Personality Foreshadows the Structure of Internalizing Disorders in Middle Childhood

by

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The current investigation compared the fit of three models of internalizing in middle childhood: (1) a unitary factor model, (2) a two-factor model corresponding to the DSM-IV Anxiety/Depression distinction, and (3) a two-factor model corresponding to the Fear/Distress distinction observed in structural studies of adult psychopathology (Krueger, 1999; Slade & Watson, 2006). Mothers of 344 children (50.6% female, mean age = 9.97, SD = .82) reported on childhood internalizing symptoms and personality traits. Confirmatory factor analyses revealed acceptable fit indices for all three models. The unitary factor model provided the most parsimonious fit to the data. Although the structural analyses suggested that internalizing subfactors were not differentiated in middle childhood, hierarchical regression analyses revealed that personality dimensions uniquely predicted fear and distress disorders. These results suggest that personality foreshadows later psychopathology structure before it is manifest at the symptom level.
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Chapter 1
Introduction

As conceptualizations of psychopathology shift toward empirically-derived structural models, it becomes increasingly important to understand the stability of this organization, potential changes through development, and the etiological factors underlying these disorders. The replication of comparable psychopathology structures in youth (Higa-McMillan, Smith, Chorpita & Hayashi, 2008; Lahey et al., 2004) and adulthood (Krueger, 1999; Slade & Watson, 2006) has lent support for the hierarchical organization of psychopathology across development. Structural studies of psychopathology in youth, however, have typically focused broadly on large samples spanning early childhood through late adolescence, and have disregarded important age-related differences in internalizing problems suggested by parallel lines of research (e.g., Cole, Truglio & Peeke, 1997). Accordingly, it is not yet clear whether the structure of internalizing disorders remains uniform across various stages of development.

The examination of personality traits may represent a potential strategy for elucidating the structure of psychopathology. Indeed, considerable evidence supports the etiological role of personality traits in developmental psychopathology (Nigg, 2006; Tackett, 2006). Given their potential to illuminate developmental processes and risk factors, personality traits have been increasingly used to contextualize and aid in the interpretation of psychopathology (Krueger & Tackett, 2006). For example, recommendations for the forthcoming DSM-5 include the assessment of higher-order and facet-level personality traits in the conceptualization of personality disorders (Clark & Krueger, 2010). The rationale for examining personality traits is to improve upon the shortcomings inherent in the current DSM-IV model of personality disorders, including criticism of excessive diagnostic comorbidity (Widiger & Trull, 2007). Problems of high comorbidity have also plagued DSM-IV mood and anxiety disorders (Brady & Kendall, 1992; Kessler et al., 2003), thus, personality dimensions may similarly aid in clarification of these symptoms. To-date, no investigations have directly studied the associations between personality traits and internalizing symptoms in middle childhood. The purpose of the
current study was to examine the associations of among internalizing problems and personality dimensions within a previously understudied population.

1.1 The structure of internalizing disorders

The predominant model of internalizing problems, as codified in the DSM-IV-TR, separates anxiety and depression into distinct classes of disorders. It has been suggested, however, that anxiety and depression may not be empirically distinguishable (e.g., Dobson, 1985). Research on preadolescent youths has failed to reveal support for discriminant constructs, suggesting instead that these symptoms may better reflect a unitary construct (Cole et al., 1997; Hodges, 1990; Ollendick & Yule, 1990). Interestingly, Cole and colleagues (1997) observed a distinction between depression and anxiety symptoms in a sample of sixth graders but not in third graders. One interpretation of these results is that internalizing subfactors may not be distinguished in younger children, but rather reflect a unified construct that differentiates with age. Although these findings indicate the possibility of important changes in the structure of internalizing problems from middle childhood through early adolescence, no studies have directly examined models of depression and anxiety within this critical developmental period.

High diagnostic comorbidity among DSM-IV-TR depression and anxiety disorders (e.g., Brady & Kendall, 1992; Kessler & Walters, 1998) has called the validity of the depression/anxiety distinction into question. The results from quantitative studies examining the underlying structure of psychopathology have suggested that internalizing disorders in adulthood may be better conceptualized as clusters of Fear and Distress (or Anxious-Misery) symptoms (Krueger, 1999; Slade & Watson, 2006; Watson, 2005). Specifically, the Fear factor represents a cluster of panic disorder, agoraphobia, specific phobia and social phobia symptoms, whereas the Distress factor represents a cluster of generalized anxiety disorder, major depression, dysthymic disorder and posttraumatic stress disorder symptoms.

Preliminary evidence for the Fear/Distress distinction of internalizing problems at early ages has come from several large samples of children and adolescents. A number of inconsistent findings and methodological shortcomings, however, limit the conclusions that can be drawn from these investigations. The earliest study investigating the structure of psychopathology in youth was
conducted by Lahey and colleagues (2004). This investigation examined the structure of multi-informant reports of the symptoms of youths aged 4 – 17 years within a large, representative sample. Symptoms of internalizing disorders were assessed using a comprehensive, structured interview. Symptom-level data were then subjected to exploratory factor analysis (EFA) using a principal factor analysis of the product-moment correlation matrix. Parallel analyses for youth and caregiver informants revealed a two-factor structure of internalizing, resembling the Fear/Distress model observed in adults. In this investigation, separation anxiety disorder (SAD) and fears loaded on a Fear dimension; symptoms of social anxiety, depression, and overanxious disorder, as well as somatic complaints (e.g., headaches and stomach aches) loaded on a Distress dimension. The results for social anxiety are in contrast to the findings from structural studies of psychopathology in adulthood, raising the possibility that the structure of internalizing problems may vary from youth to adulthood. This investigation provided important insight into the hierarchical structure of psychopathology in children and adolescents. The exploratory analyses and large age range used by Lahey et al. (2004) require additional studies utilizing more circumscribed confirmatory analyses to better understand the structure of internalizing symptoms at various stages of childhood.

Higa-MacMillan and colleagues (2008) subsequently examined the self-reported symptoms of SOC, GAD and MDD among clinic-referred youths aged 6 – 18 years old. As in the previous investigation, symptoms were assessed using a semi-structured interview. The authors found that a Fear-Distress model, wherein SOC symptoms loaded on a Fear dimension, and GAD and MDD symptoms loaded on a Distress dimension, provided superior fit to the two-factor DSM-IV-TR model and a unitary factor model. Overall, however, the authors observed optimal fit for a four-factor model consisting of (1) MDD symptoms, (2) SOC symptoms, (3) GAD-worry symptoms, and (4) GAD-somatic problems. The results of this investigation are limited in that the authors first conducted an exploratory factor analysis (EFA), followed by confirmatory factor analysis (CFA) on the same dataset, which may capitalize on sample-specific patterns of covariation (Mueller, 1997). Further, the authors used a limited set of internalizing symptoms, none of which represented the symptoms that clustered on Lahey and colleague’s (2004) Fear dimensions.
Additional studies have investigated the structure of internalizing problems in adolescence. For example, Prenoveau and colleagues (2010) found support for a Fear/Distress distinction of internalizing problems in high school juniors (mean age = 16.9 years, SD = 0.40). Tully, Zajac and Venning (2009) also examined the structure of internalizing in younger (age 12 – 14 years) and older (age 15 – 18 years) adolescents. Although Tully and colleagues did not test the Fear/Distress model of internalizing, they did observe superior fit for a tripartite model, consisting of factors related to Anxiety, Depression and general negative affect, over a unitary factor structure. Taken together, the aforementioned structural studies provide considerable support for the hypothesis that internalizing may be best conceptualized as a two-factor structure, typically corresponding to a Fear/Distress distinction. These studies, however, do not adequately address the possibility that internalizing in pre-adolescent youths may better correspond to a unitary factor structure, as suggested by Cole et al. (1997). Given the potential for important changes to the structure of internalizing problems between middle childhood and adolescence, it seems important to directly examine the structure of internalizing within this critical developmental period. To-date, no studies have exclusively examined the comparative fit of one- and two-factor models of internalizing within middle childhood. Further, previous studies have always relied on a single measure of internalizing problems. Accordingly, multi-method research is needed to further explore the structure of internalizing problems within the specific developmental period of middle childhood.

1.2 Internalizing disorders and personality

A growing body of research has invoked the associations between personality traits and psychopathology to help explain the etiology, expression and course of mental illness (Nigg, 2006; Shiner & Caspi, 2003; Tackett, 2006; Widiger, Verheul, & van den Brink, 1999). Given the stability of temperamental/personality traits across development (e.g., Durbin, Hayden, Klein & Olino, 2007; Graziano 2003; Kubzansky, Martin, & Buka, 2009; Roberts & DelVecchio, 2000), personality dimensions may offer important insight regarding internalizing symptoms throughout the lifespan. Indeed, several longitudinal studies have supported the capacity of temperament early in life for predicting later depression and anxiety (Côté et al., 2009; Dougherty, Klein, Durbin, Hayden & Olino, 2010; Gilliom & Shaw, 2004; Hayden, Klein &
Durbin, 2005; Schmitz et al., 1999). In addition, maternal depression is associated with temperamental traits relevant to internalizing problems as early as toddlerhood (Durbin, Klein, Hayden, Buckley & Moerk, 2005). Whether indicative of an early risk factor or an early manifestation of disorder, these findings suggest that childhood personality traits relevant for internalizing disorders may emerge earlier than the manifest symptoms themselves.

Although high Neuroticism/Negative Emotionality (N/NE) has been commonly associated with internalizing symptoms (Côté et al., 2009; Gilliom & Shaw, 2004; Dougherty et al., 2010; Hayden et al., 2005; Schmitz et al., 1999), other personality dimensions may be differentially related to specific disorders. In particular, low E/PE characterizes depressive disorders, but not anxious disorders (Anthony, Lonigan, Hooe & Phillips, 2002; Dougherty et al., 2010; Phillips, Lonigan, Driscoll & Hooe, 2002). This pattern of associations corresponds to Clark and Watson’s (1991) tripartite model, in which depressive and anxious disorders consist of: (1) a shared general distress factor (corresponding to N/NE); (2) a specific depression factor (corresponding to low E/PE); and (3) a specific anxiety factor (corresponding to high physiological arousal). Despite connections drawn between tripartite components and broad temperament-personality dimensions (Clark, Watson & Mineka, 1994), no studies of the tripartite model have directly assessed the associations between internalizing symptoms, N/NE and E/PE in middle childhood.

As previously noted, middle childhood may represent a critical time for the development and structure of internalizing disorders (e.g., Cole et al., 1997). In a related study of N/NE, E/PE and internalizing, Lonigan and colleagues (1999) observed important differences in the associations between personality traits and internalizing symptoms among youths in middle childhood and early adolescence. In this study, investigators observed structural invariance for a two-factor model of positive and negative affectivity (related to E/PE and N/NE, respectively) in younger ($M = 10.3$ years) and older ($M = 14.2$ years) youths. Surprisingly, personality and internalizing symptoms showed differential associations across the two age groups, wherein positive affectivity differentiated between depressive and anxious symptoms; this pattern of results was not observed in the younger sample. These findings are suggestive that personality structures, such as E/PE and N/NE, may already be in place before the differentiation of depressive and
anxious symptoms. Additional research directly examining the associations of broad personality dimensions and to the structure of internalizing symptoms in middle childhood is needed to shed light on this possibility.

1.3 The current investigation

The aims of the current investigation were twofold: (1) to elucidate the structure of internalizing disorders within the specific developmental period of middle childhood, and (2) to examine whether early personality dimensions reflect specific structural models. The comparative fit of three competing models were examined using CFA to determine whether internalizing in middle childhood is better conceptualized as a unitary construct or a two-factor construct (e.g., Anxiety/Depression or Fear/Distress). We then examined the capacity of five factor model (FFM) personality dimensions to support each model. The current investigation represents the first study to directly compare the fit of competing structural models of internalizing problems in middle childhood. A second novel contribution of this research is the assessment of personality dimensions to aid in the interpretation of this structure. Consistent with previous structural studies (Higa-MacMillan et al., 2008; Lahey et al., 2004; Watson, 2005), it was hypothesized that a two-factor Fears/Distress model would provide the best fit to the data on internalizing symptoms in middle childhood. It was further hypothesized that all internalizing factors would be positively associated with Neuroticism, whereas low Extraversion would distinguish Depression and Distress from Anxiety and Fears, as predicted by the tripartite model.
Chapter 2
Method

2.1 Participants

Participants were the mothers of 344 youths in middle childhood (mean age = 9.97, SD = .82). Participants were solicited using a community-based participant pool database maintained by the Department of Psychology at the University of Toronto and flyers posted throughout the community. Inclusion/exclusion criteria were fluency in English and an absence of neurodevelopmental disorders, psychotic disorders, and mental retardation in the child. Informed consent was obtained from adult caregivers and verbal assent was obtained from child participants. Youths were evenly split between males (n = 170) and females (n = 174). The sample was moderately diverse, with the majority (71.2%) of European descent.

2.2 Measures

2.2.1 Internalizing symptoms

*Child Behavior Checklist* (CBCL – 6-18; Achenbach, 2001). The CBCL is a 118-item parent report questionnaire measuring children’s behavioural and emotional problems. The presence of problems in the past six months are rated 0-2, ranging from “not true (as far as you know)” to “very true or often true.” Items from the CBCL are scored to generate a dimensional score for Internalizing Behaviors, as well as DSM-oriented syndrome scales, which have demonstrated good psychometric properties (Nakamura, Ebesutani, Bernstein & Chorpita, 2009). The current investigation examined the DSM-oriented scales measuring Affective Problems (CBCL AFF), Anxiety Problems (CBCL ANX), and Somatic Problems (CBCL SOM). The CBCL AFF scale encompasses symptoms specific to depressive disorders (e.g., enjoys little, cries, worthlessness, feels tired, sleeps less/more), whereas CBCL ANX encompasses symptoms that are unique to various DSM-IV-TR anxiety disorders (e.g., dependent, fearful, nervous, worries), and CBCL SOM encompasses physical complains (e.g., aches, headaches, nausea, vomiting). These scales were used to maintain maximal convergence with the other measure of psychopathology, described below.
Computerized Diagnostic Interview Schedule for Children (C-DISC; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The C-DISC is a highly structured interview that assesses symptoms of childhood and adolescent DSM-IV disorders. The parent version of the C-DISC was developed to evaluate children aged 9 – 17 years. Software for the C-DISC generates symptom count variables, which provide dimensional measures for specific DSM-IV disorders. All symptoms rated in the C-DISC are coded dichotomously (0=absent, 1= present). Symptom count scores generated by the C-DISC do not perfectly correspond to DSM-IV criteria counts, as they do not account for frequency, duration or impairment. In the current investigation, we utilized C-DISC assessment for symptoms of major depressive disorder (MDD), social phobia (SOC), and separation anxiety disorder (SAD). The rates of youths meeting diagnostic criteria for DSM-IV internalizing disorders are displayed in Table 1.

2.2.2 Personality traits

Inventory of Child Individual Differences (ICID; Halverson et al., 2003). The ICID is a 108-item questionnaire designed to assess the FFM of personality in children. Each item is rated based on a seven-point rating scale (1 = much less than the average youth to 7 = much more than the average youth). Ratings can be scored to generate five higher-order scales corresponding to FFM domains and 15 facet scales. The ICID was completed by the same two primary caregivers as the CBCL. The current investigation examined the FFM domain scores measuring Neuroticism, Extraversion, Openness-to-experience, Agreeableness, and Conscientiousness.

2.3 Procedure

Data for the present investigation were collected at the intake phase of an ongoing longitudinal study examining the role of personality traits in predicting behavioural outcomes. In this study, data on children’s psychopathological symptoms and personality were assessed using multiple methods of measurement (i.e., questionnaires and a structured interview) upon their initial assessment in the Personality Across Development Laboratory at the University of Toronto. Ethics approval for this investigation was obtained from the institutional review board. Packages including informed consent documentation, the ICID and CBCL were mailed to participating caregivers in advance to be completed and returned upon arrival at their in-lab testing session. At
the lab visit, participating mothers were administered the parent versions of the C-DISC to assess for the presence of children’s emotional and behavioural problems. Parents received $30 Canadian and children received 2 small gifts for completing the full 2 hour protocol. In total, 292 participating mothers (87.2%) attended the testing session and completed the C-DISC. For the remaining participating children, fathers completed the C-DISC. Fathers data were not used here because the number of fathers with parallel data on all measures to the large sample of mothers was too small to be considered separately. The ICID was completed by 327 mothers (95.1%). The CBCL was added to the study protocol after data collection had begun, and was completed by 279 mothers (81.1%). For the current analyses, missing data were imputed using the expectation-maximization (EM) algorithm in SPSS 17. Descriptive statistics for mother-reported internalizing problems and FFM personality traits are displayed in Table 2.
Chapter 3
Results

3.1 Evaluating models of childhood internalizing

Mother-reported scales from the CBCL and C-DISC were subjected to confirmatory factor analyses (CFA) in Mplus (Muthén & Muthén, 2007). All models used maximum likelihood parameter estimates with standard errors and a $\chi^2$ statistic that are robust to non-normality (MLR). The Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), the Comparative Fit Index (CFI; Bentler, 1990), and the Bayesian Information Criterion (BIC; Schwarz, 1978) were used to evaluate model fit. Following previous recommendations (Browne & Cudek, 1993; Henry & Crawford, 2005), good model fit is indicated by RMSEA $< .06$, CFI $< .90$, and lower BIC values when comparing models.

Fit indices for the three CFA models of internalizing problems are displayed in Table 3. In the first model, all indicators were loaded onto a single latent factor representing Internalizing Problems (see Figure 1). Standardized factor loadings ranged from .40 to .68 ($M=.58$, $SD=.10$). The results suggest that this model provides a good fit to the data (RMSEA = .06, CFI = .95, BIC = 8213.91).

The second model examined the combination of factor indicators based on the DSM-IV-TR categories of Anxiety (CBCL ANX, CBCL SOM, C-DISC SOC and C-DISC SAD) and Depression (CBCL AFF and C-DISC MDD; see Figure 2). The CBCL SOM scale was loaded on the Anxiety factor to model the assumption in the DSM-IV-TR that physical complaints (e.g., headaches, stomach aches, nausea and vomiting) reflect anxiety disorders (e.g., separation anxiety disorder, panic disorder). Unstandardized parameter estimates for CBCL AFF and C-DISC MDD were constrained to be equal to attain model convergence. Standardized factor loadings ranged from .38 to .77 ($M=.57$, $SD=.13$). Although the model fit was close to acceptable levels (RMSEA = .08, CFI = .91, BIC = 8225.17), the latent factor intercorrelation was .92 and the confidence interval was not significantly different from 1.0 (99% CI [.75, 1.09]), suggesting an inability to distinguish between the two factors.
The third model, corresponding to Lahey et al.’s (2004) model, assigned factor indicators to dimensions of Fear (CBCL ANX and C-DISC SAD) and Distress (CBCL AFF, CBCL SOM, C-DISC SOC and C-DISC MDD; see Figure 3). The CBCL SOM scale loaded on the Distress factor to maintain consistency with Lahey and colleagues’ (2004) original model. Unstandardized parameter estimates for CBCL ANX and C-DISC SAD were constrained to be equal to attain model convergence. Standardized factor loadings ranged from .39 to .69 (M=.58, SD=.10). This model demonstrated acceptable fit (RMSEA =.06, CFI =.95, BIC = 8210.90), but the latent factor intercorrelation was .89, and the confidence interval was not significantly different from 1.0 (99% CI [.68, 1.10]).

3.2 Personality predictors of internalizing factors

A series of hierarchical regressions were conducted to evaluate the relationships between personality dimensions and the structure of internalizing disorders. Regression analyses were conducted separately for each factor from each of the three models (i.e., 1: Internalizing Problems; 2: Anxiety and Depression; 3: Fear and Distress). Internalizing factors were computed by summing CBCL and C-DISC scores in accord with the hypothesized CFA models.

For all models, sex was controlled (Step 1) and followed by a block entry of the FFM domain scores (Step 2) in order to determine the amount of variance specifically contributed by the FFM domains. In both of the 2-factor models, the alternate subfactor was also entered alongside sex in Step 1 to control for shared variance and highlight unique relationships for each subfactor.

The results from the hierarchical regression analysis for the 1-factor model are displayed in Figure 4. These findings indicate that internalizing problems were significantly predicted by Neuroticism ($\beta = .79, p < .001$), and Agreeableness ($\beta = .51, p < .001$), over and above sex. The results for the regression analyses examining factors from the DSM-IV-TR model are displayed in Figure 5. These findings indicate that Neuroticism predicted both Anxiety ($\beta = .45, p < .001$) and Depression ($\beta = .27, p < .01$), whereas Agreeableness ($\beta = .41, p < .001$) uniquely predicted Anxiety. The results for regression analyses examining factors from the Fear/Distress model are displayed in Figure 6. These findings indicate that Neuroticism and Agreeableness predict both Fear ($\beta = .37, p < .001$ and $\beta = .25, p < .01$, respectively), and Distress ($\beta = .38, p < .001$ and $\beta =
.24, \( p < .01 \), respectively), whereas Fear was uniquely predicted by Conscientiousness (\( \beta = .21, p < .05 \)) and Distress was uniquely predicted by low Extraversion (\( \beta = -.19, p < .01 \)).
Chapter 4
Discussion

The current study is the first to compare competing structural models of internalizing symptoms in a sample of youths in middle childhood. A major strength of the current investigation was the use of a multimethod assessment procedure, including structured clinical interviews and parent-report questionnaires. The current results therefore provide novel insights into the structure of internalizing problems in a previously understudied, yet critical developmental period. In addition, the present investigation adds to a burgeoning body of research on personality-psychopathology relations in childhood.

4.1 The structure of internalizing in middle childhood

Contrary to our hypotheses, a one-factor model provided the best fit for mother-reported internalizing problems, supporting the previous hypothesis that internalizing in middle childhood is better conceptualized as a unitary construct (Cole et al., 1997; Lonigan et al., 1999). These findings are contrary to previous investigations examining structural models in childhood and adolescence (Higa-MacMillan et al., 2008; Lahey et al., 2004; Tully et al., 2009), which have primarily studied psychopathology in samples of broad developmental periods, ranging from childhood through adolescence. In the current study, the Fear/Distress model provided slightly better fit than the unitary factor model; the latent factor intercorrelation for the Fear/Distress, exceeded .85, however, suggesting poor discriminant validity among Fear and Distress symptom clusters (Kline, 2005). Accordingly, the increased complexity of the Fear/Distress model did not demonstrate incremental fit over a unitary factor model. The results therefore suggest that internalizing in middle childhood may be better conceptualized as a unitary construct (Cole et al., 1997; Lonigan et al., 1999). Although the Fear/Distress model provided a slightly better fit than the unitary factor model, the latent factor intercorrelation exceeded .85, suggesting poor discriminant validity among Fear and Distress symptom clusters (Kline, 2005). Accordingly, the increased complexity of the Fear/Distress model did not demonstrate incremental fit over a unitary factor model. The results therefore suggest that internalizing in middle childhood may be better conceptualized as a unitary construct (Cole et al., 1997; Lonigan et al., 1999).
4.2 Personality forecasts the structure of internalizing

The incorporation of personality traits represents a novel contribution of this investigation to research on structural models of childhood psychopathology. In the current investigation, personality traits served as common and unique predictors of symptom clusters within the three models. Across all three models, high Neuroticism significantly predicted each internalizing factor, which is consistent with the widely held notion that N/NE represents a general feature of all internalizing disorders (Clark & Watson, 1991; Watson, Kotov & Gamez, 2006). High Agreeableness also predicted most factors, with the exception of DSM-IV-TR Depression, which is in contrast to a previously observed link between high Agreeableness and vulnerability for depression in young adults (Evans & Rothbart, 2007). These results therefore suggest that high Neuroticism and high Agreeableness may represent common predictors of internalizing problems in middle childhood.

The regression analyses on the Fear/Distress model revealed interesting results, wherein certain personality characteristics uniquely identified each symptom cluster. In the replication of Lahey and colleagues’ (2004) model, low Extraversion predicted the Distress factor but not the Fear factor, whereas high Conscientiousness predicted the Fear factor but not the distress factor. These results are partly consistent with previous research that has revealed similar associations between high Conscientiousness and anxiety (Lonigan, Vasey, Phillips & Hazen, 2004; Lonigan & Vasey, 2009), and between low Extraversion and depression (Anthony et al., 2002; Dougherty et al., 2010; Phillips et al., 2002). Similar results, however, were not observed in the DSM-IV-TR model, suggesting that the links between personality dimensions and internalizing psychopathology are dependent on the conceptualization of internalizing constructs, which may help resolve discrepancies in the existing literature. Nevertheless, the current results suggest that personality characteristics may be useful in differentiating between types of internalizing syndromes, and may therefore hold important information for teasing apart differential diagnoses.

Given the capacity of early temperamental-personality traits for predicting later depression and anxiety (Côté et al., 2009; Gilliom & Shaw, 2004; Dougherty et al., 2010; Hayden et al., 2005; Schmitz et al., 1999), the current results may identify important personality risk factors or early
manifestations of internalizing disorders. Specifically, high Neuroticism and high Agreeableness early in life may confer risk for later internalizing problems. Moreover, youths high in Conscientiousness may be predisposed to problems specific to the Fears spectrum, whereas those low in Extraversion may be predisposed to problems specific to the Distress spectrum. Such features may ultimately assist in identifying youths at risk for developing internalizing problems, and who may be ideal candidates for preventive intervention programs.

4.3 Limitations and future directions

Several limitations of the present study must be acknowledged and should be addressed in future research endeavours. First, as it is preferable to incorporate multi-informant data (Grills & Ollendick, 2002), the present analyses are limited in that they were only conducted on mother-reported data on child internalizing problems and personality traits. A number of studies suggest, however, that mothers are relatively accurate raters of child internalizing problems (Briggs-Gowan, Carter & Schwab-Stone, 1996; Kemper, Gerhardstein, Repper & Kistner, 2003). The current investigation also reflects the applied clinical setting, wherein mothers are the most frequent reporters of child and adolescent behaviours (Phares, 1997; Renk, 2005). Nevertheless, future research endeavours should include multi-informant data in structural models to enhance the accuracy of reported internalizing problems and personality dimensions.

Second, the current investigation was limited to a select number of internalizing disorders (social phobia, separation anxiety and major depression). In addition, the C-DISC module for social phobia utilizes ‘skip-out’ rules during its administration, whereby the program automatically continues on to the next module if it is clear that the diagnostic criteria will not be met. This therefore poses an additional limit on the range of internalizing problems assessed in the current investigation. Future research should include a more comprehensive assessment of internalizing symptoms from additional DSM-IV mood and anxiety disorders (e.g., generalized anxiety disorder, panic disorder, specific phobia and post-traumatic stress disorder), to further examine the structure of these disorders within discrete developmental periods, such as middle childhood.

Finally, the current results are subject to the common limitations of a cross-sectional design, and only provide a concurrent description of the structure of internalizing disorders and its links to
personality dimensions. Further longitudinal research is needed to clarify how or when internalizing symptoms begin to differentiate into two factors, as observed in structural studies of adult psychopathology. In addition, longitudinal research is still needed to verify whether the personality precursors identified in the current investigation accurately predict the development of later internalizing problems.

Taken together, the results of the current investigation indicate that although the symptom clusters in the Fear/Distress model were statistically indistinguishable, as evidenced by a high latent factor intercorrelation, these constructs were significantly distinguished using personality dimensions. These observations have important practical implications for the assessment of internalizing problems in childhood. Specifically, the current results suggest that related personality precursors for internalizing problems are differentiated before Fear/Distress internalizing structures can be distinguished. This supports the possibility that childhood personality traits may foreshadow later internalizing problems. The current results therefore suggest that the assessment of childhood personality dimensions may hold important diagnostic information. Clinicians and researchers would have access to such information if the recommendations of the personality disorder work group appear in DSM-5. Early identification of at-risk youths would undoubtedly improve the delivery of preventive and early intervention treatment programs, thereby carrying tremendous practical utility for clinicians. Thus, these findings support the inclusion of personality trait assessments in DSM-5.
References


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<thead>
<tr>
<th>Disorder</th>
<th>Current Sample</th>
<th>Population Estimate</th>
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<td>Social Phobia</td>
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<td>Separation Anxiety Disorder</td>
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<td>4.1</td>
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<tr>
<td>Major Depressive Disorder</td>
<td>2</td>
<td>2.8</td>
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*Note.* Rates of DSM-IV internalizing disorders in the current sample reflect the number of participants meeting DSM-IV criteria as assessed using the C-DISC. Population estimates of DSM-IV internalizing disorders are based on the results of previous epidemiological studies (Costello et al., 1996; Costello, Erkanli & Angold, 2006; Shear, Jin, Ruscio, Walters & Kessler, 2006). \( N = 344. \)
Table 2

Descriptive statistics for childhood internalizing problems and personality traits

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<tr>
<th></th>
<th>( M )</th>
<th>( SD )</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CBCL T scores</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBCL AFF</td>
<td>54.34</td>
<td>5.12</td>
<td>50.00 – 76.00</td>
</tr>
<tr>
<td>CBCL ANX</td>
<td>53.58</td>
<td>4.93</td>
<td>50.00 – 77.00</td>
</tr>
<tr>
<td>CBCL SOM</td>
<td>54.68</td>
<td>5.92</td>
<td>50.00 – 80.00</td>
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<tr>
<td><strong>C-DISC Symptom Counts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-DISC SOC</td>
<td>1.29</td>
<td>2.29</td>
<td>0.00 – 12.00</td>
</tr>
<tr>
<td>C-DISC SAD</td>
<td>1.78</td>
<td>1.86</td>
<td>0.00 – 11.00</td>
</tr>
<tr>
<td>C-DISC MDD</td>
<td>3.61</td>
<td>2.84</td>
<td>0.00 – 15.00</td>
</tr>
<tr>
<td><strong>ICID Scales</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>3.58</td>
<td>0.64</td>
<td>1.57 – 5.22</td>
</tr>
<tr>
<td>Extraversion</td>
<td>5.05</td>
<td>0.61</td>
<td>3.03 – 6.56</td>
</tr>
<tr>
<td>Openness</td>
<td>5.14</td>
<td>0.76</td>
<td>2.43 – 6.88</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>4.86</td>
<td>0.74</td>
<td>2.42 – 6.72</td>
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<tr>
<td>Conscientiousness</td>
<td>4.46</td>
<td>0.90</td>
<td>1.76 – 7.00</td>
</tr>
</tbody>
</table>

*Note. CBCL AFF = Affective Problems; CBCL ANX = Anxiety Problems; CBCL SOM = Somatic Problems; C-DISC SOC = Social Phobia; C-DISC SAD = Separation Anxiety Disorder; C-DISC MDD = Major Depressive Disorder. \( N = 344 \).*
Table 3

Fit statistics for confirmatory factor analysis structural models

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p$</th>
<th>CFI</th>
<th>RMSEA</th>
<th>BIC</th>
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</thead>
<tbody>
<tr>
<td>1-Factor</td>
<td>20.38</td>
<td>9</td>
<td>.02</td>
<td>.95</td>
<td>.06</td>
<td>8213.91</td>
</tr>
<tr>
<td>2-Factor DSM-IV-TR</td>
<td>27.62</td>
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<td>.00</td>
<td>.91</td>
<td>.08</td>
<td>8225.17</td>
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<tr>
<td>2-Factor Fear-Distress</td>
<td>19.13</td>
<td>9</td>
<td>.02</td>
<td>.95</td>
<td>.06</td>
<td>8210.90</td>
</tr>
</tbody>
</table>

*Note. CFI = Comparative Fit Index; RMSEA = Root mean square error of approximation; BIC = Bayes information criterion.*
Internalizing Problems

- CBCL AFF
- CBCL ANX
- CBCL SOM
- CDISC SAD
- CDISC SOC
- CDISC MDD

Note. Values in brackets denote confidence interval for 99th percentile. All parameter estimates significant at p<.001.
Figure 2

Two-factor DSM-IV-TR structural model of internalizing problems

Note. Values in brackets denote confidence interval for 99th percentile. All parameter estimates significant at p<.001.
Figure 3
Two-factor Fear/Distress structural model of internalizing problems

Note. Values in brackets denote confidence interval for 99th percentile. All parameter estimates significant at p<.001.
Figure 4

Standardized coefficients from hierarchical regression analysis predicting unitary internalizing factor from FFM personality traits

* $p < .05$  ** $p < .01$  *** $p < .001$.  

![Graph showing standardized coefficients for FFM personality traits](image-url)
Figure 5
Standardized coefficients from hierarchical regression analysis predicting DSM-IV-TR model factors from FFM personality traits

![Graph showing standardized regression coefficients for anxiety and depression across neuroticism, extraversion, openness, agreeableness, and conscientiousness. Stars indicate significance levels: * p < .05, ** p < .01, *** p < .001.]
Figure 6

Standardized coefficients from hierarchical regression analysis predicting Lahey and colleagues’ (2004) model factors from FFM personality traits