt and Zuroff's (1992) theory postulates that the personality vulnerabilities of self-criticism and dependency develop early in life (Blatt, 1974), a growing body of research has examined the theory in younger populations. Although these studies are fewer in number, findings suggest that these predispositions may be associated with depressive symptoms during adolescence. For instance, Adams and colleagues (2009) found strong support for the theory by demonstrating that both dependency and self-criticism represented vulnerabilities to prospective depressive symptoms in at-risk youth. The majority of studies, however, only found support for self-criticism as a vulnerability factor (Abela et al., 2007; Abela & Taylor, 2003; Shahar et al., 2004) suggesting that this personality predisposition may be especially problematic during adolescence. This is consistent with Nietzel and Harris's (1990) meta-analysis on the personality predispositions in which the authors suggested that self-criticism may represent a unique vulnerability to depression for adult, Western populations.

Past research has identified culture as an important variable to consider when examining the effects of personality predispositions as it may impact the intensity, expression, and correlates of personality traits (Church, 2001). In addition, researchers have examined which aspects of personality are universal and which are culture specific (see Church, 2008, 2010; McCrae, 2001 for reviews). Although a long-standing body of research has identified several personality constructs which exist both in Western and Eastern cultures (see Chiu, 1990; Luk & Bond, 1993; McCrae, 2001; McCrae, Costa Jr., & Yik, 1996; for examples), investigations concerning self-criticism and dependency in Asian cultural groups are scarce. To date, only one study previously examined the personality vulnerabilities in mainland China, or any other Asian cultural group. In a University sample in mainland China, Yao, Fang, Zhu, and Zuroff (2008) tested the presence of self-criticism and dependency and its association with depressive symptoms. Compared to a normative Western sample, similar levels of self-criticism and dependency were found and both correlated with depressive scores at a six-month follow-up.

The present study built upon this initial investigation (Yao et al., 2008) and examined the longitudinal association between the personality predispositions and internalizing symptoms in Chinese adolescents. Past research criticized the validity of Western theories of personality in Asian cultural groups because they are often not inclusive of an interpersonal relatedness construct (Cheung et al., 2001; Cheung, Leung, Fan, Song, Zhang, & Zhang, 1996; Markus & Kitayama, 1998). However, because Blatt and Zuroff's (1992) theory explicitly articulates the interpersonal relatedness personality dimension of dependency, this may be an especially useful Western theory of personality from which to understand risk to internalizing symptoms within the context of Chinese culture.

Addressing conceptual and methodological limitations of prior research

The present study extended the findings of Yao and colleagues (2008) by incorporating several suggestions and limitations noted in prior reviews of the personality predispositions literature (e.g., Coyne & Whiffen, 1995; Zuroff, Mongrain, & Santor, 2004). First, past research traditionally isolated the personality predispositions during analyses. However, self-criticism and dependency are related constructs, with correlations between the two personality types ranging from 0.04 to 0.43 (Abela et al., 2007, Abela & Taylor, 2003; Little & Garber, 2000, 2004; Shahar et al., 2004; Shahar & Priel, 2003). Given this, critics of Blatt and Zuroff's theory suggested that both personality predispositions need to be included together in statistical models (Coyne & Whiffen, 1995). Therefore, to better account for unique effects of self-criticism and dependency on internalizing symptoms, both personality predispositions were assessed and examined simultaneously in the statistical analyses for the present study.

Second, we accounted for neuroticism to examine whether dependency and self-criticism predicted psychological symptoms above and beyond this well-established personality construct. Prior research indicated that similar to their Western counterparts, neuroticism serves as a vulnerability to Chinese adolescents' mental health (McCrae et al., 1996). In addition, past research found high correlations between neuroticism and dependency (Birtchnell, Deahl, & Falkowski, 1991) as well as neuroticism and self-criticism (Dunkley, Blankstein, & Flett, 1997). Furthermore, Mongrain (1993) found that neuroticism predicted both self-criticism and dependency. Taken together, these results led some to question whether findings between self-criticism, dependency, and depression can be explained by neuroticism (Ouimette & Klein, 1993). Thus, in the present study, we evaluated whether the personality predispositions uniquely predicted symptoms above and beyond neuroticism for emotional distress symptoms.

Third, the present study utilized a short-term prospective design as opposed to a cross-sectional or two-time point panel design. Using a multi-wave design allowed for changes in negative events and symptom levels within the individual to be tracked over time and to examine moderation and mediation hypotheses related to the personality predispositions. Recent research emphasized the need for developmental psychopathologists to test both moderation and mediation models to better understand the mechanisms through which negative events exerts influence (Eberhart, Auerbach, Bigda-Peyton, & Abela, 2011).

The majority of past dependency and self-criticism studies examined a diathesis-stress (moderation) model in which dependency/self-criticism either interacted with a specific stressor (the specific vulnerability hypothesis) or general stressor (the general vulnerability hypothesis) to predict depressive symptoms. The specific vulnerability hypothesis states that depression is triggered only when individuals high in dependency/self-criticism experience stressors congruent with their personality predisposition (Blatt & Zuroff, 1992). On the other hand, a general vulnerability stress hypothesis states that overall levels of negative events interact with the personality predispositions to predict depressive symptoms (Shahar et al., 2004). The available research lends support to both the specific (Abela et al., 2003; Abela & Taylor, 2003; Hammen & Goodman-Brown, 1990) and general (Abela, Webb, Ho, Wagner, & Adams, 2006; Adams et al., 2009; Shahar et al., 2004) vulnerability hypotheses in Western adolescents.

In addition to the more commonly tested moderation model, other research demonstrated that self-criticism and dependency directly predict depressive symptoms during adolescence without interacting with negative events (Shahar et al., 2004). In line with a mediation model, it may be that negative events mediate the relation between the personality vulnerabilities and depressive symptoms. Consistent with the *stress generation model* (see Hammen, 2006 for a

review), prior research suggested that the interpersonal styles of individuals with maladaptive personality predispositions may lead to increased levels of stressors through dysfunctional relationships (e.g., Lee & Hankin, 2009; Hankin, Kassel, & Abela, 2005). Applying the stress generation framework to Blatt and Zuroff's (1992) personality predispositions theory, self-criticism was shown to predict interpersonal and achievement related negative events which, in turn, led to depressive symptoms among college student samples (Priel & Shahar, 2000; Shahar et al., 2004). In the present study, we examined whether the stress generation mediation model demonstrated a specific pathway for how the personality predispositions lead to prospective changes in internalizing symptoms among.

Personality predispositions and specificity of predicting depressive and social anxiety symptoms

Finally, in addition to investigating how these personality predispositions related to depressive symptoms in adolescents living in mainland China, the present study also sought to prospectively examine associations among self-criticism, dependency, and social anxiety symptoms. Past research suggested that the personality predispositions, specifically self-criticism, may not be a unique predictor of depression alone. For instance, two cross-sectional examinations found elevated levels of self-criticism, but not dependency, in patients with social phobia, even compared to patients diagnosed with panic disorder (Cox, Fleet, & Stein, 2004; Cox, Rector, Bagby, Swinson, Levitt, & Joffe, 2000). Furthermore, Cox, Walker, Enns, and Karpinski (2002) demonstrated that decreases in levels of self-criticism were related to decreases of symptoms of social phobia in patients receiving cognitive-behavioral therapy. Thus, although originally conceptualized as vulnerabilities for depression, self-criticism may be implicated in the onset and maintenance of social anxiety symptoms as well.

Testing the role self-criticism and dependency play in the development of social anxiety in mainland Chinese adolescents is important because of distinct cultural manifestations found for the disorder. Extant research suggested that *Taijin Kyofusho* may represent a 'culture bound' form of social anxiety which is unique to Asian cultural groups where individuals have fears of offending others within their social networks (Kirmayer, 1991; Nakamura, Kitanishi, Miyake, Hashimoto & Kubota, 2002). This is different from Western cultural groups where social anxiety is believed to be rooted in fears of outing oneself as a failure (Clark & Wells, 1995). Therefore, because of the distinct cognitions associated with social anxiety between the two cultures, different vulnerability factors may exist for the development of social anxiety.

The present research investigated how self-criticism and dependency related to internalizing symptoms in mainland Chinese adolescents. We hypothesized that consistent with Western adolescents (Abela et al., 2007; Abela & Taylor, 2003; Shahar et al., 2004) self-criticism would emerge as a risk factor for depressive symptoms in the present study. On the contrary, dependency, as opposed to self-criticism, was predicted to be associated with prospective social anxiety symptoms because in Asian cultural groups the disorder is associated with fears of letting others down (Nakamura et al., 2002). Finally, based on recent findings which found greater support for mediation, as opposed to moderation, models for vulnerabilities for internalizing symptoms (Eberhart et al., 2011), it was predicted that negative events would mediate the relation between the personality predispositions and emotional distress.

Methods

Participants

The participants in the current study were 558 adolescents (310 females and 248 males) from an urban school in Changsha, and 592 adolescents (287 females and 305 males) from a rural school in Liuyang, both in Hunan province located in mainland China. These cities were chosen as previous research found differences regarding internalizing symptoms between urban and rural sites in mainland China (Fan, Zhang, Yang, Mo & Liu, 2011; Yip, Callanan, & Yuen, 2000). Both schools are ranked as average in terms of academic standards. The final sample consisted of 1150 adolescents ranging in age from 14 to 19 ($M = 16.26$) years. The median annual family income was in the range of 18,000 to 24,000 Ren Min Bi (RMB) per year ($2,250 to $3,000 USD). In relation to annual gross domestic product, Hunan province ranks 23rd (10,336 RMB) out of the 34 provinces in China and therefore falls below the national provincial average ($\mu = 29,719$ RMB; SD = 47,462 RMB). Lastly, the sample was 99.2% Han, the predominant ethnic group in China, and 0.8% ethnic minority. Schools were compensated for their participation.

Procedure

Written consent was obtained from parents and adolescents prior to the start of the study. After consent forms were collected, researchers went to each school to meet with students. During the initial assessment, students completed the following questionnaires: (1) the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), (2) the Multidimensional Anxiety Scale for Children (March, 1997), (3) the Adolescent Life Event Questionnaire (ALEQ; Hankin & Abramson, 2002), (4) the Depressive Experiences Questionnaire for Adolescents

(DEQ-A; Fichman, Koestner, & Zuroff, 1994), and (5) the Five Factor Inventory-Neuroticism Subscale (FFI-N; Costa & McCrae, 1992). The second phase of the study consisted of 5 follow-up assessments, occurring every month for the subsequent 5 months. The multi-wave, longitudinal design for this study allowed for fluctuations in depressive and social anxiety symptoms as well as life events and the long-term consequences of the personality predispositions to be assessed. Additionally, this time frame was chosen because it was similar to other studies which have assessed the longitudinal effects of these personality predispositions in Western samples (Adams et al., 2009). At each follow-up, a research assistant returned to the school and administered the CES-D, MASC, and ALEQ to the adolescent. Following the adolescents' participation in the study, the participants were fully debriefed, but no compensation was given.

Measures

The Chinese version of measures were developed using the back-translation method (Brislin, 1986; Pena, 2007). First, the original English versions were translated into Chinese by a bilingual translator from Second Xiangya Hospital. Afterwards, the Chinese version was back-translated into English by another bilingual translator. When inconsistencies emerged in the back-translation, translators worked cooperatively to make appropriate corrections to the final Chinese versions. No items were removed or significantly altered during translation. Finally, all measures have been used in prior psychological investigations in China (Auerbach, Abela, Zhu, & Yao, 2007; Yang, Soong, Kuo, Chang, & Chen, 2004; Yao et al., 2008).

Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item measure designed to assess depressive symptoms in the general population.

Each item consists of a symptom. Participants indicate on a scale of 0 (rarely) to 3 (most of the time) how often they experienced each symptom in the past week. Total scores range from 0-60, with higher scores indicating higher levels of depressive symptoms. Example items from the CES-D are "I felt sad" and "I was bothered by things that don't usually bother me". The Chinese version of the CES-D exhibits a high degree of reliability and validity (Yang et al., 2004). In the current study, the Cronbach alphas at each time point ranged between 0.91 and 0.95, demonstrating a high level of internal reliability.

The Multidimensional Anxiety Scale for Children-Social Anxiety Subscale (MASC-SA; March, 1997). The MASC is a 39-item scale that assesses a broad range of anxious symptoms. Participants rate on a four-point Likert scale ranging from 0 (never applies to me) to 3 (often applies to me) how much a statement applies to them. For the present study, only the social anxiety subscale was included (MASC-SA; 9 items). An example item from this subscale includes "I'm afraid other people will make fun of me". Possible scores range between 0 and 27 on this subscale. Past research demonstrated high levels of reliability and validity with the Chinese version of the social anxiety subscale of the MASC (Yao et al., 2007). For the present study cronbach alphas for baseline and follow-up assessments ranged between 0.82 and 0.91.

Adolescent Life Event Questionnaire (ALEQ; Hankin & Abramson, 2002). The ALEQ is a 57-item measure which was designed to assess a broad range of negative events which may occur in an adolescent's life. Examples of such stressors include school/achievement problems, friendship and romantic difficulties, and family problems. Participants were asked to indicate on a Likert scale ranging from A (Never) to E (Always) whether these events had occurred to them over the past 3 months. Example items from the ALEQ are "I got a bad report card" and "I had an argument with a close friend". Past research has found the ALEQ to be a

reliable and valid measure when used with Western (Hankin, 2008; Skitch & Abela, 2008) and Chinese adolescents (Auerbach et al., 2007; Yao et al., 2008). In order to test the specific-stress vulnerability hypothesis (Blatt & Zuroff, 1992) the measure was split into achievement and interpersonal subscales (Hankin, Stone, & Wright, 2010). In total, there were 39 interpersonal items and 9 achievement items.

Five Factor Inventory-Neuroticism Subscale (FFI-N; Costa & McCrae, 1992). The FFI-N is a self report measure that assesses neuroticism by rating each of the 12 items on a scale of 0-4. Total scores on this subscale range from 0 to 48 with higher scores reflecting higher levels of neuroticism. An example item from this scale is "I often feel helpless and want others to solve my problems". The present study found moderate internal reliability for the measure (α = .62). Past research supports that the FFI-N is reliable across different cultural samples and item pools (Costa & McCrae, 1992), including mainland China (Auerbach et al., 2007).

Depressive Experiences Questionnaire for Adolescents (DEQ-A; Fichman et al., 1994). The DEQ-A is a 20-item self-report questionnaire that taps into a broad array of beliefs about the self and others. The measure consists of selected items from the original 66-item DEQ measure (Blatt, D'Afflitti, & Quinlan, 1976) and is worded for adolescents. The measure consists of both dependency and self-criticism subscales. An item from the dependency subscale is, "Often I feel I have disappointed others". Meanwhile, an example item from the self-criticism subscale is "I set goals at a very high level". Each item is rated on a Likert scale from 1 (*strongly disagree)* to 7 *(strongly agree)*. Total scores on the measure range from 20 to 140, with higher scores representing higher levels of the personality predisposition. Past research has demonstrated that the DEQ-A has strong reliability and validity (Fichman et al., 1994). Although the shortened adolescent version has not previously been used in a Chinese sample, the full

version has demonstrated similar reliability and validity to Western samples for the self-criticism and dependency subscales (Yao et al., 2008). The present study found moderate internal consistency for the self-criticism ($\alpha = 0.66$) and dependency subscales ($\alpha = 0.63$). These coefficient alphas are similar to what other studies have found among Western adolescent populations (Adams et al., 2009; Fichman et al., 1994).

Results

Descriptive Statistics

Preliminary analyses showed that the CES-D, MASC-SA, and ALEQ scores exhibited significant positive skew. These variables were transformed (e.g., the inverse was taken of the CES-D and ALEQ, and the square root was taken for the MASC-SA) prior to further analysis to satisfy assumptions of normality. Next, it was examined if data were missing at random to justify the use of data imputation methods for estimating missing values (Schafer & Graham, 2002). For the present study, 73.8% participants were present at Time 1 and all five follow-ups, while less than 10% (9.2%) of the sample missed more than one follow-up. Little's missing completely at random (MCAR) test, for which the null hypothesis is that the data are MCAR (Little & Rubin, 1987) was not significant, $\chi(15,239) = 956.07$, $p = ns$). Given these results, maximum likelihood estimates of missing data were created and used in all subsequent analyses (see Schafer & Graham, 2002 for further explanation).

All descriptive statistics were computed prior to data transformation and imputation. Means and standard deviations for all Time 1 measures are presented in Table 1, while intercorrelations between these measures are reported in Table 2. Additionally, means and standard deviations for the CES-D, MASC-SA, and ALEQ from the five follow-up assessments are presented in Table 3. Preliminary regression analyses found that girls experience more depressive symptoms ($t(1148) = -2.89$, $p < .01$) and social anxiety symptoms ($t(1148) = -7.10$, $p < .01$) compared to boys. Meanwhile, preliminary regression analyses showed that urban children experienced more depressive symptoms ($t(1148) = -3.45$, $p < .01$) and social anxiety

symptoms (t(1148) = 6.20, $p < .01$). Therefore, both participant's sex and site were entered as covariates for all analyses.

Description of Data-Analysis

To test our hypotheses concerning personality predispositions, negative events, and symptoms of depression and social anxiety we used multilevel modeling. Specifically, we used SAS (version 9.1) MIXED procedure and maximum likelihood with within-subject elevations in depressive symptoms (Depression; scores on the CES-D) and social anxiety symptoms (Social Anxiety; scores on the MASC-SA) during the follow-up interval representing the dependent variable, and Dependency (scores on the DEQ-DEP), Self-Criticism (scores on the DEQ-SC), and increases in negative events (scores on the ALEQ) during the follow-up interval as the predictor variables. For the general stress vulnerability hypotheses, the negative event variable was comprised of all items on the ALEQ (General NE). However, with regard to the stress specificity vulnerability hypotheses, the negative event construct was represented by two variables: interpersonal negative events (Interpersonal NE) and achievement negative events (Achievement NE). For the hypotheses related to mediation, separate models were built and tested to examine whether increases in General NE, Interpersonal NE, or Achievement NE mediated the relations between Self-Criticism/Dependency and Depression/Anxiety. As Dependency and Self-Criticism were between-subject predictors, these scores were standardized prior to analyses. However, because NE is a within-subject predictor, these scores were centered at each participant's mean before analyses. Therefore, NE reflects increases or decreases in one's own average level of negative events. In addition, for all analyses we included Neuroticism (scores on the FFIN) to examine whether findings were unique to Self-criticism and/or Dependency. Furthermore, based on findings from past research concerning the comorbidity of

social anxiety and depressive symptoms (Angold, Costello, & Erkanli, 1999), for all analyses Social Anxiety was controlled for when using Depression as an outcome, and Depression was controlled for when using Social Anxiety as an outcome.

Consistent with a model for analysis proposed by Molenberghs and Verbeke (2005), all analyses included a random effect for intercept to account for individual variability in the average level of stress, and a random effect for slope to account for individual variability in the amount of symptoms one experiences in the presence of negative events. In addition, to provide a more stringent test of the present study's hypotheses, all analyses were run in a time-lagged data-analytic design. Specifically, a time-lagged data-analytic design examined if psychological symptoms at time *n* were predicted by negative events at time *n-1*. In addition, because of the large sample used for the present study, only findings with a *p* value less than .01 were considered significant and effect sizes using the *r* statistic (see Rosnow, Rosenthal, & Rubin, 2000 for explanation of statistic; see Rice & Harris, 2005 for comparisons to other effect size statistics) were calculated for all results. This approach was utilized to help highlight the potential clinical significance of our findings.

Finally, prior to testing the hypotheses related to moderation and mediation, it was examined whether the interaction between Self-Criticism and Dependency explained symptom outcomes above and beyond either of the predispositions on their own. However, results for these analyses were all non-significant, and therefore, these interactions were not included in the moderation and mediation models.

Moderation Analyses

For the general and specific stress hypotheses, two-way interactions were included in the model described above. Expressly, for the general stress hypothesis two-way interaction terms (Self-Criticism × General NE and Dependency × General NE) were added to examine the relation between the personality predispositions and negative events. Similarly, for the specific stress hypothesis, the following interaction terms were added to the model: Self-Criticism × Achievement NE, Dependency × Interpersonal NE.

With regard to depressive symptoms, findings for the general-stress hypothesis and the specific-stress hypothesis can be found in Table 4. Results demonstrated that neither the general-stress or specific-stress hypothesis predicted prospective elevations of depressive symptoms. However, significant findings were found for Self-Criticism as a main effect, but not Dependency. Next, models concerning Social Anxiety were tested. Findings regarding the general and specific stress hypothesis for Social Anxiety can be found in Table 5. Similar to Depression, no significant findings regarding the general stress hypothesis or the specific stress hypothesis were found for Social Anxiety. However, a main effect for Dependency predicting Social Anxiety was found.

Mediation Analyses

All mediation analyses were conducted following Bauer, Preacher, and Gil's (2006) recommendations concerning lower level mediation (i.e., where the mediator is a within-subject predictor), and tested both specific forms of negative events (Interpersonal NE, Achievement NE) and total negative events (General NE) as mediators. In addition, all analyses once again

included Neuroticism and Social Anxiety for Depression outcomes and Depression and

Neuroticism when examining Social Anxiety as outcomes.

With regard to depressive symptoms, it was first tested (Step 1) if Self-criticism and

Dependency predicted Depression. Findings supported that Self-Criticism significantly predicted

Depression (F(1146) = 11.16, p < .001; $r_{effect\ size}$ = .10) while Dependency did not (F(1146) =

4.14, ns; $r_{effect\ size}$ = .06). Because only Self-Criticism emerged as a significant predictor, only a

mediation model for Self-Criticism was tested. However, in line with past recommendations

(Coyne & Whiffen, 1995), Dependency was included in all analyses. Next (Step 2), it was

examined if Self-Criticism predicted General NE. Findings demonstrated that Self-Criticism did

not predict General NE (F(1146) = 0.16, ns; $r_{effect\ size}$ = .00). With regard to specific forms of

negative events, it was found that Self-Criticism predicted Achievement NE (F(1145) = 12.84, p

< .001; $r_{effect\ size}$ = .11) and not Interpersonal NE (F(1146) = 1.80, ns; $r_{effect\ size}$ = .04). Finally (Step

3), it was tested whether Self-Criticism remained a significant predictor of Depression when

Achievement NE was included in the model. Findings from this analysis demonstrated that both

Achievement NE (F(1146) = 57.88, p < .001; $r_{effect\ size}$ = .22) and Self-Criticism (F(1146) = 9.94,

p < .001; $r_{effect\ size}$ = .09) remained significant in the model. Because both predictors were

significant, a Sobel's test was performed to see if Achievement NE was a partial mediator for the

relation between Self-Criticism and Depression. Findings from this analysis found the test to be

significant (Z = 2.81, p < .01), suggesting Achievement NE partially mediated this relation.

Similar steps were taken with regard to social anxiety symptoms as was described above

with depressive symptoms. For Step 1, Dependency predicted Social Anxiety (F(1146) = 18.93,

p < .001; $r_{effect\ size}$ = .13), while Self-Criticism did not (F(1146) = 1.56, p = ns; $r_{effect\ size}$ = .04.

Next, it was tested whether Dependency predicted NE (Step 2). For this step we found that

Dependency did not predict General NE ($F(1146) = 3.51$, $p = ns$; $r_{effect\ size} = .06$) or Achievement NE ($F(1146) = 2.42$, $p = ns$; $r_{effect\ size} = 0.05$), but did predict Interpersonal NE ($F(1146) = 13.35$, $p < .001$; $r_{effect\ size} = .11$). Finally for Step 3, it was tested whether Interpersonal NE mediated the relation between Dependency and Social Anxiety. For Social Anxiety both Dependency ($F(1146) = 18.07$, $p < .001$; $r_{effect\ size} = .12$) and Interpersonal NE ($F(4598) = 57.18$, $p < .001$; $r_{effect\ size} = .11$)) remained significant. Once again Sobel's tests were run following Step 3. Results demonstrated that the relation between Dependency and Social Anxiety was partially mediated by Interpersonal NE ($Z = 3.71$, $p < .01$).

Discussion

The present study found that self-criticism and dependency each play an important role in understanding vulnerability to internalizing symptoms in Chinese adolescents. High levels of each personality predisposition specifically predicted prospective increases of internalizing symptoms and did so through the mediating role of generation of specific stressors. In particular, self-criticism predicted depressive, but not social anxiety, symptoms and this association was partly mediated through increases in achievement stressors. Furthermore, dependency predicted social anxiety, but not depressive, symptoms, and this relation was partially mediated by interpersonal stressors. These findings are believed to be the first to identify the role negative events play in the relation between the personality predispositions and different forms of commonly occurring internalizing symptoms in mainland China, and the first to examine the prospective effects of the personality predispositions with regard to social anxiety during adolescence. Taken together, these findings demonstrate specificity in the form of a stress generation mediation model with regard to the personality predispositions and internalizing symptoms and highlight the pathways which lead from the vulnerabilities to anxiety and depressive symptoms in Chinese adolescents. We discuss each of these findings as well as implications for cross-cultural developmental psychopathology research and translational work.

It is well-documented that negative events play an important role in the development of internalizing disorders (see Chorpita & Barlow, 1998 for anxiety; see Hammen, 2005 for depression), but the specific mechanisms of this effect have remained unclear. Clear conceptual models in the literature include the moderation (diathesis-stress) and mediation (stress-generation) models. Findings from this study focusing on personality predispositions found support only for the mediation model, whereas there was no evidence for the moderation model.

This is comparable to other research which found strong support for a mediation model when both models were tested simultaneously (Eberhart et al., 2011). In addition, and of importance, we found that Chinese adolescents exhibiting high levels of self-criticism specifically generated achievement related stressors, whereas youth with elevated dependency specifically generated interpersonal related stressors. To our knowledge, these are novel findings demonstrating domain specific match in stress generation and personality predispositions. Consistent with this domain congruent vulnerability and stress generation match hypothesis, other research has shown that particular individual differences in youth predict increases in specific types of negative events. For example, Hankin and colleagues (2010) showed that youth who tend to coruminate specifically generated interpersonal dependent events, and in turn, these stressors predicted prospective elevations of depressive symptoms.

With regard to self-criticism, the present study is consistent with previous research in mainland China (Yao et al., 2008) and Western adolescent samples (Abela et al., 2006; Adams et al., 2009; Shahar et al., 2004) by finding that self-criticism predicted prospective depressive symptoms. Also consistent with Western studies (Abela et al., 2006; Shahar et al., 2004), the present study found no relation between dependency and prospective depressive symptoms. This lends support to the theory that dependency may only represent a vulnerability to depression for individuals with at-risk social support systems (i.e., depressed mothers; Adams et al., 2009). Overall, the consistency between these findings adds to the growing body of research which demonstrates similar vulnerabilities for depression between American and Chinese adolescent populations (Abela et al., in press; Auerbach et al., 2007; Hong et al., 2010; Starrs et al., 2010).

Although the present study demonstrated similar findings concerning self-criticism and depression, the reason self-criticism leads to depressive symptoms may be culturally distinct.

Past findings concerning self-criticism and depression postulated that the interaction between self-criticism and achievement negative events produced strained interpersonal relations which contribute to the development and maintenance of mood disturbances (Aub'e & Whiffen, 1996; Fichman et al., 1994; Shahar & Priel, 2003; Shahar et al., 2004). For instance, a self-critical child may feel especially irritated after a bad grade, and may be more vigilant in responding to his or her parents about the grade. Within this example, we would (1) find a significant interaction between achievement negative events and self-criticism, and (2) that interpersonal negative events mediate the relation between the interaction and symptoms. However, in mainland China, we found neither of these statistical tests to be significant. Instead, we found that achievement stressors mediated the relation between self-criticism and prospective depressive symptoms. One possible reason for the different findings is that the present study only assessed depressive symptoms over 6 months. With longer follow-up intervals, a similar path from self-criticism to depressive symptoms may play out. However, another possible reason is that self-critical adolescents in China may be less likely to engage in conflict with parents following a poor grade. In cultural groups from traditionally collectivist countries there is a greater emphasis on maintaining harmony within relationships, compared to Western cultural groups (Markus & Lin, 1999). As a result, past research has found conflict between parents and adolescents to be more muted and ephemeral in Asian cultural groups (Rothbaum, Pott, Azuma, Miyake, & Weisz, 2000), even when discussing academic stressors (Yau and Smetana, 2003). Therefore, academic stressors may be less likely to spill-over to family conflict in mainland China compared to Western cultural groups. Instead, in mainland China, academic stressors increase for self-critical individuals, eventually leading to depressive symptoms.

In addition to results concerning depressive symptoms, the present study was the first to demonstrate significant findings concerning the personality predispositions and prospective social anxiety symptoms. The finding that dependency predicted social anxiety symptoms is consistent with past postulations by Mongrain and Zuroff (1994) and with research that demonstrated that cognitive correlates of dependency play an important role in the development of social anxiety (Bornstein, 1995; Darcey, Davila, & Beck, 2005; Overholser, 1997) in Western samples. Findings that dependency predicted social anxiety symptoms in mainland Chinese adolescents are important, as few prospective studies have examined the relationship between different personality types and anxiety in non-Western samples (Matsudaira & Kitamura, 2006).

Although findings between dependency and social anxiety are consistent with previous findings in Western samples, our finding that self-criticism did not relate to prospective social anxiety symptoms was contrary to past findings in Western samples concerning the personality predisposition (Cox et al., 2004; Cox et al., 2000; Cox et al., 2002). The reason for these discrepant findings may be related to methodological differences between the studies as the present study was the first to utilize a multi-wave, longitudinal approach to examine the relation between self-criticism and social anxiety symptoms. However, these findings may also highlight unique developmental pathways which exist for anxiety between Western and non-Western communities. Specifically, in Western cultural groups the ability to influence one's environment and achievement are vital to a positive self-view (Markus & Kitayama, 2004; Markus, Uchida, Omoregie, Townsend, & Kitayama, 2006). As a result, individuals may feel anxious in a social setting because they may feel that they will be exposed as a failure (Clark & Wells, 1995). Extensive research has supported this view in Western cultural groups by showing that in addition to self-criticism (Cox et al., 2004) achievement related stressors are associated with the

maintenance of social phobia among clinically diagnosed patients in North America (Dozois & Frewen, 2006).

On the other hand, in non-Western samples past research postulated that social anxiety may exist in more of an interpersonal context. Past research found that social anxiety is more associated with interpersonal cognitions in mainland China (Kirmayer, 1991; Nakamura et al., 2002), and suggested that *Taijin Kyofusho* may represent a specific form of the disorder. The present research was consistent with the theoretical tenants of *Taijin Kyofusho,* and with prior research involving Asian cultural groups which demonstrated that social anxiety was associated with interpersonal, but not achievement, related factors (Hong & Woody, 2007). Taken together, differences between cultures in the developmental context of social anxiety may explain why dependency predicted social anxiety symptoms in the present study, while self-criticism was found to predict social anxiety in Western cultural groups (Cox et al., 2004; Cox et al., 2000; Cox et al., 2002). Future research should continue to examine whether achievement related vulnerabilities, such as self-criticism, which have found to predict both depressive and social anxiety symptoms in Western cultural groups (Cox et al., 2004; Shahar et al., 2004), are only associated with depressive symptoms in mainland China. This may lead to findings which suggest that Western and non-Western cultural groups share vulnerabilities for depression, but that vulnerabilities for social anxiety may be more culture-specific.

The present study has many strengths. First, we were able to address many of the criticisms (e.g., Coyne & Whiffen, 1995) of the existing personality predisposition literature. Second, the present study utilized a multi-wave, longitudinal design with a community sample, which is an optimal approach to studying developmental psychopathology (Willett, Singer, & Martin, 1998). Third, the present study used a sample from mainland China. Despite being one

of the largest populations in the world, relatively less research on these populations has been reported compared to smaller Chinese populations such as Taiwan or Hong Kong (Chen & Davey, 2008). This is important as past research identified important psychosocial differences between mainland China and these Chinese territories (Berndt, Cheung, Lau, Hau, & Lew, 1993).

However, despite these strengths, the present study has limitations. First, self-report measures were used to assess symptoms of depression and social anxiety. Although both the MASC and CDI possess high levels of reliability and validity, clinical implications when using self-reported measures must be tempered (Ingram & Siegle, 2002). Second, self-report measures were used to assess negative events. Past research suggested that a contextual interview is needed to understand the impact and quality of these events, (Hammen, 2005). However, finding significance for a-priori, specific stress hypotheses adds to an emerging body of literature which suggests that self-report measures may be a useful and valid tool in psychological research (Haeffel & Howard, 2010). Third, the present study only took place over a 6-month span. Therefore, the long-term impact of these personality predispositions still needs to be examined. Fourth, the present study utilized a theory of personality developed within a Western theoretical context. Although it is believed to be appropriate because it includes a measure related to interdependence, future research should examine how Blatt and Zuroff's (1992) model of personality predispositions relate to emic theories of personality developed in mainland China. Finally, a community sample was used in the present sample. Although this approach carries many advantages for researching developmental psychopathology (Willett et al., 1998), it limits our ability to make clinical inferences based on the study's findings. This is especially important with regard to the present study, as past research suggests that increased levels of internalizing

symptoms, especially anxiety, may not be as distressing in China compared to Western cultures (Hong & Woody, 2007; see Hsu & Alden, 2007 for an argument against this point). In addition, although we found statistical significance for our findings, the effect sizes for self-criticism and dependency were within the small range. However, it should be noted that small effect sizes are expected when conducting non-experimental field research (McClelland & Judd, 1993).

In sum, the present study sheds light on important risk factors related to the development of depression and social anxiety in mainland China, and the role negative events play in this relation. As rates of internalizing disorders in younger populations escalate in this part of the world (Lee, Wong, Chow, & McBride-Chang, 2006) a greater focus on developmental factors which are contributing to this increase in psychopathology is needed. With this knowledge, targeted prevention programs, which have been found to be more effective than universal programs (Garber, 2006; Stice, Shaw, Bohon, Marti, & Rohde, 2009), can begin to be developed specifically for mainland Chinese youth. To date, few of these prevention programs exist for Chinese adolescents (Bush, 2003; Bush et al., 2002; see Yu & Seligman, 2002 as an example of such a program). Findings from the present study suggest that self-criticism and dependency may be important risk factors to examine in the development of these programs and for targeting at-risk youth. By continuing to examine the impact of these vulnerabilities on depression and social anxiety, effective prevention programs can be created and the increase in incidents of psychopathology among Chinese adolescents (Dennis, 2004; Lee et al., 2006; Lee et al., 2009) can be systematically addressed.

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Tables

Table 1

Means and Standard Deviations for Baseline Measures

Measures	Mean	SD	N
CES-D	32.82	8.88	1133
MASC-SA	14.40	5.29	1142
Self-Criticism	38.95	6.56	1142
Dependency	44.73	8.33	1142
Neuroticism	33.95	7.64	1125
General NE	117.13	25.40	1134
Interpersonal NE	74.25	17.12	1134
Achievement NE	23.04	5.56	1134

Note: CES-D = Time 1 scores on the Center for Epidemiological Studies Depression Scale; MASC-SA = Time 1 scores on the MASC, social anxiety subscale; Self-Criticism = Time 1 scores on the Depression Experiences Questionnaire, self-criticism subscale; Dependency = Time 1 scores on the Depression Experiences Questionnaire, dependency subscale; Neuroticism = Time 1 scores on the Five Factor Inventory, neuroticism subscale; General NE = Time 1 scores on the Adolescent Life Events Questionnaire (ALEQ), total score; Interpersonal NE = Time 1 scores on the ALEQ, interpersonal subscale; Achievement NE = Time 1 scores on the ALEQ, achievement subscale.

Table 2

Intercorrelations between Baseline Measures

	1	2	3	4	5	6	7	8	9	10
1) CES-D	-									
2) MASC-SA	.55**	-								
3) Self-Criticism	.39**	.34**	-							
4) Dependency	.37**	.40**	.42**	-						
5) Neuroticism	.61**	.54**	.37**	.39**	-					
6) General NE	.43**	.35**	.28**	.28**	.48**	-				
7) Interpersonal NE	.39**	.33**	.23**	.26**	.44**	.96**	-			
8) Achievement NE	.41**	.32**	.26**	.24**	.43**	.74**	.57**	-		
9) Site	-.08**	.00	.01	-.07**	.04	.03	.03	-.08**	-	
10) Sex	.06*	.15**	.00	.02	.18**	.13**	.13**	.02	.08**	-

Note: CES-D = Time 1 scores on the Center for Epidemiological Studies Depression Scale; MASC-SA = Time 1 scores on the MASC, social anxiety subscale; Self-Criticism = Time 1 scores on the Depression Experiences Questionnaire, self-criticism subscale; Dependency = Time 1 scores on the Depression Experiences Questionnaire, dependency subscale; Neuroticism = Time 1 scores on the Five Factor Inventory, neuroticism subscale; General NE = Time 1 scores on the Adolescent Life Events Questionnaire (ALEQ), total score; Interpersonal NE = Time 1 scores on the ALEQ, interpersonal subscale; Achievement NE = Time 1 scores on the ALEQ, achievement subscale; Site = Participant's Location (0 = Urban, 1 = Rural); Sex = Participant's Sex (Boy = 0, Girl = 1).

Table 3

Means and Standard Deviations for All Follow-Up Measures

Measures		Mean	SD	N
CES-D	FU 1	12.83	9.59	1132
	FU2	12.45	9.77	1097
	FU3	12.13	10.12	1043
	FU4	11.81	9.56	1059
	FU5	12.24	10.47	1031
MASC-SA	FU1	12.48	5.91	1142
	FU2	11.73	6.11	1100
	FU3	11.00	6.44	1045
	FU4	11.30	6.43	1064
	FU5	10.68	6.67	1036
Gen NE	FU1	100.19	25.26	1101
	FU2	95.71	26.27	1096
	FU3	92.47	26.43	1043
	FU4	91.15	25.41	1059
	FU5	90.15	25.87	1034
Int NE	FU1	62.32	16.16	1101
	FU2	59.58	16.71	1096
	FU3	57.46	16.05	1043
	FU4	57.03	15.85	1058
	FU5	56.59	16.14	1034
Ach NE	FU1	21.64	6.53	1101
	FU2	20.77	6.88	1093
	FU3	20.03	7.36	1042
	FU4	19.34	6.92	1059
	FU5	19.22	7.26	1033

Note: CES-D = Follow-up scores on the CESD; MASC-SA = Follow-up scores on the MASC, social anxiety subscale; Gen NE = Follow-up scores on the ALEQ, total score; Int NE = Follow-up scores on the ALEQ, interpersonal subscale; Ach NE = Follow-up scores on the ALEQ, achievement subscale.

Table 4

Results of General and Specific Vulnerability-Stress Hypotheses for Depression

General Vulnerability-Stress Hypothesis					
	B	SE	F	*Df*	r$_{Effect Size}$
Site	-0.05	0.03	2.88	1146	0.05
Sex	-0.09	0.03	7.62*	1146	0.08
Social Anxiety	0.38	0.01	839.97**	4596	0.39††
Neuroticism	0.03	0.00	182.13**	1146	0.37††
General NE	-0.03	0.11	0.07	4596	0.00
Self-Criticism	0.01	0.00	10.94**	1146	0.10†
Dependency	0.00	0.00	3.97	1146	0.06
Self-Criticism X NE (Gen)	0.00	0.00	0.13	4596	0.01
Dependency X NE (Gen)	0.00	0.00	0.22	4596	0.01
Specific Vulnerability-Stress Hypothesis					
	B	SE	F	*Df*	r$_{Effect Size}$
Site	-0.05	0.03	2.03	1146	0.05
Sex	0.05	0.03	6.51*	1146	0.08
Social Anxiety	0.35	0.01	689.85**	4594	0.36††
Neuroticism	0.03	0.00	172.03**	1145	0.36††
Interpersonal NE	-0.02	0.08	0.11	4594	0.01
Achievement NE	-0.02	0.06	0.21	4594	0.01
Self-Criticism	0.01	0.00	9.14*	1145	0.09
Dependency	0.00	0.00	4.00	1145	0.06
Self-Criticism × Achievement NE	0.00	0.00	1.78	4594	0.02
Dependency × Interpersonal NE	0.00	0.00	2.04	4594	0.02

Note: Site = Participant's Location (0 = Urban, 1 = Rural); Sex = Participant's Sex (Boy = 0, Girl = 1); Social Anxiety = Follow-up interval scores on the Multidimensional Anxiety Scale for Children (MASC), social anxiety subscale. Neuroticism = Time 1 scores on the Five Factor Inventory, neuroticism subscale; General NE = Follow-up interval scores on the Adolescent Life Events Questionnaire (ALEQ), total score; Interpersonal NE = Follow-up interval scores on the ALEQ, interpersonal subscale; Achievement NE = Follow-up interval scores on the ALEQ, achievement subscale. Self-Criticism = Time 1 scores on the Depression Experiences Questionnaire, self-criticism subscale; Dependency = Time 1 scores on the Depression Experiences Questionnaire, dependency subscale. * = $p < .01$; ** = $p < .001$ † = small effect size; †† = medium effect size.

Table 5

Results of General Stress and Specific Stress Hypotheses for Social Anxiety

General Stress Hypothesis					
	B	SE	F	*Df*	r$_{Effect Size}$
Site	-0.32	0.04	55.83**	1146	0.22†
Sex	-0.29	0.04	47.33**	1146	0.20†
Depression	0.34	0.01	695.91**	4596	0.36††
Neuroticism	0.03	0.00	106.09**	1146	0.29†
NE (Gen)	0.28	0.19	2.18	4596	0.02
Self-Criticism	0.00	0.00	1.60	1146	0.04
Dependency	0.01	0.00	18.44**	1146	0.13†
Self-Criticism X NE (Gen)	-0.01	0.00	1.39	4596	0.02
Dependency X NE (Gen)	0.00	0.00	1.65	4596	0.02
Specific Stress Hypothesis					
	B	SE	F	*Df*	r$_{Effect Size}$
Site	-0.30	0.04	49.61**	1146	0.20†
Sex	-0.31	0.04	50.97**	1146	0.21†
Depression	0.31	0.01	592.21**	4596	0.34††
Neuroticism	0.03	0.00	85.74**	1146	0.26†
NE (Int)	0.24	0.09	6.66**	4596	0.04
NE (Ach)	0.32	0.08	15.64**	4596	0.06
Self-Criticism	0.00	0.00	1.11	1146	0.03
Dependency	0.01	0.00	20.10**	1146	0.13†
Self-Criticism × NE (Ach)	0.00	0.00	5.66	4596	0.04
Dependency × NE (Int)	0.00	0.00	1.25	4596	0.02

Note: Site = Participant's Location (0 = Urban, 1 = Rural); Sex = Participant's Sex (Girl = 0, Boy = 1); Depression = Follow-up interval scores on the Center for Epidemiological Studies Depression Scale. Neuroticism = Time 1 scores on the Five Factor Inventory, neuroticism subscale; General NE = Follow-up interval scores on the Adolescent Life Events Questionnaire (ALEQ), total score; Interpersonal NE = Follow-up interval scores on the ALEQ, interpersonal subscale; Achievement NE = Follow-up interval scores on the ALEQ, achievement subscale. Self-Criticism = Time 1 scores on the Depression Experiences Questionnaire, self-criticism subscale; Dependency = Time 1 scores on the Depression Experiences Questionnaire, dependency subscale. *$p < .01$; ** = $p < .001$; † = small effect size; †† = medium effect size.