

**CHILDHOOD RISK AND RESILIENCE PROFILES AND THEIR
LONGITUDINAL ASSOCIATIONS WITH ADOLESCENT
INTERNALIZING AND EXTERNALIZING
SYMPTOM PROFILES**

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ABSTRACT

Within the field of developmental psychopathology, research has repeatedly demonstrated that there are multiple complex and dynamic pathways originating in childhood that may lead to the development of internalizing and externalizing problems among adolescents. However, additional research is needed that examines the unique and concurrent contributions among child-, parent-, and family-level risk and resilience factors during childhood that may be associated with internalizing and externalizing problems in adolescence. To address this gap, the current study utilized a person-centered approach to identify profiles of risk and resilience factors among youth in middle childhood (ages 10-12) characterized by the quality and quantity of (a) child-level factors (i.e., temperamental features, executive functioning abilities); (b) parent-level factors (i.e., parental acceptance, control, disciplinary style); and (c) family-level factors (i.e., family cohesion, conflict, organization) among a sample of 775 participants (Aim 1). The study also examined internalizing and externalizing symptom profiles in adolescence (age 16) by identifying subgroups of youth characterized by the quality and quantity of internalizing and externalizing problems within each of the identified childhood risk profiles (Aim 2). Lastly, the study investigated transitions from childhood risk profiles to adolescent symptom profiles (Aim 3). Results demonstrated that a four-class model best fit the data in regard to childhood risk profiles, with classes of youth most saliently characterized by (a) accepting parents, (b) controlling parents, (c) disengaged parents, and (d) chaotic homes. With regard to adolescent internalizing and externalizing symptom profiles, results indicated a three-class model best fit the data and included classes distinguished by the presence of (a) low symptoms, (b) moderate symptoms, and

(c) high internalizing and moderate externalizing symptoms. Most youth from the four childhood risk profiles transitioned to the low symptom profile at age 16; however, youth from the chaotic home profile were more likely to transition into one of the two higher-level symptom profiles. Findings enhance our understanding of risk and resilience by identifying distinct childhood risk profiles and corresponding adolescent symptom profiles. These findings will have implications for both prevention and treatment efforts that target specific risk factors within each risk profile.

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CHAPTER 1

INTRODUCTION

Internalizing and externalizing problems are recognized as the most common forms of psychopathology throughout childhood and adolescence (Bongers, Koot, van der Ende, & Verhulst, 2003; Centers for Disease Control and Prevention, 2013; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). As such, extensive research has been conducted to elucidate why some youth develop internalizing and/or externalizing symptoms, whereas others appear to be resilient (e.g., Compas, Hinden, & Gerhardt, 1995; Davis, Votruba-Drzal, & Silk, 2015; Ormel et al., 2005; Wiggins, Mitchell, Hyde, & Monk, 2015). Though resilience has been operationalized in numerous ways, it is imperative to adopt a definition of resilience that captures the multiple pathways and processes involved when an individual faces adversity (Goldstein & Brooks, 2013). Broadly, the construct of resilience refers to the dynamic developmental system that allows an individual to withstand or overcome adverse experiences, thus leading to positive adaptation (Prince-Embury, 2012; Rutter, 2006; Wright, Masten, & Narayan, 2013). Critical to this dynamic system are the transactions among child-specific and contextual risk and resilience factors, which may interact to lead to more positive outcomes and/or attenuate or preclude negative outcomes (Fergus & Zimmerman, 2005; Prince-Embury, 2012; Wright et al., 2013). Given the complex interplay among risk and resilience factors, the aim of the current study was to increase our understanding of how child-, parent-, and family-level factors in childhood can confer or buffer risk for internalizing and externalizing symptoms in adolescence.

It is important to examine the development of internalizing and externalizing

problems among youth. Internalizing problems represent difficulties with introjective emotions and moods (e.g., sadness, guilt, fear, worry; Zahn-Waxler, Klimes-Dougan, & Slattery, 2000), which are typically captured through the categorical and dimensional assessment of clinical and subclinical levels of anxiety and depression (Zahn-Waxler et al., 2000), as well as social withdrawal and psychosomatic reactions (Achenbach, 1991). In contrast to internalizing symptoms, externalizing (i.e., “acting out”) problems include hostile, aggressive, and noncompliant behaviors, as well as inattention, impulsivity, and hyperactivity (McMahon, 1994). In addition to examining externalizing behaviors through categorical diagnoses of oppositional defiant disorder (ODD) and conduct disorder (CD), dimensional approaches to externalizing behaviors can help to identify youth at risk for more severe symptom trajectories prior to meeting full diagnostic criteria for these disorders (Drabick & Kendall, 2010).

Encompassing both anxiety and depressive symptoms, internalizing problems represent a significant public health concern given their prevalence in childhood and adolescence (Costello et al., 2003) and their persistence into adulthood (Angold & Costello, 1993). Past findings indicate that the trajectory of internalizing problems is relatively stable during childhood, with increases in symptoms during adolescence (Bongers et al., 2003; Costello et al., 2003). Sex differences have also been found, with females demonstrating higher levels of internalizing problems in adolescence (Bongers et al., 2003; Nolen-Hoeksema & Girgus, 1994). As such, examining internalizing symptoms in adolescence is pertinent as this developmental period may demarcate a critical shift in symptoms among some youth.

Externalizing problems, which include behavioral difficulties generally captured

in the symptoms of CD and ODD, similarly represent a significant public health concern. Externalizing behaviors are considered to be the most common form of maladjustment during childhood (Campbell, 1995); indeed, childhood externalizing behavior is a risk factor for aggression and criminal behavior in adolescence and adulthood (Farrington, 1989; Moffitt, 1993). However, findings regarding the developmental trajectory of externalizing behavior from childhood to adolescence are mixed depending on the measures, informants, and developmental periods considered (Leve, Kim, & Pears, 2005). For example, externalizing behavior as assessed by the Child Behavior Checklist (CBCL; Achenbach, 1991) was found to decrease from kindergarten through eighth grade based on mother report, but increased over time based on teacher report (Keiley, Howe, Dodge, Bates, & Pettit, 2001). Other researchers suggest that externalizing behaviors generally decrease over time, though boys may exhibit higher levels of externalizing problems compared to girls (Bongers et al., 2003; Leve et al., 2005). Given these mixed findings, it is important to examine externalizing symptoms from childhood at least through adolescence.

Despite the distinctions between internalizing and externalizing problems in general, research indicates that there are high rates of co-occurrence among these problems (Angold & Costello, 1995; Angold, Costello, & Erkanli, 1999a). There is an extensive body of literature suggesting that disruptive behavior disorders are comorbid with anxiety and depressive disorders in childhood and adolescence (e.g., Birmaher et al., 1996; Fergusson, Boden, & Horwood, 2010; Kashani & Orvaschel, 1990; Loeber, Burke, Lahey, Winters, & Zera, 2000; Loeber & Keenan, 1994). Interestingly, research suggests that pure externalizing and pure internalizing syndromes may be distinct from co-

occurring internalizing and externalizing syndromes (Epkins, 2000; Keiley, Bates, Dodge, & Pettit, 2000). Further, co-occurring internalizing and externalizing problems may place youth at even higher risk for maladaptive outcomes (Newman, Moffitt, Caspi, & Silva, 1998). Previous literature thus emphasizes the need for additional research to jointly examine internalizing, externalizing, and co-occurring symptom presentations, as future findings may help to demarcate a subgroup of youth who are at greater risk for maladaptive outcomes and may need interventions tailored to both sets of symptoms. Indeed, multiple factors are at play for individuals with co-occurring symptoms, including increased levels of risk, shared risk factors, and the presence of existing symptoms that may predispose individuals to additional symptomology (Drabick & Kendall, 2010; Russo & Beidel, 1994). By further parsing apart the risk factors associated with internalizing and externalizing symptom presentations in adolescence, we may better understand the pathways to internalizing and externalizing disorders and potentially design and implement intervention efforts to reduce later symptomology.

Given the transactional nature of multiple risk and resilience factors within various developmental contexts, it is important to consider within a developmental psychopathology framework how these interactions may potentially lead to similar (equifinality) or numerous (multifinality) outcomes (Cicchetti & Rogosch, 1996). Specifically, equifinality refers to the idea that a diversity of pathways and processes can lead to the same outcome, whereas multifinality refers to the notion that the same risk factor (e.g., poor parenting) may result in multiple outcomes (e.g., depression or antisocial behavior; Cicchetti & Rogosch, 1996). Although there are many child-specific and contextual factors that may impact symptom trajectories among youth, the current

study focuses on child-, parent-, and family-level variables that are illustrative of the primary domains of risk and resilience factors, can aid in identification of youth at risk for internalizing and/or externalizing symptoms, and may potentially be amenable to intervention. More specifically, the current study considers two well-established child-specific factors that may confer or attenuate risk for internalizing and externalizing symptoms, specifically temperamental features and executive functioning (EF). Additionally, the current study examines aspects of parent- (i.e., parental acceptance, control, disciplinary styles) and family-level (i.e., family cohesion, conflict, organization) factors, as these risk and resilience factors can also be appropriately targeted in interventions by involving parents and/or the broader family unit.

Two domains of child-specific factors that have received particular attention in the literature are a child's temperament and higher-order EF abilities, such as inhibition and attentional control (De Pauw & Mervielde, 2010; Kim & Deater-Deckard, 2011; Leve et al., 2005; Parra, DuBois, & Sher, 2006; Rettew, Althoff, Dumenci, Ayer, & Hudziak, 2008; Wright et al., 2013). The constructs of temperament and EF are appropriate child-focused targets of intervention in the study and treatment of internalizing and externalizing problems. Thus, there is a need to better understand these child-specific domains and how they can confer or buffer risk for internalizing and externalizing symptoms among youth.

Although there is debate regarding the precise definition of temperament, most research characterizes temperament as individual differences that are present early in life, are relatively stable across situations and over time, and often have biological underpinnings (e.g., Goldsmith et al., 1987; Levesque, 2011; Rothbart, 2012; Shiner et

al., 2012; Zentner & Bates, 2008). More recently, temperament researchers have acknowledged that the individual differences that comprise temperament include both affective and cognitive systems, which, in turn, are highly integrated (Derryberry & Tucker, 2006; Forgas, 2008; Shiner et al., 2012). Furthermore, current approaches view temperament using an integrative model of biological and environmental factors interacting throughout development (Shiner et al., 2012).

Temperamental styles and traits are considered to be antecedents to later emotional and behavioral problems, consistent with a vulnerability model of temperament (Caspi, Henry, McGee, Moffitt, & Silva, 1995; Laceulle, Ormel, Vollebergh, van Aken, & Nederhof, 2014; Ormel et al., 2005; Rothbart & Bates, 2006; Zentner & Bates, 2008). Indeed, childhood temperamental features such as negative emotionality (e.g., sadness, fear) and aspects of behavioral reactivity (e.g., behavioral inhibition, shyness, withdrawn behavior, reduced impulsivity) exhibit concurrent and longitudinal associations with internalizing problems at both subclinical and clinical levels (Caspi et al., 1995; Eisenberg et al., 2001, 2009; Leve et al., 2005; Prior, Smart, Sanson, & Oberklaid, 2000). Child temperamental features, such as impulsivity, low inhibition or effortful control, and negative emotionality, also have been linked to externalizing problems among youth concurrently (Caspi et al., 1995; Eisenberg et al., 2001, 2009; Leve et al., 2005) and prospectively across the transition from childhood to adolescence when adopting both categorical and dimensional approaches to externalizing problems (Laceulle et al., 2014; Leve et al., 2005). As temperamental features can be observed and measured early in life, it is critical to study temperament when considering risk and resilience factors among youth.

Much like the study of temperament, the construct of EF has numerous definitions in the extant literature (Zhou, Chen, & Main, 2012). For the present dissertation, I define EF as a multidimensional construct that involves self-regulation through higher-order cognitive control processes, broadly associated with the prefrontal cortex, that help to control and regulate attention, cognition, and behaviors (Bunge & Souza, 2009; Miyake & Friedman, 2012). EF has been linked to physical (Hall, Elias, & Crossley, 2006) and psychological (Snyder, Miyake, & Hankin, 2015) health outcomes, as well as to various domains of daily life, such as academic, occupational, and social functioning (Best, Miller, & Jones, 2009; Miller, Nevado-Montenegro, & Hinshaw, 2012). As such, the existing literature points to deficits in EF as potential risk factors for various emotional and behavioral symptoms and disorders (Nolen-Hoeksema & Watkins, 2011; see Snyder et al., 2015, for a review).

Past research suggests a link between EF deficits and internalizing symptoms in childhood and adolescence, though findings are mixed depending on the methodology used (for reviews, see Baune, Fuhr, Air, & Hering, 2014, and Vilgis, Silk, & Vance, 2015; Burgers & Drabick, 2016; Emerson, Mollet, & Harrison, 2005; Favre et al., 2009). Broadly, EF deficits have been associated with symptoms of anxiety and depression among youth both concurrently (Emerson et al., 2005; Toren et al., 2000) and prospectively (Han et al., 2016; Riggs, Blair, & Greenberg, 2004). Associations between EF and externalizing behaviors have also been found among youth, though mixed findings underscore the heterogeneity of associations among EF and disruptive behavior (Drabick, Bubier, Chen, Price, & Lanza, 2011; Olson, Schilling, & Bates, 1999; Riggs et al., 2004). Past research suggesting a link between EF deficits and internalizing and

externalizing symptoms among youth lends support for an integrated model of youth risk and resilience that also includes aspects of EF.

In addition to the child-specific factors of temperament and EF, it is also important to consider risk and resilience factors within the domains of parenting and the broader family unit. Indeed, both parent- and family-level factors are consistently associated with internalizing and externalizing symptoms among youth (Davies & Sturge-Apple, 2014; Davis et al., 2015; Wiggins et al., 2015; for a review, see Yap & Jorm, 2015). Parenting behaviors, including the broad dimensions of parental control and rejection, have been linked with both internalizing and externalizing symptoms among youth (for reviews, see McKee, Colletti, Rakow, Jones, & Forehand, 2008; McLeod, Weisz, & Wood, 2007a; McLeod, Wood, & Weisz, 2007b). Specifically, parental control is more strongly related to youth anxiety, whereas parental rejection is more strongly related to youth depression when using both dimensional and categorical approaches to conceptualize internalizing difficulties (McLeod et al., 2007a, 2007b). Higher levels of psychological control predict increases in internalizing problems more generally (Lansford, Laird, Pettit, Bates, & Dodge, 2014), whereas parental monitoring, a positive facet of parental control, has been associated with lower levels of depression among youth (Yap & Jorm, 2015). Similarly, parental autonomy-granting (i.e., encouraging the child to form opinions and make choices, in addition to soliciting the child's input) is associated with attenuated anxiety (McLeod et al., 2007b). Parental rejection is suggested to confer risk for internalizing symptoms, whereas parental warmth buffers this risk among children and adolescents (Sentse, Lindenberg, Omvlee, Ormel, & Veenstra, 2010; Yap & Jorm, 2015; Yap, Pilkington, Ryan, & Jorm, 2014).

Regarding externalizing problems, parental control consistently is associated with increased externalizing behaviors, whereas parental acceptance is associated with decreased externalizing behaviors (for a review, see Rothbaum & Weisz, 1994). Consistent with this point, parental monitoring, psychological control, rejection, and hostility have been found to account for 11% of the variance in delinquent behaviors among youth (Hoeve et al., 2009). When considering the interactions among different parental behaviors, findings suggest that in the context of low parental warmth, higher levels of parental behavioral control were associated with increased externalizing symptoms among adolescents (Forehand & Nousiainen, 1993; Weaver & Prelow, 2005), which suggests that some parenting behaviors may be differentially effective in buffering risk for externalizing problems given the presence of other parenting behaviors (McKee et al., 2008). Taken together, the past literature supports the notion that parenting is linked with internalizing and externalizing symptoms among youth, though additional research is warranted to better parse apart which facets of parenting and what combinations of parenting factors might be predictive of internalizing and/or externalizing symptoms (McKee et al., 2008).

Though it is important to examine the impact of parenting factors specifically among youth, the family systems perspective also emphasizes the need to study family processes at a broader level (Davies & Sturge-Apple, 2014). Indeed, evidence supports the notion that familial experiences and environments can impact risk and resilience among youth above and beyond the variance that can be attributed to parent-child interactions (White, Shelton, & Elgar, 2014). Youth from families with higher levels of family functioning demonstrate fewer internalizing problems compared to youth with

lower levels of family functioning (Sheidow, Henry, Tolan, & Strachan, 2014). Regarding internalizing symptoms, evidence generally supports a negative relation between family cohesion and youth symptomology (Lucia & Breslau, 2006). For example, lower levels of family cohesion at age 6 were associated with stable, higher levels of internalizing problems at age 6 and age 11 (Lucia & Breslau, 2006). Past research similarly points to an inverse association between higher family functioning and youth externalizing problems. Indeed, youth with poorer family functioning (i.e., lower levels of cohesion and organization, higher levels of conflict) demonstrated higher levels of externalizing problems (Lucia & Breslau, 2006). In regard to family cohesion specifically, higher levels of family cohesion at age 6 were associated with lower externalizing symptoms among youth, though this association was stronger at age 6 than at age 11 (Lucia & Breslau, 2006). Thus, family environmental characteristics are important to consider when examining the development of internalizing and externalizing symptoms.

In sum, the extant literature suggests that certain childhood risk and resilience factors, including child- (i.e., temperamental features, EF abilities), parent- (i.e., parental acceptance, control, disciplinary style), and family-level (i.e., family cohesion, conflict, organization) factors, can confer risk for or promote resilience against internalizing and externalizing behaviors in adolescence. Despite these established links, a model that takes into account multiple domains and indices of childhood risk and resilience factors, including their quality and quantity, is needed when considering internalizing and externalizing symptoms in adolescence. Given the high rates of co-occurrence of internalizing and externalizing symptoms among youth (Angold & Costello, 1995;

Angold et al., 1999a), it is also crucial to determine if there are distinct internalizing and externalizing symptom profiles present during adolescence. Thus, a comprehensive model is needed that first considers childhood profiles of risk and resilience factors, and then considers whether these distinct childhood profiles are associated with certain symptom presentations in adolescence.

The current study used a developmental psychopathology framework, including multiple levels of analysis and dimensional approaches, to take a person-centered approach to address these gaps in the literature (Beauchaine, 2003). As previously illustrated, the child-specific factors of temperament and EF, as well as parent- and family-level factors in childhood, are associated with internalizing and externalizing symptoms in adolescence. However, there is likely some combination of these variables that may be more likely to confer risk for, or offer protection from, maladaptive outcomes among youth. To better delineate the constellations of risk and resilience factors in childhood, the current study used latent profile analysis (LPA) to identify subgroups (i.e., classes) of youth characterized by the quality and frequency of child-, parent-, and family-level risk and resilience factors in middle childhood, herein referred to as risk profiles. It was hypothesized that the following four profiles of childhood risk and resilience factors would be identified by LPA: youth with (1) low overall risk (i.e., low levels of child-, parent-, and family-level risk factors); (2) high child-level risk (i.e., poor EF abilities, difficult temperament, but strong parent- and family-level resilience factors); (3) high parent- and family-level risk (i.e., poor parenting styles and difficult family environmental characteristics, but strong child-specific resilience factors); and (4) high overall risk (i.e., presence of many child-, parent-, and family-level risk factors).

Although there is a dearth of literature jointly examining the specific risk and resilience factors of interest in the current study, this hypothesis is based on previous research that has identified low risk, high parent/family risk, high child-specific risk, and multi-level risk groups of youth (Lanza, Rhoades, Nix, Greenberg, & the Conduct Problems Prevention Research Group, 2010; Parra et al., 2006; Rettew et al., 2008).

To further our understanding of the longitudinal impact of the childhood risk profiles, the current study also used LPA to discern classes of youth characterized by the quality and frequency of internalizing and externalizing behaviors in adolescence. It was hypothesized that four symptom profiles in adolescence would be derived: (1) low levels of internalizing and externalizing behaviors, (2) higher levels of internalizing and lower levels of externalizing behaviors, (3) lower levels of internalizing and higher levels of externalizing behaviors, and (4) co-occurring internalizing and externalizing behaviors, which is in line with past findings indicating the presence of normative, internalizing, externalizing, and comorbid/co-occurring symptom profiles (Rosato & Baer, 2012).

Additionally, latent transition analysis (LTA) was used to examine the transitions from childhood risk profiles to adolescent symptom profiles in order to identify classes of adolescent internalizing and externalizing symptom presentations that are specifically associated with each identified childhood risk profile. It was predicted that youth in the high overall risk profile would most likely transition into the co-occurring internalizing and externalizing symptom profile in adolescence, whereas youth in the low overall risk profile would most frequently transition to the adolescent symptom profile with low levels of internalizing and externalizing symptoms. In regard to the high child-level risk and high parent- and family-level risk profiles, it was predicted that these profiles would

likely transition into the symptom profiles with high internalizing or high externalizing profiles, though it was expected that youth with these risk profiles would transition to each of the symptom profiles across classes.

CHAPTER 2

METHOD

Participants

Participants were 775 families recruited through the Center for Education and Drug Abuse Research (CEDAR) at the University of Pittsburgh, who conducted a longitudinal study to identify youth who may be at risk for substance use disorders (SUD). Males with a history of SUD, psychiatric disorder, or no psychiatric disorders who were biological fathers to a child aged 10-12 (index child) were recruited through substance use treatment programs, social service agencies, newspaper and radio advertisements, public service announcements, and random digit telephone calls to decrease the risk of sampling bias (Merikangas et al., 1998). In the present study, youth were classified into one of two categories according to the father's lifetime prevalence of mental health disorders: (1) no lifetime history of SUD or psychiatric diagnosis (45%) or (2) a lifetime diagnosis of SUD or other psychiatric disorder (55%) as assessed via the Structured Clinical Interview for *DSM-III-R* (Spitzer, Williams, Gibbon, & First, 1992). Given the original study's aim to examine the development of SUD, males were purposefully oversampled as they are more likely to develop SUD compared to females. Recruitment of female index children began later than male recruitment because of changes in the National Institute of Health gender equality regulations after the CEDAR project commenced; thus, there are more males than females in the current sample.

Data from the present study were drawn from child and caregiver assessments when youth were 10-12 years old (Time 1) and 16 years old (Time 2). At Time 1, participants were 775 youth ($M = 11.42 \pm 0.92$ years; 71% male; 76% Caucasian, 22%

African American/Black, 3% “Other”). At Time 2, participants were 624 youth ($M = 16.09 \pm 0.45$ years; 72% male; 76% Caucasian, 22% African American/Black, 3% Other). Families were excluded from the study on the basis of a history of neurological disorders, schizophrenia, or uncorrectable sensory incapacity in the father; or neurological injury requiring hospitalization, IQ less than 70, chronic physical disability, uncorrectable sensory incapacity, or psychosis in the index child. More extensive recruitment source information and procedures are described elsewhere (Clark et al., 1997; Tarter & Vanyukov, 2001).

Procedure

Procedures were approved by the University of Pittsburgh Institutional Review Board. Adult participants provided informed consent after receiving information about the goals, procedures, risks, and benefits of the research protocol. Of the fathers recruited who met criteria to participate, 87% consented. Minor children provided assent. Families were advised that a Certificate of Confidentiality was obtained from the National Institute of Drug Abuse to protect participants.

Mothers reported on child internalizing and externalizing behaviors, child temperament, and family environment characteristics at Time 1. Youth completed cognitive assessments, including EF tasks, at Time 1 in the research laboratory. Youth also reported on their mothers’ and fathers’ parenting styles at Time 1, as well as their own internalizing and externalizing behaviors at Time 2.

Measures

Child-level factors. Child temperamental features and EF abilities were examined as potential risk and resilience factors at Time 1. Youth symptoms at Time 1

and intellectual functioning were examined in auxiliary analyses.

Executive functions. Index children completed a battery of neuropsychological tests administered at Time 1 by trained clinicians that assess various components of EF.

Impulsivity. Impulsivity was assessed via the Vigilance Test (Schneider & Detweiler, 1987), as well as the Porteus Maze Test – the Vineland Revision (Porteus, 1965). On the Vigilance Test, children viewed rapidly changing computer displays of four single letters in a 2×2 matrix and were required to hit the space bar when 1 of 2 target letters appeared. The variable of interest was the number of errors of commission to non-target stimuli (i.e., when children pressed the space bar for a non-target item). Greater number of errors indexes greater impulsivity. On the Porteus Maze Test, children solved increasingly difficult mazes by following the path using a continuous pencil line from the start to end point (Krikorian & Bartok, 1998). The Qualitative score (Q score) assesses the errors made on this task, such as lifting the pencil, drawing wavy lines, changing direction, cutting corners, and crossing or touching lines, which is intended to assess haphazard and impulsive behaviors on the task (Rankin & Thompson, 1966). Thus, higher Q scores indicate greater impulsivity.

Inhibition. Inhibition, defined as the ability to inhibit a prepotent response (Miyake et al., 2000), was assessed via the Stroop Color Word Test, a three trial laboratory-based computer task. In the first trial (Word Trial), index children were asked to read the word stimuli (e.g., the word “blue” is presented in blue font). In the second trial (Color Trial), children were asked to state the color of the ink of items (e.g., “XXX” was presented in red font). In the third trial (Color-Word Trial), children responded to the colors of word stimuli while ignoring the word name (e.g., the correct response is “blue”

when the word “red” is printed in blue font; Stroop, 1935). An interference score was calculated as the difference between the score for the Color-Word Trial and the Color Trial (i.e., the delay in naming the color in an incongruent color-word pair compared to naming the color alone). The variable of interest for the current study was the interference score; higher scores represent poorer inhibition abilities.

Self-regulation. The Forbidden Toy task is a measure of attentional and behavioral self-regulation (Cole, Usher, & Cargo, 1993; Silverman & Ragusa, 1992). Children were instructed not to play with toys while performing a chip-sorting task. Two raters observed the children through a mirror, rating the frequency of off-task distraction. The two raters’ mean score (interrater reliability $r = .98$) is indicative of off-task behavior, with higher scores demonstrating greater off-task behavior. As such, this task assesses on-task persistence despite distraction from the surrounding stimuli (toys), thus requiring intact attention, concentration, and inhibition abilities (Cole et al., 1993; Silverman & Ragusa, 1992).

Temperamental features. Child temperament was assessed using the 54-item Revised Dimensions of Temperament Survey at Time 1 via mother report (DOTS-R; Windle, 1992; Windle & Lerner, 1986). Three subscales of the 54-item DOTS-R were of interest in the present study: Approach/Withdrawal, Flexibility/Rigidity, and Mood Quality. Mothers reported on the child’s temperamental features on a scale from 1 (*Usually False*) to 4 (*Usually True*), with higher subscale scores coded to indicate more approach behaviors, flexible behavioral styles, and positive quality of mood, respectively. Sample items from the 7-item Approach/Withdrawal subscale ($\alpha = .78$) include “My child’s first reaction is to reject something new or unfamiliar to him/her” (reverse coded)

and “On meeting a new person my child tends to move towards him or her.” Sample items from the 5-item Flexibility/Rigidity subscale ($\alpha = .77$) include “It takes my child a long time to adjust to new schedules” and “My child resists new routines” (both reverse coded). Sample items from the 7-item Mood Quality subscale ($\alpha = .87$) include “My child’s mood is generally cheerful” and “My child laughs and smiles at a lot of things.” Several studies have indicated that the internal consistency, reliability, and validity of the DOTS-R are acceptable (Carson, Council, & Volk, 1989; Windle, 1989, 1991, 1992).

Internalizing and externalizing problems. Mothers reported on the index child’s internalizing and externalizing behaviors in middle childhood (Time 1) using the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983), a widely used measure of behavioral and emotional problems. T-scores of the Internalizing (girls under 12 years old: 49 items, $\alpha = .85$; girls 12 and older: 45 items, $\alpha = .89$; boys under 12: 50 items, $\alpha = .89$; boys 12 and older: 48 items, $\alpha = .86$) and Externalizing (girls under 12: 51 items, $\alpha = .91$; girls 12 and older: 45 items, $\alpha = .94$; boys under 12: 42 items, $\alpha = .93$; boys 12 and older: 40 items, $\alpha = .92$) composite subscales were used to assess emotional and behavioral functioning at Time 1. Items were rated on a 3-point scale (0 = *Not True*, 1 = *Somewhat/Sometimes True*, 2 = *Very/Often True*) and summed; raw scores were converted to T-scores normed based on youth age and sex. These composites were examined in auxiliary analyses as described below. The CBCL is a reliable and well-validated instrument (Achenbach & Edelbrock, 1983; Achenbach, 1991), with the internalizing and externalizing subscales demonstrating acceptable concurrent validity (Cohen, Gotlieb, Kershner, & Wehrspann, 1985) and internal consistency (Guttmanova, Szanyi, & Cali, 2007).

At age 16 (Time 2), youth reported on their own internalizing and externalizing behaviors using the Youth Self-Report (YSR; Achenbach, 1991; Achenbach & Edelbrock, 1987). The YSR is a complementary version of the CBCL, which similarly is widely used to assess youth symptoms and behaviors, with demonstrated reliability and validity (Achenbach & Rescorla, 2001; Doyle, Mick, & Biederman, 2007). The subscales of interest in the present study included the 16-item Anxious/Depressed ($\alpha = .82$) and 7-item Withdrawn ($\alpha = .64$) syndrome subscales, which capture internalizing symptoms, and the 19-item Aggressive Behaviors ($\alpha = .82$) and 11-item Delinquent Behaviors ($\alpha = .74$) subscales, which capture externalizing symptoms. Internalizing and externalizing symptoms were rated on a 3-point scale (0 = *Not True*, 1 = *Somewhat/Sometimes True*, 2 = *Very/Often True*). The 31-item Internalizing (girls: $\alpha = .88$; boys: $\alpha = .83$) and 30-item Externalizing (girls: $\alpha = .85$; boys: $\alpha = .87$) composite subscales were also considered in auxiliary analyses performed at Time 1.

Intellectual functioning. Children's intellectual functioning was assessed at Time 1 using the Full-Scale IQ from the Wechsler Intelligence Scale for Children – Third Edition (WISC-III; Wechsler, 1991).

Parent-level factors. Dimensions of parenting behaviors were assessed as potential risk and resilience factors. Additionally, given the current sample's recruitment approach, paternal psychiatric status was examined in auxiliary analyses to determine whether groups differed on this variable.

Parenting behaviors. Index children reported on their perceptions of their mothers' and fathers' parenting behaviors at Time 1 via the Children's Report of Parental Behavior Inventory (CRPBI; Schaefer, 1965; Schludermann & Schludermann, 1970).

The 162-item CRPBI yields three factors of maternal and paternal parenting styles, with two subscales per factor (Acceptance vs. Rejection factor: Acceptance and Child Centeredness; Psychological Autonomy vs. Psychological Control factor: Control through Guilt and Instilling Persistent Anxiety; Firm Control vs. Lax Control factor: Lax Discipline and Non-enforcement of Rules). Children completed items regarding their parents' behaviors on a scale from 1 (*Very True*) to 3 (*Not At All True*). Item responses were recoded such that higher total subscale scores indicated greater levels of the subscale of interest (e.g., a higher score on Acceptance indicates greater parental acceptance of the child). Sample items from each subscale include "My mother/father seems to see my good points rather than my faults" (Acceptance, 16 items per parent; mother: $\alpha = .90$, father: $\alpha = .91$); "My mother/father is always thinking of things that will make me happy" (Child Centeredness, 8 items per parent; mother: $\alpha = .75$, father: $\alpha = .79$); "My mother/father says if I loved her/him, I'd do what s/he wants me to do" (Control through Guilt, 8 items per parent; mother: $\alpha = .77$, father: $\alpha = .77$), "My mother/father says that someday I'll be sorry that I wasn't a better child" (Instilling Persistent Anxiety, 8 items per parent; mother: $\alpha = .76$, father: $\alpha = .77$); "My mother/father lets me get away with a lot of things" (Lax Discipline, 8 items per parent; mother: $\alpha = .54$, father: $\alpha = .56$); and "I can talk my mother/father out of an order, if I complain" (Non-enforcement of Rules, 8 items per parent; mother: $\alpha = .61$, father: $\alpha = .64$). Separate subscale scores were derived for maternal and paternal parenting styles. The CRPBI has demonstrated good internal consistency, validity, and reliability (Margolies & Weintraub, 1977; Safford, Alloy, & Pieracci, 2007; Schludermann & Schludermann, 1970).

Paternal psychiatric status. Lifetime paternal psychiatric history was assessed based on the Structured Clinical Interview for *DSM-III-R* (Spitzer et al., 1992). Paternal psychiatric status was coded “0” for fathers with no history of psychiatric diagnoses and “1” if there was any history of psychiatric or substance use disorders.

Family-level factors. Family environment characteristics were examined as potential risk and resilience factors. Family SES was also examined in auxiliary analyses.

Family environment. Parents completed the Family Environment Scale (FES; Moos & Moos, 1986, 1994) at Time 1, which assesses multiple dimensions of family social environments. The 90-item FES yields numerous subscales of interest, including the 9-item Cohesion subscale (i.e., the degree of commitment, help, and support family members provide for one another; sample item: “There is a feeling of togetherness in our family”; $\alpha = .70$); the 9-item Conflict subscale (i.e., the amount of openly expressed anger, aggression, and conflict among family members; sample item: “We fight a lot in our family”; $\alpha = .74$); and the 9-item Organization subscale (i.e., the degree of importance of clear organization and structure in planning family activities and responsibilities; sample item: “What each person is expected to do is known in our family”; $\alpha = .67$). Items were rated 1 (*True*) or 0 (*False*), with higher scores indicating greater levels of the subscale of interest (e.g., a higher score on Cohesion indicates greater family cohesion). These subscales have previously demonstrated good construct validity and acceptable internal consistency (Sanford, Bingham, & Zucker, 1999).

Socioeconomic status. Household SES, a family-level risk factor, was indexed using Hollingshead ratings for the head-of-household (Hollingshead, 1990).

Statistical Analyses

Descriptive statistics and bivariate correlations were conducted using SPSS Version 24.0 to determine whether distributions were appropriate for the proposed analyses, and to identify any potential issues with multicollinearity among variables. After examining distributions of variables, it was determined that the EF variable indicating commission errors on the Vigilance Test was highly positively skewed and thus a log transformation was performed. Prior to inclusion in the childhood risk profile LPA (Aim 1) and adolescent symptom profile LPA (Aim 2), all variables were standardized (z -scored).

Primary analyses were conducted using Mplus Version 7.11 (Muthén & Muthén, 1998-2014). To address missing data, Mplus uses Full Information Maximum Likelihood (FIML) estimation, which conducts parameter estimation and estimates standard errors using all available data (Graham, 2009). Given that other strategies for managing missing data (e.g., listwise or pairwise deletion, mean imputation) may bias an analytic sample (Graham, 2009; Little & Rubin, 2002; Newman, 2003), FIML permits inclusion of participants with missing data. FIML assumes that missing data are either missing completely at random or missing at random, but does not impute missing data. Rather, FIML fits the covariance structure model directly to the observed (and available) raw data for each participant (Enders, 2001), which allows for maintenance of participants with missing data in model estimation and yields smaller errors in parameter estimates and standard errors relative to other strategies for addressing missing data (Enders, 2001; Graham, 2009; Newman, 2003).

Aim 1: Identify profiles of risk and resilience factors in middle childhood.

Latent profile analysis. LPA was conducted using Mplus (Muthén & Muthén, 1998-2014) to identify profiles of risk and resilience factors in middle childhood (Time 1). LPA is a person-centered statistical approach that clusters individuals into homogeneous groups on the basis of observed data using continuous or categorical variables (Gomez & Vance, 2014; Oberski, 2015). LPA is conceptually similar to latent class analysis, with the exception that it uses continuous indicator variables as opposed to categorical indicator variables (Maynard, Salas-Wright, Vaughn, & Peters, 2012).

LPA was used to estimate models with subgroups of youth with various levels of child-, parent-, and family-level risk and resilience factors at Time 1. Each latent profile of childhood risk and resilience factors describes the relations among observed variables (e.g., quality of child EF, child temperament, parenting behaviors, familial environment characteristics). This approach is more effective than traditional classification of classes using cut-off scores and categorical approaches, which can lead to classification errors such as false positives and false negatives (Nylund, Bellmore, Nishina, & Graham, 2007b). Furthermore, past research examining risk factor profiles suggests that using person-centered statistical approaches allows for a more nuanced understanding of early risk for negative outcomes, as compared to variable-centered approaches that study risk based on the number of risks present and assumes that risk factors operate similarly across the entire sample (Lanza et al., 2010). Thus, LPA is an appropriate approach for identifying subgroups of youth who differ on child-, parent-, and family-level risk and resilience factors.

LPA uses statistical indices and conceptual/practical implications in order to select the best-fitting model for the data (Nylund et al., 2007b). LPA models are fit

starting with the one-class model, which is the independence model based on the observed means in the data (Nylund et al., 2007b). Following the one-class model, the number of classes was incrementally increased until the models no longer converged and/or were no longer conceptually sound. The fit of each model to the data is determined by statistical indicators and the conceptual model, with an emphasis on model parsimony. Each model was compared to the model with one fewer class (Nylund et al., 2007b).

Given that there is no “gold standard” for determining the best model fit, multiple statistical indices were used to determine the optimal number of classes (Nylund, Asparouhouv, & Muthén, 2007a). The following statistical indices to assess model fit were utilized: Bayesian Information Criterion (BIC; Schwartz, 1978); sample-size adjusted BIC (ABIC; Sclove, 1987); Akaike Information Criterion (AIC; Akaike, 1987); and Bootstrap Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000; Nylund et al., 2007a). For BIC, AIC, and ABIC, lower values indicate better fitting models (Nylund et al., 2007a). The BLRT estimates the log likelihood differences and compares the fit of the model with k classes to the model with $k-1$ classes to evaluate if model fit is significantly improved by adding an additional class. Based on Monte Carlo simulation studies, the BLRT and BIC indices are considered the most reliable indicators of model fit (Nylund et al., 2007a).

To determine the model with the best fit, the conceptual underpinnings and the interpretability of the various models also were considered (Maynard et al., 2012). In addition, entropy scores, posterior probabilities, and smallest class size were examined. Entropy assesses the value and utility of classes by measuring the distinguishability of the latent classes and the precision with which participants are placed into classes (Masyn,

Henderson, & Greenbaum, 2010). Entropy is based on individuals' estimated posterior class probabilities, with values ranging from 0 to 1; values closer to 1 indicate clearer class separation (Masyn et al., 2010). Posterior class probabilities are estimated to index the individual's probability of belonging to each class of the fitted model, given the individual's observed response pattern for the assessed risk and resilience factors. Class size was also considered to ensure that the smallest class represents a significant portion of the sample (e.g., > 5%-10%). Very small classes suggest over-fitting of the data and reduce the likelihood of model replication. Final model selection was based on the conceptual models and theories underpinning the analyses, and the interpretability of the number of classes.

Auxiliary analyses. Following the identification of childhood risk profiles at Time 1, demographic variables (i.e., child age, sex, and ethnicity; family SES), paternal psychiatric status, child general intelligence, and child composite internalizing and externalizing symptoms at Time 1 and Time 2, were examined to determine whether the profiles at Time 1 differed significantly on these auxiliary variables using tests of equality of means. For these tests, class membership was held constant and weighted based on posterior probabilities. For any significant omnibus tests ($p < .05$), pairwise comparisons were considered to identify significant differences among the classes.

Aim 2: Identify profiles of internalizing and externalizing symptoms in adolescence.

Latent profile analysis. LPA was used to estimate models examining subgroups of youth with varying levels of internalizing and externalizing behaviors at Time 2. The same statistical indices and conceptual meaningfulness of the class solutions were

considered as stated in Aim 1 to determine best model fit.

Auxiliary analyses. Following the identification of adolescent symptom profiles at Time 2, demographic variables (i.e., child age, sex, and ethnicity; family SES), and paternal psychiatric status were examined to determine whether Time 2 profiles differed significantly on these auxiliary variables using tests of equality of means. As described earlier, class membership was held constant and weighted based on posterior probabilities. For any significant omnibus tests ($p < .05$), pairwise comparisons were considered to identify significant differences among the classes.

Aim 3: Examine the transition from childhood risk profile membership (Time 1) to adolescent internalizing and externalizing symptom profile membership (Time 2).

Latent transition analysis. Latent transition analysis (LTA; Clogg, 1995) was used to examine developmental patterns of childhood risk profiles with adolescent symptom profiles. LTA examines changes, or transitions, in latent class membership over time (e.g., Nylund, 2007). LTA models provide transition probabilities, which are conditional probabilities describing the likelihood of class membership at time = t , conditional on the state at time = $t - 1$ (Cosden, Larsen, Donahue, & Nylund-Gibson, 2015).

To conduct the LTA, the best-fitting LPA model for each time point first was used as a measurement model (Nylund, 2007). LTA models utilize FIML to retain the original sample size from each LPA time point; thus, the total sample from the LPA at Time 1 ($N = 775$) was retained for estimating the variance-covariance matrix for the LTA. Parameters for each class were set based on means obtained in the LPAs at each

time point so that classes remained stable in the LTA. Next, autoregressive models were used to examine transitions of individuals from childhood risk profiles (Time 1) to adolescent symptom profiles (Time 2).

CHAPTER 3

RESULTS

Descriptive Statistics

Continuous study variables were significantly correlated in expected directions (see Table 1). Correlations among variables derived from separate measures were generally small in magnitude, whereas correlations among subscales drawn from the same instrument were moderate overall. Given the sample size, many correlations were significant; however, most significant correlations were $< .20$. Bivariate correlations indicated continuity in internalizing and externalizing behaviors from Time 1 to Time 2 (e.g., Time 1 internalizing symptoms with Time 2 internalizing symptoms). More positive parenting behaviors were associated with positive family variables (e.g., parental acceptance was positively associated with family cohesion and organization, and negatively associated with family conflict). Child positive mood was positively associated with parental acceptance and child-centeredness and negatively associated with parental control through guilt and instilling persistent anxiety.

Child approachability and flexibility at Time 1 were negatively associated with the Time 2 YSR Withdrawn subscale. Additionally, child flexibility was negatively associated with the Time 2 YSR Anxious/Depressed subscale. Child positive mood at Time 1 was negatively associated with the Time 2 YSR Delinquent Behaviors subscale. Many parent- and family-level factors at Time 1 were also associated with Time 2 symptoms (see Table 1).

Table 1

Bivariate Correlations Among Continuous Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Age T1	-										
2. SES	.06	-									
3. FSIQ	-.01	.43***	-								
4. VT FA log	-.16***	-.21***	-.37***	-							
5. Q score	-.20***	-.22***	-.35***	.27**	-						
6. Stroop Int	-.20***	-.02	-.09*	.05	.10**	-					
7. FT Distract	-.14***	-.12**	-.11**	.11**	.16***	.13**	-				
8. Approach	-.01	-.10**	.23***	.01	-.03	-.01	.07	-			
9. Flexibility	.04	-.07*	.18***	-.11**	-.10**	-.03	-.03	.41***	-		
10. Pos Mood	-.02	.12**	.12**	-.05	-.03	.01	-.05	.37**	.32***	-	
11. F Accept	-.01	.12**	.06	-.02	.03	-.06	-.12**	.02	-.01	.14***	-
12. M Accept	-.09*	.08*	.06	.03	.09*	-.03	-.12**	.03	-.01	.14***	.77***
13. F Child-C	-.07	-.01	-.03	.02	.01	-.07	-.08*	-.01	.00	.12**	.79***
14. M Child-C	-.08*	-.08*	-.11**	.11**	.08*	-.06	-.07	-.03	-.06	.09*	.54***
15. F Guilt	-.15***	-.17***	-.21***	.17***	.14***	.05	.15***	.01	-.04	-.13***	.04
16. M Guilt	-.13**	-.17***	-.21***	.17***	.14***	.04	.16***	.02	-.06	-.12**	-.07
17. F Anxiety	-.08*	-.23***	-.30***	.21***	.22***	.03	.14***	.02	-.03	-.10**	-.12**
18. M Anxiety	-.07	-.25***	-.31***	.20***	.18***	-.01	.14***	.01	-.07	-.10*	-.13**
19. F Lax Dis	.05	-.01	-.06	-.01	-.02	.01	.01	.02	.04	.02	-.29***
20. M Lax Dis	.05	-.01	-.05	.001	-.03	.02	.01	.02	.08*	-.02	-.33***
21. F Nonenf	.02	-.06	-.12**	.05	.06	.01	-.05	.04	.01	.03	.22***
22. M Nonenf	-.01	-.09*	-.16***	.09*	.10**	.05	.03	.03	.01	-.02	.01
23. Cohesion	-.004	.15***	.10**	-.08*	-.07	-.02	-.10**	.14***	.14***	.27***	.25***
24. Conflict	-.01	-.10**	-.10**	.03	.06	.07	.14***	-.02	-.14***	-.22***	-.20***
25. Organiz	-.07	.07*	.05	-.05	-.03	-.03	-.04	-.05	.08*	.12**	.11**
26. Int Sx T1	.06	-.10**	-.11**	.06	.05	.002	.18***	-.19***	-.34***	-.31***	-.11**
27. Ext Sx T1	.08*	-.17***	-.20***	.15***	.18***	.05	.27***	-.03	-.30***	-.24***	-.24***
28. Age T2	.56***	.01	-.04	-.11**	-.13**	-.13**	-.13**	-.002	.02	-.02	.04
29. Anx/Dep T2	.04	-.02	-.06	.05	.03	.03	-.002	-.07	-.08*	-.02	-.11*
30. Withdr T2	.001	-.06	-.07	.07	.05	.03	-.02	-.13**	-.13**	-.06	-.14**
31. Agg Bx T2	.02	-.10*	-.002	.10*	.14**	.02	.08	.05	-.06	-.06	-.13**
32. Del Bx T2	.07	-.11**	-.04	.08	.09*	-.03	.14***	.01	-.04	-.10*	-.17***
33. Int Sx T2	.02	-.05	-.07	.05	.06	.03	.03	-.09*	-.08*	-.06	-.14**
34. Ext Sx T2	.04	-.10*	-.01	.09*	.14**	-.01	.08	.05	-.04	-.07	-.17***
<i>M</i>	11.42	41.47	106.91	-1.80	45.74	615.22	2.20	21.00	15.78	25.27	40.79
<i>SD</i>	0.92	13.91	15.91	0.59	23.63	289.65	3.01	3.68	2.80	3.19	6.11
<i>n</i>	775	775	774	723	766	745	769	765	764	765	686

Table 1 (continued)

Bivariate Correlations Among Continuous Study Variables

Variable	12	13	14	15	16	17	18	19	20	21	22
12. M Accept	-										
13. F Child-C	.60***	-									
14. M Child-C	.74***	.73***	-								
15. F Guilt	.01	.13***	.12**	-							
16. M Guilt	-.01	.04	.12**	.91***	-						
17. F Anxiety	-.07	.04	.10**	.66***	.64***	-					
18. M Anxiety	-.10**	.04	.10**	.62***	.66***	.91***	-				
19. F Lax Dis	-.34***	-.24***	-.24***	-.11**	-.08*	-.12**	-.03	-			
20. M Lax Dis	-.34***	-.24***	-.25***	-.09*	-.07	-.03	-.06	.74***	-		
21. F Nonenf	.06	.28***	.14***	.16***	.12**	.07	.14***	.43***	.29***	-	
22. M Nonenf	.13**	.10**	.22***	.18***	.19***	.20***	.16***	.28***	.45***	.65***	-
23. Cohesion	.24***	.22***	.17***	-.05	-.11**	-.07	-.11**	-.07	-.08*	-.02	-.03
24. Conflict	-.20***	-.16***	-.13**	.09*	.16***	.10*	.17***	.04	.01	.03	.02
25. Organiz	.11**	.10**	.08*	.01	-.04	-.04	-.08*	-.04	-.03	-.04	-.01
26. Int Sx T1	-.07	-.08*	-.02	.11**	.13**	.06	.09*	.03	.02	.04	.06
27. Ext Sx T1	-.19***	-.16***	-.07	.16***	.20***	.20***	.24***	.02	-.004	.03	.05
28. Age T2	.03	.06	.06	-.11*	-.13**	-.07	-.06	.01	-.03	.03	-.01
29. Anx/Dep T2	-.06	-.10*	-.02	.04	.08	.05	.02	-.001	.02	-.06	.03
30. Withdr T2	-.09*	.13**	-.05	.03	.04	.03	.02	.08	.07	-.03	.03
31. Agg Bx T2	-.05	-.10*	-.03	.09*	.14**	.11**	.12**	-.002	.02	.003	.07
32. Del Bx T2	-.16***	-.14**	-.12**	.09*	.09*	.14**	.15***	.07	.08	.03	.08*
33. Int Sx T2	-.09*	-.13**	-.05	.07	.10*	.08	.05	.03	.05	-.04	.04
34. Ext Sx T2	.09*	-.15***	-.08	.07	.10*	.13**	.13**	.04	.05	.02	.09*
<i>M</i>	41.93	19.04	19.75	13.85	14.24	13.32	13.50	12.14	11.90	14.19	14.48
<i>SD</i>	5.43	3.15	2.84	3.46	3.52	3.49	3.48	2.44	2.32	2.72	2.62
<i>n</i>	690	686	690	686	689	686	689	687	690	687	690

Table 1 (continued)

Bivariate Correlations Among Continuous Study Variables

Variable	23	24	25	26	27	28	29	30	31	32	33	34
23. Cohesion	-											
24. Conflict	-.52***	-										
25. Organiz	.53***	-.45***	-									
26. Int Sx T1	-.28***	.28***	-.24***	-								
27. Ext Sx T1	-.31***	.40***	-.31***	.71***	-							
28. Age T2	.05	-.08*	-.04	.05	.05	-						
29. Anx/Dep T2	-.18***	.14**	-.14**	.19***	.12**	.01	-					
30. Withdr T2	-.11**	.07	-.14***	.16***	.08*	-.01	.70***	-				
31. Agg Bx T2	-.15***	.21***	-.15***	.15***	.25***	-.03	.52***	.39***	-			
32. Del Bx T2	-.14***	.19***	-.16***	.15***	.25***	.01	.36***	.36***	.61***	-		
33. Int Sx T2	-.17***	.14***	-.16***	.21***	.13**	-.01	.87***	.82***	.56***	.42***	-	
34. Ext Sx T2	-.15***	.21***	-.18***	.15***	.24***	-.01	.52***	.44***	.93***	.79***	.58***	-
<i>M</i>	7.24	3.17	5.63	48.80	49.12	16.09	3.80	2.67	7.02	3.53	45.03	48.59
<i>SD</i>	1.85	2.20	2.15	9.30	10.13	0.45	4.42	2.31	5.34	2.98	10.72	10.88
<i>n</i>	763	763	763	727	727	624	624	624	624	624	624	624

Note. T1 = Time 1 (ages 10-12); T2 = Time 2 (age 16); SES = socioeconomic status; FSIQ = Wechsler Intelligence Scale for Children, Full-Scale IQ at T1; VT FA log = Vigilance Test false alarms, log transformed at T1; Q score = Porteus Maze Qualitative score at T1; Stroop Int = Stroop Color Word Test interference score at T1; FT Distract = Forbidden Toys mean distraction score at T1; Approach = DOTS-R approach subscale at T1; Flexibility = DOTS-R flexibility subscale at T1; Pos Mood = DOTS-R mood quality subscale at T1; F = Father; M = Mother; Accept = CRPBI parental acceptance at T1; Child-C = CRPBI parental child-centeredness at T1; Guilt = CRPBI parental control through guilt at T1; Anxiety = CRPBI parental instilling persistent anxiety at T1; Lax Dis = CRPBI parental lax discipline at T1; Nonenf = CRPBI parental nonenforcement of rules at T1; Cohesion = FES cohesion at T1; Conflict = FES conflict at T1; Organiz = FES organization at T1; Int Sx T1 = CBCL internalizing composite T-score; Ext Sx T1 = CBCL externalizing composite T-score; Anx/Dep = YSR anxious/depressed subscale; Withdr = YSR withdrawn subscale; Agg Bx = YSR aggressive behavior subscale; Del Bx = YSR delinquent behavior subscale; Int Sx T2 = YSR internalizing composite T-score; Ext Sx T2 = YSR externalizing composite T-score.

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

Aim 1: Identify profiles of risk and resilience factors in middle childhood

A one-class LPA model (i.e., the independence model) of child-, parent-, and family-level risk and resilience factors was initially run, followed by models with additional classes that were incremented one class at a time. Table 2 describes fit information (i.e., log likelihood ratio, AIC, BIC, ABIC, p values for the BLRT, entropy, smallest class size) for LPA models with one through five classes. As previously noted, Monte Carlo simulations indicate that the BLRT and BIC indices provide the most reliable indicators of model fit (Nylund et al., 2007a), so these indices primarily were considered in model selection.

Examining results for the LPA in Table 2, fit indices (i.e., log likelihood, AIC, BIC, ABIC) decreased as the number of classes increased, indicating a better fitting model with each additional class. The BLRT also remained significant ($p < .05$) with each additional class. However, the five-class model did not reveal substantively distinct or meaningful classes, indicating that youth in the additional class beyond the four-class model likely had extreme values on some scores and were placed into their own class.

Table 2

Fit Indices for Models of Childhood Risk With 1 to 5 Latent Profiles

No. of classes	1	2	3	4	5
No. of free parameters	44	67	90	113	136
Log likelihood	-22441.03	-21666.33	-21084.03	-20857.38	-20673.49
AIC	44970.05	43466.68	42348.07	41940.76	41618.97
BIC	451774.78	43778.42	42766.82	42466.54	42251.76
ABIC	45035.06	43035.06	42481.03	42107.71	41819.89
BLRT p value	N/A ^a	<.001	<.001	<.001	<.001
Entropy	1	0.85	0.83	0.85	0.83
Smallest class size n (%)	775 (100%)	247 (32%)	196 (25%)	105 (14%)	98 (13%)

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = Sample size adjusted BIC; BLRT = Bootstrap likelihood ratio test.

^aBLRT is not available for the one-class model.

Taken together, the four-class model appears to best fit the data compared to models with fewer classes. The four-class model also had adequate delineation of classes as indicated by acceptable entropy (.85). Posterior class probabilities ranged from .91 to .94, indicating that a high percentage of youth were placed into a class that reflected their respective levels of child-, parent-, and family-level risk factors. The smallest class size (14%, $n = 105$) was both reasonable in size and conceptually meaningful. In sum, multiple fit indices and parameters, as well as conceptual meaningfulness and parsimony, indicated that the four-class model best fit the data at Time 1.

Figure 1 depicts class means for each risk or resilience factor for the four-class model. Consistent with naming conventions, I labeled classes based on the factors that most clearly differentiated them, namely, parent-level factors. Despite this approach to naming, below I also characterize each class based on child- and family-level factors. Individuals in the largest class, termed the “Accepting, Autonomy-Promoting Parents” class (hereafter, “Accepting Parents” class; $n = 354$, 46%), were distinguished by elevated levels of maternal and paternal acceptance and child-centeredness (approaching or greater than 0.5 *SDs* above the current sample mean) and attenuated levels of maternal and paternal control through guilt and instilling persistent anxiety (0.5 *SDs* or more below the current sample mean). These youth also demonstrated average EF skills and temperament, had parents who used structured disciplinary styles, and had cohesive, organized families with lower levels of conflict.

One quarter of youth were placed in the “Child-Centered, Psychologically Controlling Parents” class (hereafter, “Controlling Parents” class; $n = 190$, 25%). These youth were distinguished by high levels of maternal and paternal control through guilt

and instilling persistent anxiety (greater than 1 *SD* above the sample mean), as well as elevated maternal and paternal levels of child-centeredness (approaching or greater than 0.5 *SDs* above the current sample mean). Compared to the overall sample means on EF tasks, youth in the Controlling Parents class demonstrated higher levels of impulsivity, poorer self-regulation, and average inhibition abilities. These youth also demonstrated average temperamental features and family cohesion, conflict, and organization.

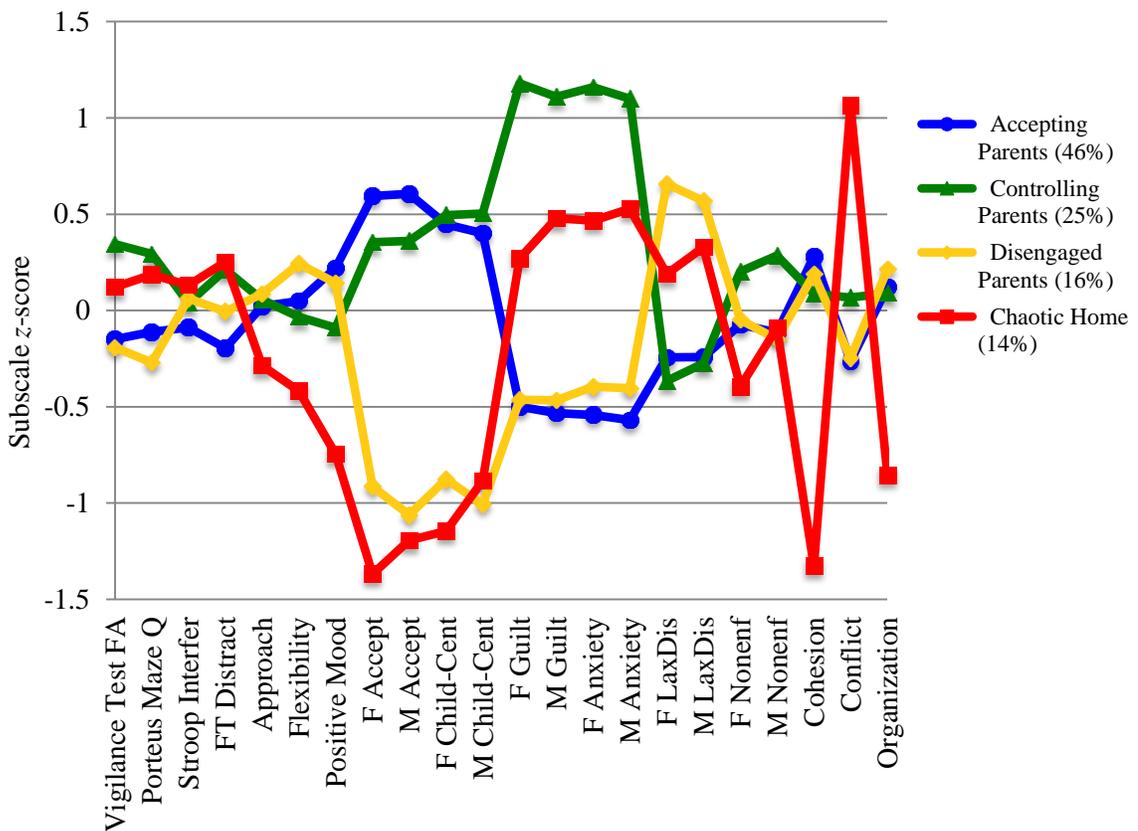


Figure 1. Z-Scores for the four-class model of childhood risk profiles at Time 1 ($N = 775$).

Note. FA = False alarms (impulsivity); Q = Qualitative score (impulsivity); Interfer = Interference (inhibition); FT Distract = Forbidden Toys mean distraction score (self-regulation); F = Father; M = Mother; Accept = Acceptance; Child-Cent = Child-centeredness; Guilt = Control through guilt; Anxiety = Instilling persistent anxiety; LaxDis = Lax discipline; Nonenf = Nonenforcement of rules.

Individuals in the “Disengaged Parents” class ($n = 126$, 16%) were distinguished by low levels of maternal and paternal acceptance and child-centeredness (approaching or greater than 1 *SD* above the current sample mean), elevated levels of maternal and paternal lax discipline (greater than 0.5 *SDs* above the current sample mean), and attenuated levels of maternal and paternal control through guilt (approaching 0.5 *SDs* below the current sample mean). These youth also demonstrated average EF abilities and temperamental features and had cohesive, organized families with lower levels of conflict.

Individuals in the smallest class, termed the “Chaotic Home” class ($n = 105$, 14%), were distinguished by low levels of child positive mood (greater than 0.5 *SDs* below the current sample mean), low levels of family cohesion (greater than 1 *SD* below the current sample mean), high levels of family conflict (greater than 1 *SD* above the current sample mean), low levels of family organization (more than 0.5 *SDs* below the current sample mean), low levels of maternal and paternal acceptance and child-centeredness (approaching or more than 1 *SD* below the current sample mean), and elevated levels of maternal control through guilt and maternal and paternal instilling persistent anxiety (approaching or greater than 0.5 *SDs* from the current sample mean). Compared to the overall sample means, youth in the Chaotic Home class demonstrated average EF skills, lower levels of flexibility, and more relaxed parental disciplinary styles.

Auxiliary analyses. Omnibus equality of means tests and follow-up pairwise comparisons for auxiliary analyses are presented in Table 3. The omnibus chi-squared test assessing class differences in terms of sex was significant ($\chi^2 = 30.58$, $p < .001$, $\phi =$

.20). Pairwise comparisons revealed that members of the Controlling Parents, Disengaged Parents, and Chaotic Home classes were more likely to be males than members of the Accepting Parents class ($\chi^2 = 28.95, p < .001, \phi = .23$; $\chi^2 = 4.83, p = .028, \phi = .10$; $\chi^2 = 6.59, p = .010, \phi = .12$, respectively). Pairwise comparisons also revealed that members of the Controlling Parents class were more likely to be males than members of the Disengaged Parents class ($\chi^2 = 4.66, p = .031, \phi = .12$). The omnibus chi-squared test assessing class differences in age was also significant ($\chi^2 = 23.00, p < .001, \phi = .17$). Pairwise comparisons revealed that members of the Accepting Parents, Disengaged Parents, and Chaotic Home classes were older than members of the Controlling Parents class ($\chi^2 = 19.80, p < .001, \phi = .19$; $\chi^2 = 14.38, p < .001, \phi = .21$; $\chi^2 = 8.74, p = .003, \phi = .17$, respectively). The omnibus chi-squared test for between-class differences in ethnicity was significant ($\chi^2 = 20.04, p < .001, \phi = .16$). Pairwise comparisons indicated that youth in the Controlling Parents and Chaotic Home classes were more likely to be non-Caucasian than youth in the Accepting Parents class ($\chi^2 = 11.44, p = .001, \phi = .15$; $\chi^2 = 12.15, p < .001, \phi = .16$, respectively), as well as the Disengaged Parents class ($\chi^2 = 5.21, p = .023, \phi = .13$; $\chi^2 = 5.40, p = .020, \phi = .15$, respectively). The omnibus chi-squared test for between-class differences in SES was significant ($\chi^2 = 38.58, p < .001, \phi = .22$). Pairwise comparisons indicated that youth in the Accepting Parents and Disengaged Parents classes came from families with higher SES compared to youth in the Controlling Parents ($\chi^2 = 23.29, p < .001, \phi = .21$; $\chi^2 = 9.56, p = .002, \phi = .17$, respectively) and Chaotic Home ($\chi^2 = 23.57, p < .001, \phi = .23$; $\chi^2 = 10.39, p = .001, \phi = .21$, respectively) classes.

An omnibus chi-squared test also indicated that classes differed in regard to

paternal psychiatric status ($\chi^2 = 22.77, p < .001, \phi = .17$). Members of the Controlling Parents and Chaotic Home classes were more likely to have fathers with a lifetime history of SUD or other psychiatric disorder than members of the Accepting Parents class ($\chi^2 = 14.66, p < .001, \phi = .16$; $\chi^2 = 14.56, p < .001, \phi = .18$, respectively).

An omnibus chi-squared test indicated that classes differed in regard to FSIQ ($\chi^2 = 57.87, p < .001, \phi = .27$). Pairwise comparisons revealed that youth in the Accepting Parents class had higher FSIQs compared to youth in the Controlling Parents ($\chi^2 = 32.79, p < .001, \phi = .25$) and Chaotic Home ($\chi^2 = 28.61, p < .001, \phi = .25$) classes. Further, youth in the Disengaged Parents class had higher FSIQs compared to youth in Controlling Parents ($\chi^2 = 26.42, p < .001, \phi = .29$) and Chaotic Home ($\chi^2 = 21.87, p < .001, \phi = .31$) classes.

Auxiliary analyses were also performed examining Time 1 internalizing and externalizing composite T-scores from the CBCL. An omnibus chi-squared test indicated that classes differed in regard to internalizing symptoms ($\chi^2 = 36.58, p < .001, \phi = .22$). Pairwise comparisons revealed that youth in the Chaotic Home class had higher levels of internalizing symptoms compared to youth in the Accepting Parents ($\chi^2 = 35.04, p < .001, \phi = .28$), Controlling Parents ($\chi^2 = 16.24, p < .001, \phi = .23$), and Disengaged Parents ($\chi^2 = 23.61, p < .001, \phi = .32$) classes. In regard to externalizing symptoms, an omnibus chi-squared test also indicated class differences ($\chi^2 = 80.44, p < .001, \phi = .32$). Specifically, pairwise comparisons revealed that youth in the Chaotic Home class demonstrated higher levels of externalizing symptoms compared to youth in the Accepting Parents ($\chi^2 = 72.77, p < .001, \phi = .40$), Controlling Parents ($\chi^2 = 19.99, p < .001, \phi = .26$), and Disengaged Parents ($\chi^2 = 35.59, p < .001, \phi = .39$) classes. Additionally, youth in the Controlling

Parents class demonstrated higher levels of externalizing symptoms compared to youth in the Accepting Parents class ($\chi^2 = 17.89, p < .001, \phi = .18$).

Auxiliary analyses considering whether childhood risk profile classes differed with regard to youth-reported internalizing and externalizing symptoms at Time 2 were also performed using composite T-scores from the YSR. Analyses revealed that the four childhood risk profiles differed in regard to Time 2 internalizing ($\chi^2 = 7.85, p = .049, \phi = .11$) and externalizing ($\chi^2 = 13.33, p = .004, \phi = .15$) symptoms. Pairwise comparisons indicated that compared to the Accepting Parents class, youth in the Chaotic Home class demonstrated higher levels of internalizing ($\chi^2 = 5.64, p = .018, \phi = .12$) and externalizing ($\chi^2 = 9.85, p = .002, \phi = .16$) symptoms at Time 2. Compared to the Accepting Parents class, the Controlling Parents class also had higher levels of internalizing ($\chi^2 = 4.16, p = .042, \phi = .10$) and externalizing ($\chi^2 = 4.96, p = .026, \phi = .11$) symptoms at Time 2.

Aim 2: Identify profiles of internalizing and externalizing symptoms in adolescence

Results for the LPA of internalizing and externalizing symptoms in adolescence (Time 2) indicated that a three-class model best fit the data. As evinced in Table 4, fit indices (i.e., log likelihood, AIC, BIC, ABIC) decreased as the number of classes increased, indicating a better fitting model with each additional class. The BLRT also remained significant ($p < .05$) with each additional class. However, the smallest class size in the four-class model only included 2% of the sample, which suggests possible overfitting of the data. Additionally, the four-class model did not reveal substantively distinct or meaningful classes, indicating that youth in the additional class beyond the three-class model likely had extreme values on some scores and were placed into their own class.

Table 3

Omnibus Equality of Means Tests and Follow-Up Pairwise Comparisons for Childhood Risk Profiles

Categorical Variables												
	Accepting Parents (<i>n</i> = 354)		Controlling Parents (<i>n</i> = 190)		Disengaged Parents (<i>n</i> = 126)		Chaotic Home (<i>n</i> = 105)		Omnibus χ^2 test			Pairwise Comparisons
	<i>n</i> (%)		<i>n</i> (%)		<i>n</i> (%)		<i>n</i> (%)		χ^2	<i>p</i>	ϕ	
Sex (male)	215 (61%)		162 (85%)		92 (73%)		80 (76%)		30.58	<.001	.20	CP, DP, CH > AP; CP > DP
Ethnicity (non-Caucasian)	59 (17%)		65 (34%)		25 (20%)		39 (37%)		20.04	<.001	.16	CP, CH > AP, DP
Paternal Psychiatric Status (Hx of dx)	159 (45%)		123 (65%)		69 (55%)		72 (68%)		22.77	<.001	.17	CP, CH > AP
Dimensional Variables												
	Accepting Parents (<i>n</i> = 354)		Controlling Parents (<i>n</i> = 190)		Disengaged Parents (<i>n</i> = 126)		Chaotic Home (<i>n</i> = 105)		Omnibus χ^2 test			Pairwise Comparisons
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	χ^2	<i>p</i>	ϕ	
Age	11.53	0.05	11.10	0.08	11.55	0.09	11.46	0.09	23.00	<.001	.17	AP, DP, CH > CP
SES	44.44	0.79	37.69	1.07	43.11	1.37	36.57	1.41	38.58	<.001	.22	AP, DP > CP, CH
FSIQ	110.52	0.91	101.16	1.27	110.76	1.36	100.56	1.62	57.87	<.001	.27	AP, DP > CP, CH
Int. Sx T1	47.30	0.50	49.12	0.77	47.55	0.88	54.99	1.20	36.58	<.001	.22	CH > AP, CP, DP
Ext. Sx T1	46.14	0.51	50.65	0.89	48.16	0.91	57.66	1.25	80.44	<.001	.32	CH > AP, CP, DP; CP > AP
Int. Sx T2	43.75	0.69	46.32	0.98	44.83	1.06	47.30	1.32	7.85	.049	.11	CP, CH > AP
Ext. Sx T2	46.75	0.69	49.57	1.00	49.53	1.05	51.76	1.44	13.33	.004	.15	CP, CH > AP

Note. AP = Accepting Parents; CP = Controlling Parents; DP = Disengaged Parents; CH = Chaotic Home; Hx of dx = Lifetime history of substance use disorder or psychiatric disorder; SES = socioeconomic status; FSIQ = Full-Scale IQ; Int. Sx T1 = CBCL internalizing composite T-score; Ext. Sx T1 = CBCL externalizing composite T-score; Int. Sx T2 = YSR internalizing composite T-score; Ext. Sx T2 = YSR externalizing composite T-score.

The three-class model also had adequate delineation of classes as indicated by acceptable entropy (.82). Posterior class probabilities ranged from .84 to .94, indicating that a high percentage of youth were placed into a class that reflected their respective levels of internalizing and externalizing symptoms. The smallest class size (10%, $n = 60$) was reasonable in size and conceptually meaningful. Thus, multiple fit indices and parameters, as well as conceptual meaningfulness and parsimony, indicated that the three-class model best fit the data at Time 2.

Table 4

Fit Indices for Models of Adolescent Symptoms With 1 to 4 Latent Profiles

No. of classes	1	2	3	4
No. of free parameters	8	13	18	23
Log likelihood	-3539.67	-3168.57	-3082.69	-3004.52
AIC	7095.34	6363.14	6201.38	6055.03
BIC	7130.83	6420.81	6281.23	6157.07
ABIC	7105.43	6379.54	6224.08	6084.04
BLRT p value	N/A ^a	<.001	<.001	<.001
Entropy	1	0.94	0.82	0.85
Smallest class size n (%)	624 (100%)	111 (18%)	60 (10%)	10 (2%)

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = Sample size adjusted BIC; BLRT = Bootstrap likelihood ratio test.

^aBLRT is not available for the one-class model.

Figure 2 depicts class means for internalizing (withdrawn and anxious/depressed subscales) and externalizing (aggressive behavior and delinquent behavior subscales) symptoms for the three-class model at Time 2. Most youth were placed in the “Low Symptoms” class ($n = 411$, 66%), distinguished by attenuated levels of internalizing and externalizing symptoms (approaching or more than 0.5 SD s below the current sample mean). One quarter of youth were placed in the “Moderate Internalizing and Externalizing Symptoms” class (hereafter, “Moderate Symptoms” class; $n = 153$, 25%),

distinguished by elevated levels of internalizing (approaching 0.5 *SDs* above the current sample mean) and externalizing (greater than 0.5 *SDs* above the current sample mean) symptoms. Lastly, individuals in the smallest class, termed the “High Internalizing/Moderate Externalizing Symptoms” class (hereafter, “High Int./Mod. Ext. Symptoms” class; $n = 60$, 10%), were distinguished by high levels of anxiety/depression symptoms (greater than 2 *SDs* above the current sample mean) and withdrawn symptoms (approaching 2 *SDs* above the current sample mean), as well as elevated levels of aggressive (greater than 1 *SD* above the current sample mean) and delinquent (approaching 1 *SD* above the current sample mean) behaviors.

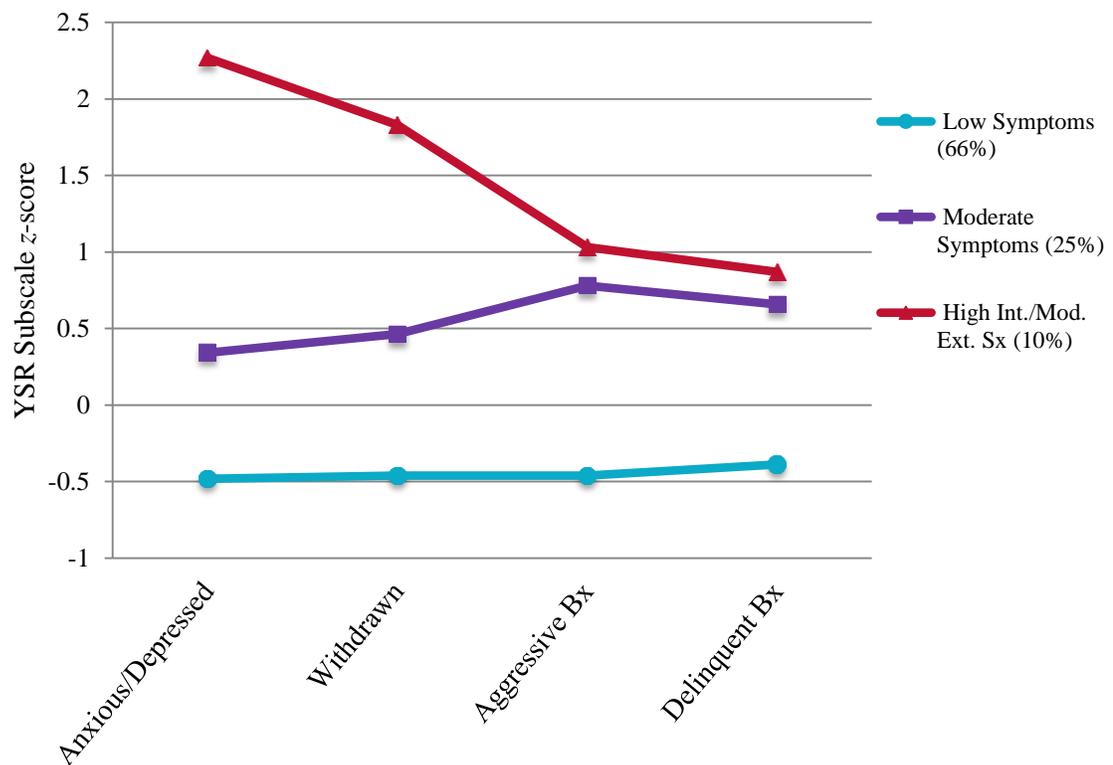


Figure 2. Z-scores for the three-class model of adolescent internalizing and externalizing symptoms at Time 2 ($n = 624$).

Note. YSR = Youth Self-Report; Sx = symptoms; Bx = behaviors.

Auxiliary analyses. Omnibus equality of means tests and follow-up pairwise comparisons for auxiliary analyses are presented in Table 5. The omnibus chi-squared test assessing class differences in regard to sex was significant ($\chi^2 = 6.66, p = .036, \phi = .10$). Pairwise comparisons revealed that members of the Low Symptoms class were more likely to be males than members of the High Int./Mod. Ext. Symptoms class ($\chi^2 = 6.10, p = .013, \phi = .11$). The omnibus chi-squared test for between-class differences in SES was significant ($\chi^2 = 7.44, p = .024, \phi = .11$). Pairwise comparisons indicated that youth in the Low Symptoms class came from families with higher SES compared to youth in the Moderate Symptoms class ($\chi^2 = 6.65, p = .010, \phi = .11$). Analyses revealed that the three classes did not differ significantly in regard to age ($\chi^2 = 0.11, p = .945, \phi = .01$) or ethnicity ($\chi^2 = 1.72, p = .422, \phi = .05$).

An omnibus chi-squared test also indicated that classes differed in regard to paternal psychiatric status ($\chi^2 = 11.57, p = .003, \phi = .14$). Members of the High Int./Mod. Ext. Symptoms class were more likely to have fathers with a lifetime history of SUD or other psychiatric disorder compared to members of the Low Symptoms class ($\chi^2 = 8.86, p = .003, \phi = .14$).

Auxiliary analyses considering whether adolescent symptom profiles differed with regard to parent-reported internalizing and externalizing symptoms at Time 1. Analyses revealed that the three adolescent symptom profiles differed in regard to Time 1 internalizing ($\chi^2 = 21.00, p < .001, \phi = .18$) and externalizing ($\chi^2 = 30.73, p < .001, \phi = .22$) symptoms. Pairwise comparisons indicated that compared to the Low Symptoms class, youth in the Moderate Symptoms class demonstrated higher levels of internalizing ($\chi^2 = 11.13, p = .001, \phi = .15$) and externalizing ($\chi^2 = 26.44, p < .001, \phi = .24$) symptoms

Table 5

Omnibus Equality of Means Tests and Follow-Up Pairwise Comparisons for Adolescent Symptom Profiles

Categorical Variables										
	Low Symptoms (<i>n</i> = 411)		Moderate Symptoms (<i>n</i> = 153)		High Int./Mod. Ext. Symptoms (<i>n</i> = 60)		Omnibus χ^2 test			Pairwise Comparisons
	<i>n</i> (%)		<i>n</i> (%)		<i>n</i> (%)		χ^2	<i>p</i>	ϕ	
Sex (male)	309 (75%)		108 (71%)		27 (46%)		6.66	.036	.10	Low Sx > High Int./Mod. Ext. Sx
Ethnicity (non-Caucasian)	59 (17%)		65 (34%)		25 (20%)		1.72	.422	.05	N/A
Paternal Psychiatric Status (Hx of dx)	199 (48%)		91 (59%)		42 (71%)		8.86	.003	.14	High Int./Mod. Ext. Sx > Low Sx
Dimensional Variables										
	Low Symptoms (<i>n</i> = 411)		Moderate Symptoms (<i>n</i> = 153)		High Int./Mod. Ext. Symptoms (<i>n</i> = 60)		Omnibus χ^2 test			Pairwise Comparisons
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	χ^2	<i>p</i>	ϕ	
Age T2	16.09	0.02	16.11	0.05	16.09	0.06	0.11	.945	.01	N/A
SES	43.06	0.73	38.63	1.41	40.65	1.83	7.44	.024	.11	Low Sx > Mod Sx
Int. Sx T1	47.30	0.48	51.22	0.98	52.19	1.33	21.00	<.001	.18	Mod Sx, High Int./Mod. Ext. Sx > Low Sx
Ext. Sx T1	46.83	0.50	53.27	1.05	50.78	1.49	30.73	<.001	.22	Mod Sx, High Int./Mod. Ext. Sx > Low Sx

Note. Low Sx = Low Symptoms class; High Int./Mod. Ext. Sx = High Internalizing/Moderate Externalizing Symptoms class; Mod Sx = Moderate Symptoms class; Hx of dx = Lifetime history of substance use disorder or psychiatric disorder; SES = socioeconomic status; Int. Sx T1 = CBCL internalizing composite T-score; Ext. Sx T1 = CBCL externalizing composite T-score.

at Time 1. Similarly, compared to the Low Symptoms class, the High Int./Mod. Ext. Symptoms class had higher levels of internalizing ($\chi^2 = 12.08, p = .001, \phi = .15$) and externalizing ($\chi^2 = 6.39, p = .011, \phi = .11$) symptoms at Time 1.

Aim 3: Examine the transition of childhood risk profile membership (Time 1) to adolescent internalizing and externalizing symptom profile membership (Time 2)

Results from the LTA are presented in Table 6, which shows the transition probabilities from the childhood risk profiles identified at ages 10-12 (Time 1) to the symptom profiles identified at age 16 (Time 2). Results indicated that the majority (>50%) of youth in the Accepting Parents, Controlling Parents, and Disengaged Parents classes identified at Time 1 transitioned to the Low Symptoms class at Time 2.

Table 6

Transition Probabilities for Latent Classes from Time 1 to Time 2

Time 1 (Age 10-12): Risk Profiles	Time 2 (Age 16): Symptom Profiles		
	Low Symptoms (<i>n</i> = 557, 72%)	Moderate Symptoms (<i>n</i> = 158, 20%)	High Int./Mod. Ext. Sx (<i>n</i> = 60, 8%)
Accepting Parents (<i>n</i> = 354, 46%)	.713	.208	.080
Controlling Parents (<i>n</i> = 190, 25%)	.607	.273	.120
Disengaged Parents (<i>n</i> = 126, 16%)	.674	.230	.096
Chaotic Home (<i>n</i> = 105, 14%)	.476	.380	.144

Note. High Int./Mod. Ext. Sx = High internalizing and moderate externalizing symptoms.

Among youth in the Accepting Parents class at Time 1, 71.3% transitioned into the Low Symptoms class at Time 2; 20.8% transitioned into the Moderate Symptoms class and only 8% transitioned into the High Int./Mod. Ext. Symptoms class. Among youth in the Controlling Parents class at Time 1, 60.7% transitioned into the Low

Symptoms class, 27.3% transitioned into the Moderate Symptoms class, and 12.0% transitioned into the High Int./Mod. Ext. Symptoms class. Among youth in the Disengaged Parents class at Time 1, 67.4% transitioned into the Low Symptoms class, 23.0% transitioned into the Moderate Symptoms class, and 9.6% transitioned into the High Int./Mod. Ext. Symptoms class. Among youth in the Chaotic Home class at Time 1, however, 47.6% of youth transitioned into the Low Symptoms class at Time 2, whereas 38.0% transitioned into the Moderate Symptoms class and 14.4% transitioned into the High Int./Mod. Ext. Symptoms class.

Additionally, multinomial logistic regression was conducted to examine associations among childhood risk profile membership (nominally coded 1-4) and covariates (i.e., child sex, SES, paternal psychiatric history, and Time 1 internalizing and externalizing symptoms) with adolescent symptom profile membership (nominally coded 1-3) to determine whether childhood risk profiles could predict adolescent profile membership above and beyond these other covariates. Youth were more likely to be in the Moderate Symptoms profile than the Low Symptoms profile if they had higher Time 1 externalizing symptoms ($\beta = 1.04, p = .003$) or if they were in the Chaotic Home risk profile as compared to the Accepting Parents profile ($\beta = 1.83, p = .039$). Youth were more likely to be in the High Int./Moderate Ext. Symptoms profile compared to the Low Symptoms profile if they had higher Time 1 internalizing symptoms ($\beta = 1.05, p = .025$) or were female ($\beta = 0.32, p < .001$). Youth with higher Time 1 internalizing symptoms were more likely to be in the High Int./Mod. Ext. Symptoms profile than the Moderate Symptoms profile ($\beta = 1.05, p = .029$), whereas youth with higher Time 1 externalizing symptoms were more likely to be in the Moderate Symptoms profile ($\beta = 0.96, p = .049$).

CHAPTER 4

DISCUSSION

The field of developmental psychopathology has long sought to understand risk and resilience among youth, leading to questions such as how do child-specific and contextual factors confer or buffer risk, how do symptoms manifest in adolescence, and what are the longitudinal outcomes of childhood risk and resilience? The present study contributes to the extant literature by addressing these questions through a person-centered approach in a large, prospective sample. The present analyses considering child-, parent-, and family-level factors identified specific childhood risk profiles primarily distinguished by the presence of parent-level factors (as evinced in the Accepting Parents, Controlling Parents, and Disengaged Parents classes), while a higher risk class (Chaotic Home class) was distinguished by the presence of child-specific and contextual factors. The results also support the notion of distinct internalizing and externalizing symptom profiles in adolescence, with classes distinguished by low levels of symptoms, moderate levels of symptoms, and elevated internalizing/moderate externalizing symptoms. Study findings also identified transitions from childhood risk profiles to adolescent symptom profiles, revealing that the majority of youth across the accepting parents, controlling parents, and disengaged parents risk profiles transitioned to the low symptoms profile. Notably, more than half of the youth from the chaotic home profile transitioned into adolescent profiles demarcated by some level of internalizing and externalizing symptoms. The aims and associated results, presented below, attempt to delineate pathways to risk and resilience among youth. Further, findings can inform intervention efforts to emphasize resilience among youth and build upon potential

protective factors.

Aim 1: Identify profiles of risk and resilience factors in middle childhood

The use of a person-centered approach allowed for the identification of distinct childhood risk profiles that differed in the quality and frequency of child EF and temperament, parenting styles and behaviors, and family environment. Contrary to initial hypotheses, the multiple profiles identified appeared to be most robustly delineated by parental factors rather than a combination of child-, parent-, and family-level factors. Indeed, the largest class was the Accepting Parents class (46% of the sample), which was distinguished by youth with typical levels of EF skills, temperament, and family environmental factors, as well as parents with high levels of acceptance and child-centeredness. The Accepting Parents class may therefore be considered as a low risk class as initially hypothesized, and is in line with past research that similarly identified a low risk class among other risk profiles (Lanza et al., 2010; Parra et al., 2006; Rettew et al., 2008).

The Chaotic Home class (14% of the sample) was distinguished by multiple risk factors across the child, parent, and family domains (i.e., low levels of child positive mood, family cohesion, family organization, and parental acceptance and child-centeredness, as well as high levels of family conflict and parental control through guilt and instilling persistent anxiety). As the class name suggests, youth in the Chaotic Home class appear to have a chaotic family life, in which family members do not act as a cohesive family unit and parents do not engage in practices that embody authoritative parenting. As such, the Chaotic Home class appears to be representative of the multi-risk groups identified in the extant literature (Lanza et al., 2010; Parra et al., 2006; Rettew et

al., 2008).

Unexpectedly, a childhood risk profile demarcated by youth with controlling parents also emerged. The Controlling Parents class (25% of the sample) was distinguished by parents who reportedly demonstrated high levels of control through guilt and instilling persistent anxiety. As such, youth in this class likely have parents who regulate and control their child's behavior through the use of psychological control by inducing guilt and fear as a consequence for bad behavior. Parental psychological control has been linked to negative sequelae in the literature, such as internalizing and externalizing problems, as well as interpersonal difficulties with peers and parents (for a review, see Soenens & Vansteenkiste, 2010). However, as evinced in the Aim 3 analyses, most youth from the Controlling Parents class transitioned into the Low Symptoms class, which suggests that not all youth with parents who use psychologically controlling strategies to regulate child behavior are on a pathway involving risk for psychological symptoms. Rather, these psychologically controlling parenting practices may be effective in managing the behavior of some youth and thus serve as a resilience factor in those cases.

Another unexpected class also emerged, distinguished by youth with disengaged parents. The Disengaged Parents class (16% of the sample) consisted of youth with low levels of parental acceptance, child-centeredness, and control through guilt, as well as high levels of parental lax discipline. It is likely that youth in this class came from families in which parents were not highly engaged in positive, involved parenting behaviors or had difficulties with developing strong parent-child relationships, thus leading them to have to have challenges regulating their child's behavioral and emotional

functioning. Youth may in turn develop anger or resentment towards their parents, which may negatively impact their emotional expression and other interpersonal relationships (Rohner, 2004) and consequently lead to internalizing and externalizing problems (e.g., Forehand & Nousiainen, 1993; Lansford et al., 2014; Rothbaum & Weisz, 1994; Weaver & Prelow, 2005). However, as demonstrated in the current Aim 3 analyses, most youth in the Disengaged Parents class transitioned into the Low Symptoms class. This finding suggests that despite the presence of disengaged parents, not all youth would be expected to be at risk for psychological symptoms. Indeed, youth in this class may be protected by child-specific features, such as their average or developmentally typical EF abilities and temperamental features. Interestingly, youth in the Disengaged Parents class demonstrated average levels of family cohesion, organization, and conflict, which suggests that the broader family unit may be functioning more typically and may also serve as a resilience factor in some cases.

Additional analyses distinguished the four identified childhood risk profiles. Youth in the Chaotic Home class demonstrated higher levels of internalizing and externalizing symptoms in middle childhood compared to all other risk profiles, as well as higher levels of internalizing and externalizing symptoms in adolescence compared to youth in the Accepting Parents class. Youth in the Controlling Parents class also demonstrated higher levels of childhood externalizing symptoms, as well as adolescent internalizing and externalizing symptoms compared to youth in the Accepting Parents class. These findings suggest that the Chaotic Home childhood risk profile may be at greatest risk for symptomology in childhood and adolescence, which is consistent with the findings from Lanza and colleagues (2010). Additionally, results indicate that youth

in the Accepting Parents class may indeed be a low risk class, as they demonstrated lower levels of symptoms compared to other classes in childhood and adolescence.

Other interesting class distinctions also emerged when considering demographics and paternal psychiatric status. For example, the Accepting Parents class was more likely to be comprised of females compared to the other three classes, which is noteworthy given that the overall sample is predominantly male. This finding suggests that girls were more likely to be at a lower level of risk and warrants additional research to evaluate why girls were more likely to have accepting, child-centered parents. Additionally, though youth in the overall sample predominately identified as Caucasian, youth in the Controlling Parents and Chaotic Home classes were more likely to be non-Caucasian compared to youth in the Accepting Parents and Disengaged Parents classes. Youth in the Controlling Parents and Chaotic Home classes also came from families with lower SES compared to youth in the Accepting Parents and Disengaged Parents classes. Youth in the Controlling Parents class also were younger than youth in the other three classes. In regard to general intelligence, youth in the Accepting Parents class had higher IQs compared to youth in the other three classes, whereas youth in the Disengaged Parents class had IQs higher than those of youth in the Controlling Parents class. Lastly, youth in the Controlling Parents and Chaotic Home classes were more likely to have fathers with a lifetime history of SUD or other psychiatric disorder compared to youth in the Accepting Parents class. Taken together, findings from these auxiliary analyses suggest other potential risk factors may be at play, such as low SES or paternal psychological difficulties, which may further contribute to a child's overall risk profile. Indeed, past research has viewed demographics and/or parental history as risk factors in and of

themselves (e.g., Lanza et al., 2010), and future research can incorporate these factors more directly into the person-centered analyses to better characterize risk profiles.

Aim 2: Identify profiles of internalizing and externalizing symptoms in adolescence

The use of a person-centered approach also identified patterns of internalizing and externalizing behaviors in adolescence that differed in regard to quality and frequency of symptoms. Though there is a growing body of research that similarly uses person-centered approaches to examine co-occurring internalizing and externalizing symptoms (e.g., Olino, Klein, Farmer, Seeley, & Lewinsohn, 2012; Rosato & Baer, 2012; Tolan & Henry, 1996; Vaidyanathan, Patrick, & Iacono, 2011), there is a dearth of research that examines symptoms concurrently in adolescence, a gap in the literature that the present study sought to address. Additionally, the present study sought to utilize self-report of symptoms, as compared to other reporters or use of diagnostic cut-offs, to extend existing research and better capture symptoms from a dimensional perspective.

At age 16, three profiles, rather than the initially hypothesized four profiles, of internalizing and externalizing symptoms emerged, which is not consistent with the literature (Olino et al., 2012; Rosato & Baer, 2012). As expected, a Low Symptoms class emerged, representing typically developing youth with low levels of internalizing and externalizing symptoms. A Moderate Symptoms class was also identified, comprised of youth with moderate levels of anxious/depressed, withdrawn, aggressive behavior, and delinquent behavior symptoms. This profile may be in line with the hypothesized higher externalizing/lower internalizing class, as the Moderate Symptoms class did demonstrate higher levels of externalizing compared to internalizing symptoms. A third class, the High Int./Mod. Ext. Symptoms class, was characterized by high levels of

anxious/depressed and withdrawn symptoms, as well as moderate levels of aggressive and delinquent behaviors. This class may be more similar to those classes identified in past work with co-occurring internalizing and externalizing symptoms given the presence of elevated levels of both sets of symptoms relative to other classes (Olinio et al., 2012; Tolan & Henry, 1996).

Auxiliary analyses also revealed distinctions among symptom classes. Indeed, males were more likely to be in the Low Symptoms class compared to the High Int./Mod. Ext. Symptoms class. This finding is likely due to the oversampling of males in the present study, as well as the fact that the Low Symptoms class was the largest class at Time 2. Additionally, youth in the Low Symptoms class had higher family SES compared to youth in the Moderate Symptoms class, which suggests that higher SES may buffer risk for adolescent symptomology. Past findings indicate that SES may be a proxy for helpful parenting strategies, which may in turn positively impact youth behavior (Misty, Vandewater, Huston, & McLoyd, 2002; Pinderhughes, Dodge, Zelli, Bates, & Pettit, 2000). Furthermore, families with higher SES may have greater resources, such as money, knowledge, social support, childcare opportunities, and parenting skills, which may protect against the development of psychopathology (Sentse, Veenstra, Lindenberg, Verhulst, & Ormel, 2009) or increase the likelihood of pursuing intervention if symptoms arise.

At Time 2, class differences in regard to paternal psychiatric status were found. Specifically, youth in the High Int./Mod. Ext. Symptoms class, which is the symptom profile with the greatest severity of symptoms, were more likely to have fathers with a lifetime history of a psychiatric disorder compared to members of the Low Symptoms

class. This finding is not surprising, given that paternal psychiatric status has been linked to youth psychopathology (for reviews, see Connell & Goodman, 2002, and Phares & Compas, 1992).

Adolescent symptom profile differences were also found in regard to Time 1 psychological symptoms. Youth in both the Moderate Symptoms and High Int./Mod. Ext. Symptoms classes demonstrated higher internalizing and externalizing symptoms during middle childhood compared to the Low Symptoms Class. This finding is in line with past research which suggests that youth who exhibit internalizing and externalizing symptoms in childhood are at higher risk for presenting with internalizing and externalizing problems in adolescence (e.g., Broidy et al., 2003; Feng, Shaw, & Silk, 2008; Ollendick & King, 1994).

Aim 3: Examine the transition from childhood risk profile membership (Time 1) to adolescent internalizing and externalizing symptom profile membership (Time 2)

Transitions from childhood risk profiles to adolescent symptom profiles suggest that most youth from the lowest risk class (Accepting Parents) at Time 1 transitioned to the Low Symptoms class at Time 2, which is consistent with the initial hypothesis. Most youth (> 50%) from the Controlling Parents and Disengaged Parents classes also transitioned to the Low Symptoms class, which suggests that despite the presence of psychologically controlling parents or disengaged parents, most youth in the current sample reported low levels of internalizing and externalizing symptoms during adolescence. However, among youth in the Chaotic Home class, distinguished by child-, parent-, and family-level risk factors, most youth transitioned into either the Moderate Symptoms or High Int./Mod. Ext. Symptoms class. This finding highlights that the

presence of multi-level risk factors place youth at greatest risk for symptomology during adolescence. Given that the above analyses found that youth in the High Int./Mod. Ext. Symptoms class were more likely to be male and have fathers with a lifetime history of a SUD or psychiatric disorder, it is possible that youth from the Chaotic Home class who transitioned to the High Int./Mod. Ext. Symptoms class had the most risk factors present across multiple domains in terms of frequency and/or severity.

Strengths, Limitations, and Future Directions

The present study has several methodological strengths that contribute to the literature. A primary strength was the large, diverse, and prospective sample spanning middle childhood to mid-adolescence, which allowed for analyses to consider profiles of youth at different developmental periods. Further, the consideration of patterns of multi-level (i.e., child, parent, and family) risk factors during childhood allowed for a more comprehensive approach to childhood risk that includes both child-specific qualities, as well as contextual factors. Expanding upon the existing literature, another strength of the current study is the use of person-centered statistical approaches, which provides a more nuanced perspective to examine childhood risk and adolescent symptom profiles. Specifically, this approach allowed for meaningful patterns of childhood risk factors to be identified, in addition to identifying developmentally typical and atypical patterns of internalizing and externalizing symptoms in adolescence. Additionally, the present study utilized adolescent-report of symptoms at age 16, which may more accurately depict the internal psychological experience of the study subjects as compared to other reporters.

Despite these strengths, several limitations should be acknowledged. Though the person-centered statistical approach appropriately tested the research questions, there is

no gold standard for assessing model fit, which may impact the generalizability of the findings. Additionally, when examining results, it is important to consider that the YSR used at Time 2 is not a *DSM*-referenced scale and thus is not a substitute for true diagnoses of psychopathology as might be the case for structured diagnostic interviews or other *DSM*-referenced instruments. Furthermore, raw scores, rather than T-scores, were used in the Time 2 LPA examining symptom profiles as age and sex were considered in auxiliary analyses. As such, youth with elevated symptoms in the findings may not meet full diagnostic criteria or demonstrate clinical symptom levels as might be inferred from using T-scores. However, it is still important to consider the identified symptom profiles from the current study as youth with subclinical levels of symptoms may still exhibit impairment (Angold, Costello, Farmer, Burns, & Erkanli, 1999b) and may help to identify youth who may benefit most from prevention and/or intervention efforts.

Another potential limitation is the use of the CRPBI to assess parenting behaviors in the present study. Though the CRPBI is a well-validated measure of parenting and has demonstrated good internal consistency, validity, and reliability (Margolies & Weintraub, 1977; Safford et al., 2007; Schludermann & Schludermann, 1970), it has also been criticized for its length and predictive utility (Safford et al., 2007). Despite most of the CRPBI subscales in the present study demonstrating acceptable to excellent internal consistency, the Lax Discipline and Non-enforcement of Rules subscales demonstrated poor or questionable internal consistency (α s ranging from .54 to .64) and may therefore not be good indicators of the constructs of interest. Thus, the finding that youth in the Disengaged Parents class may have elevated levels of parental lax discipline relative to other classes in the present sample should be interpreted cautiously.

Future research should aim to improve the generalizability of the findings. Given the oversampling of males in the current sample, the present findings may be more applicable to males than females. However, there are sex differences in adolescent symptomology, with females at greater risk for internalizing symptoms (e.g., Ge, Conger, & Elder, Jr., 2001). As such, future work should include a greater sampling of females. Additionally, classes were not distinguished based on youth performance on the EF laboratory tasks in the current study. As such, it is possible that the tasks used did not appropriately tap the EF constructs of interest, and future research should include both laboratory tasks and questionnaires (e.g., the Behavior Rating Inventory of Executive Function; Gioia, Isquith, Guy, & Kenworthy, 2000) to assess EF in daily life. Further, the use of additional informants (e.g., parents, teachers) across time points would increase the methodological rigor of the study. Lastly, expanding the childhood risk profiles beyond the child and family context, such as through the inclusion of peer, school, and neighborhood factors (Parra et al., 2006), may further enrich the patterns of childhood risk identified.

Conclusions and Clinical Implications

In summary, several important findings emerged. First, childhood risk profiles were identified using child-, parent-, and family-level factors, though these were largely determined based on parent-level factors. These profiles included a low risk class, as well as three other higher risk classes. Parenting behaviors appeared to demonstrate a more nuanced understanding of the identified childhood risk profiles. As evinced in the current study, youth from the multi-level risk class appeared to be at greatest risk for symptomology in both childhood and adolescence. They demonstrated the highest levels

of concurrent internalizing and externalizing symptoms; moreover, in adolescence, this class also had higher levels of symptoms compared to the low risk class, suggesting that multi-level risk factors in childhood are associated with residual impact in later years. Second, youth exhibited distinct constellations of internalizing and externalizing symptoms in adolescence. Third, regardless of childhood risk profile, most youth transitioned into a low symptoms class, which suggests that most youth may evince resilience in adolescence despite the presence of multiple risk factors in childhood. Youth presenting with multi-level risk factors in childhood appear to be at greatest risk for internalizing and externalizing symptom profiles in adolescence.

Findings from the present study contribute to our understanding of risk and resilience among youth. The identified childhood risk profiles highlight the importance of parenting behaviors, which can confer or buffer risk among youth. As such, parenting factors should be assessed among youth in addition to acquiring typical symptom and other child-specific information. Information gathered from such assessments can be applied to prevention and intervention efforts that can in turn target parenting behaviors or incorporate parents in treatment as a means of promoting resilience in childhood and beyond. From a prevention standpoint, parenting programs, such as Incredible Years, aim to enhance parenting competencies in order to promote child-specific protective factors, such as emotion regulation and social competence, which in turn can reduce behavioral problems (Borden, Schultz, Herman, & Brooks, 2010). Parents are often included in interventions aimed at reducing externalizing behaviors, such as Parent-Child Interaction Therapy (Brinkmeyer, & Eyberg, 2003) and the Coping Power program (Lochman & Wells, 2002), and to an extent, are incorporated into the treatment of youth internalizing

problems (e.g., Coping Cat; Kendall, 1994). In general, however, parents are not often emphasized in interventions directed toward treating internalizing symptoms (Sander & McCarty, 2005), and therefore may benefit from additional inclusion in interventions as suggested by the findings in the present study. Moreover, parenting factors may also be examined in future research as predictors or mediators of treatment outcomes. This type of evaluation has important implications for modifying or augmenting interventions to improve outcomes among youth based on risk profiles and potential mechanisms related to these outcomes.

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