# INFLUENCE OF PARENTAL HOSTILITY AND SOCIOECONOMIC STRESS ON CHILDREN'S INTERNALIZING SYMPTOM TRAJECTORIES FROM CHILDHOOD TO ADOLESCENCE

by

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DISSERTATION ABSTRACT

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Title: Influence of Parental Hostility and Socioeconomic Stress on Children's Internalizing Symptom Trajectories from Childhood to Adolescence

Children and adolescents with elevated internalizing symptoms are at increased risk for depression, anxiety, and other psychopathology later in life. Bioecological theory provides a framework for understanding multi-level influences on the development of internalizing symptoms during childhood and adolescence. The present study investigated predictive links between two bioecological factors (parental hostility and socioeconomic stress) and internalizing symptoms from childhood to adolescence. Hostile parenting has been associated with child and adolescent internalizing symptoms and was examined as an interpersonal factor predictive of longitudinal patterns of internalizing symptoms. Socioeconomic status, which includes parental educational attainment and household income, was examined as a structural stress factor. The study used data from two cohorts in the NIH Environmental influences on Child Health Outcomes (ECHO) program: Early Growth and Development Study (EGDS) and Family Life Project (FLP). The EGDS sample ($n$ = 561) included adopted children across the U.S. FLP participants ($n$ = 1,292) comprised a statistically representative stratified prenatal sample from six targeted rural communities in the eastern U.S. The study employed latent class growth mixture modeling (Jung & Wickrama, 2008) and multinomial regression mediation analysis to

test four hypotheses. Analyses identified three distinct heterogenous internalizing symptom classes characterized by relative symptom levels, including low (41%), moderate (39%), and higher (20%). When regressing child sex assigned at birth onto the latent class outcome without controlling for children's externalizing symptoms, females were more likely than males to belong to the higher internalizing symptom class, as compared with the low and moderate classes, as anticipated. However, these results reversed when children's externalizing symptoms were included in the model as a covariate; females were more likely than males to belong to the group characterized by low symptom levels in comparison to the higher symptom group. Findings also indicated that increasing levels of parental hostility and socioeconomic stress each predicted membership in the higher symptom class, as compared with the low and moderate symptom classes. A trending indirect effect suggested that parental hostility partially mediated the predictive effect of socioeconomic stress on membership likelihood in the higher symptom class versus the low symptom class. These results are supported by the extant literature and suggest that 1) attention to co-occurring externalizing symptoms is important to how the development of children's internalizing symptoms is understood and addressed; and 2) intervening on modifiable bioecological stressors may provide important protective influences on children's internalizing symptom trajectories.

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# CHAPTER I

## INTRODUCTION

This introduction provides an overview of the broader literature concerning the long-term sequelae of child and adolescent internalizing symptoms, specifically depression and anxiety. This section will focus on long range health outcomes and epidemiological impacts of youth internalizing symptoms in order to highlight both the importance of longitudinal empirical examinations of childhood precursors of psychopathology and the relevance for investigating youth symptomology as a humanitarian approach to an escalating public health crisis.

Internalizing problems in children and adolescents are widely accepted to be early indicators of functional problems associated with affective disorders, such as depression and anxiety. Characterized by inwardly-directed distress and maladaptive behavioral responses, early life internalizing symptoms may vary by bioecological factors, such as parent-child relationships and socioeconomic status (Gorostiaga et al., 2019; Ursache et al., 2017); by child characteristics influenced by developmental processes, such as age, sex assigned at birth based on anatomical and/or biological characteristics (Clarke, 2022), and pubertal status, (Brumariu & Kerns, 2010); and other factors, such as mental illnesses and comorbidities. Research findings indicate that internalizing symptoms that arise during preschool age often remain stable through middle childhood and adolescence (Bayer et al., 2006) and underscore the importance of studying the etiology of internalizing symptom trajectories beginning in childhood. Elevated internalizing symptoms in adolescence have been associated with increased risk for the development of later life psychopathology, including depression, anxiety, suicide, and other

detrimental outcomes, including problems with substance use and educational attainment (Davis et al., 2015; Dekker et al., 2007; Ellis et al., 2017; Fergusson et al., 2007; Kwong, López-López, et al., 2019; Marmorstein & Iacono, 2004; Nivard et al., 2017; Yaroslavsky et al., 2013).

Outcomes associated with early life internalizing symptoms are not only damaging for the individuals experiencing their long-term effects but also have alarming epidemiological implications. Among several mental health problems that stem from child and adolescent internalizing symptoms, depression and anxiety are prevalent. Depression alone represents a significant and increasing public health concern that currently affects more than 280 million people worldwide every year (Liu et al., 2020; World Health Organization, 2021). According to the 2017 Global Burden of Disease Study, depressive disorders are among three leading global causes of non-fatal loss of health and disability among both females and males and across all age groups (James et al., 2018). In the United States alone, depressive disorders directly affect more than 20 million people (Centers for Disease Control and Prevention, 2020) and have a lifetime prevalence of 20.6% (Hasin et al., 2018).

Anxiety disorders similarly affect millions of people. In 2010, 272 million cases of anxiety disorders were reported worldwide, an increase of 36% over the preceding two decades (Baxter et al., 2014). Overall prevalence for anxiety disorders was 4.0% in 2010 but was reported to be over one-third higher, at 5.5%, among young adults ages 20 to 24 with the sharpest rise occurring among children and adolescents between ages 10 and 19 (Baxter et al., 2014). Although the public health impacts of depression are profound, a growing body of research illustrates similarly detrimental long-term outcomes for anxiety

disorders. Findings from a 2016 Danish population study revealed marked increases in mortality related to anxiety disorders between 2002 and 2011, with significant contributions from comorbid depressive disorders (Meier et al., 2016). Among children, anxiety prevalence has increased dramatically in recent years. Findings from a 2019 systematic review and meta-analysis noted a relatively low overall prevalence of anxiety disorders among U.S. children and adolescents, at 3%, in order to highlight the profound role that life-limiting conditions play in accounting for the markedly higher incidences of anxiety disorders among this population (M. M. Barker et al., 2019). Three years after these results were published, and following the start of the COVID-19 global health pandemic, global anxiety and depression prevalence among youth roughly doubled from pre-pandemic estimates of 11.6% and 12.9% for anxiety and depressive disorders respectively, to 20.5% and 25.2% (Racine et al., 2021). These statistics underscore children's vulnerability to the development of internalizing symptoms and detrimental mental health problems.

The public health burden of internalizing symptom outcomes is also significant. Depression is among the most frequently reported sequelae of other diseases and serious health conditions in the United States (Vos et al., 2012). According to a 2015 U.S. study, Major Depressive Disorder (MDD) alone represented an economic cost of $210.5 billion based on data collected between 2005 and 2010 (Greenberg et al., 2015). As of 2014, depression prevalence among youth ages 12-17 was markedly lower, at 11.3%, than prevalence among adults (Zhu et al., 2019); however, long-term negative outcomes are more pronounced among those that develop depressive conditions in childhood and adolescence and annual rates continue to increase consistently. Prompted by evolving

public health concerns related to the COVID-19 pandemic and significant increases in anxiety, depression, and suicide, national public health prevention efforts in the U.S. have led to the development of recommendations for routine medical screenings for anxiety and depression (United States Preventive Services Taskforce, 2022). Given the profound impact of long-term outcomes of early internalizing symptoms on human welfare, efforts to identify vulnerability and risk factors for internalizing symptom progression, bolster prevention, and develop more effective interventions for children and adolescents represent vital humanitarian contributions to improving community health and well-being.

**Anti-Racism: A Humanitarian Perspective Guiding Conceptualization**

Recent events in U.S. history provide sobering evidence for the imperative to incorporate expressly humanitarian approaches to the way scientific research is conducted and its findings are applied. In 2020, the unjustifiable killing of George Floyd, an African American man, at the hands of a law enforcement officer reified racism anew within the cultural lexicon, underscoring the gravity of the impacts of racism on all foundational systems in the United States that meaningfully influence people's lives. The importance of including racism in a humanitarian approach to addressing public health concerns – such as adult depression and anxiety that commonly result from youth internalizing symptoms – cannot be overstated. Cascading effects of racial inequities that have continued to unfold over centuries implore researchers in every field of study to reassess the variables that systemic racism introduces into their inquiries, reconsider the assumptions upon which key constructs rely, and collect new forms of data where needed to address our most important questions.

Each of the focal constructs examined in the research detailed in this dissertation have clearly identifiable correlates with racial identity variables relevant to a U.S. context. Findings in the scientific literature have detected racial and ethnic differences in mental health outcomes (Hoggard et al., 2015; Williams, 2018) and physiological health outcomes that represent the leading causes of death in the U.S. – including cardiovascular disease (Lockwood et al., 2018; Pool et al., 2017), cancer (Zavala et al., 2021), COVID-19, and respiratory disease (Anderson et al., 2015). Racial and ethnic differences in related socioeconomic variables that drive these disparities include, but are not limited to, economic hardship, educational attainment, and neighborhood safety (Beardslee et al., 2021; Darity, 2003; Fuller-Rowell et al., 2018; Sewell, 2016). Although a direct exploration of race and ethnicity variables is outside the scope of the investigation detailed herein, this dissertation proactively seeks to identify these associations in the extant literature, consider their influences on the study sample, leverage analysis approaches to account for their nuanced effects, and explore their implications for future research, prevention, and intervention efforts focused on youth internalizing symptoms.

**Chapter Navigation and Literature Review**

This chapter begins with a detailed examination of the theoretical foundations of the research questions and approaches guiding this investigation. Bioecological theory is employed to conceptualize factors that convey risk for and protection from children's internalizing symptom development; diathesis-stress frameworks help to further understand how child characteristics attenuate susceptibility to or protection from symptom progression. The review of the literature that follows narrows the focus from long-term outcomes and wide-ranging societal impacts, to probe biopsychosocial factors

influencing children's vulnerability to the development of internalizing symptoms. This exposition will also address key risk factors as predictors of the development of youth internalizing symptoms and as focal constructs of this dissertation. The subsequent narrative will aim to identify and standardize the usage of key terms throughout and clearly define constructs of interest.

An overview of internalizing symptom development between childhood and adolescence will lay the groundwork for subsequent descriptions of the primary variables studied, including child sex assigned at birth (SAB) as a correlate of the internalizing symptoms outcome. The review will also address bioecological factors associated with risk for internalizing symptom development, including parental hostility (PH) and socioeconomic stress (SS). Covarying factors will be described, which include children's externalizing symptoms, and racial and ethnic identity, as well as parent depressive symptoms. Study aims and hypotheses will be specified prior to succeeding chapters. The second chapter describes study methods, instrumentation, and includes a detailed analysis approach. Chapter three will detail results from study analyses. Chapter four will summarize and examine study findings, and discuss implications for prevention, intervention, and future research.

## Theoretical Models

### Bioecological Theory

Bioecological perspectives consider how diverse factors attenuate risk and may also collectively interact to influence child development. Urie Bronfenbrenner's Bioecological Systems Theory accounts for the range of environments that may influence development, as well as interactional processes that take place within and across nested

systemic levels of children's physical and social bioecosystems (Bronfenbrenner, 1979, 1986). A child's development is influenced by direct interactions with family members, peers, and local communities on a microsystemic level (*microsystem*), as well as interactions among members of these close networks who do not directly involve the child (*mesosystem*; Criss et al., 2002; Gutman & Sameroff, 2004; Ha et al., 2019; Swearer & Hymel, 2015). Beyond a child's most proximal interactions, formal services and environments (*exosystem*), such as healthcare systems and school safety measures, have both direct and indirect effects on child development (Abrams et al., 2005; Belsky et al., 2012). The model additionally accounts for factors with indirect influences on child development, including intangible cultural values and ideologies (*macrosystem*) that heavily influence exosystemic institutions and structures, as well as the impact of contributors from all levels of the bioecosystem across an individual's life span (*chronosystem;* Stevenson et al., 2005; Velez & Spencer, 2018).

Bioecological theory is explicit in delineating requisite conditions for human development to occur. Among these conditions are an individual's objective internal and external experiences; their subjective, experiential processing of these events; the environments in which these events and experiences take place; and, fundamentally, the proximal processes that facilitate multifaceted reciprocal interactions between individuals and their external environments, including the people and objects occupying those environments (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2007). Proximal processes are considered to be key drivers; development subsequently takes shape through the interaction of proximal processes that happen within a child's microsystem and factors that exist within other levels of the bioecosystem. Importantly, time operates

as a central factor and condition; developmental processes are necessarily situated in a specific time in history and require the passage of time throughout an individual's lifespan for developmental change to occur (Bronfenbrenner & Morris, 2007).

Bioecological theory provides a useful framework for conceptualizing relationships between key factors in the present investigation, including internalizing symptoms as an outcome variable; and parental hostility (PH) and socioeconomic stress (SS) as predictors of interest. Beginning with the individual level of the bioecological model, internalizing symptoms experienced by children and adolescents function as a child characteristic and include internal biological and cognitive-affective processes as well as subjective experiences. The next nested layer of the bioecological model includes one of the variables of interest in this dissertation, parental hostility. Hostile parenting is experienced as an interpersonal factor within a child's microsystem and is among the most proximal environmental influences on child development. The second key predictor of interest, socioeconomic stress, has a more complex influence on children's internalizing symptom development. In one regard, socioeconomic status (SES) is a societal construct at the macrosystemic level and operates indirectly on child development through exosystemic factors, such as parent income and educational attainment. However, SES is often inextricably aligned with identity characteristics—including race, ethnicity, nationality, and gender—that predictably moderate the influence of socioeconomic stressors on mental health and often intersect in ways that further impact mental health other health outcomes (Braveman et al., 2005; Pinderhughes et al., 2000).

Factors that contribute to the development of youth internalizing symptoms may have an appreciable association with a particular level of the bioecological framework, such as parent–child interactions that take place within the microsystem. These factors are, nonetheless, continually shaped by influences from other levels of the bioecosystem across time. Research findings indicate that distress in family systems, including conflict between caregivers and parent mental health problems, contribute to parenting behaviors that impact children's internalizing symptoms and problem behaviors (Franck & Buehler, 2007). Systemic factors also directly impact parents' psychological wellness and behaviors. Poverty, for example, acts as a powerful macrosystemic construct that cuts across bioecological levels in the way it affects resource access critical to the fulfillment of basic needs. Income alone impacts myriad tangible resources, as well the overall wellbeing of caregivers, which in turn plays a significant role in parent–child interactions (Belsky et al., 2012; Landers-Potts et al., 2015). Other systemic factors, such as identity-based discrimination (e.g., race, gender, religious belief), represent macrosystemic stressors that can affect mental health, as well as attitudes and behaviors that may influence parenting. Among the adversities that some parents experience on a regular basis, workplace discrimination, for example, operates as an exosystemic stressor with clear contributions from biased attitudes endemic to a macrosystem; these negative interactions and experiences may accompany consequences for a parent's earned income, employment status, and related resources (e.g., healthcare benefits) that directly affect a child's rearing environment. These examples serve to illustrate that children may be affected by factors from individual bioecological levels, such as hostile parenting and socioeconomic stress, or the interplay between those levels.

### Diathesis–Stress Frameworks

In tandem with the robust scaffolding that bioecological theory provides, additive perspectives from diathesis–stress models elucidate the role of bioecological factors that moderate children's susceptibility to developing internalizing symptoms and later psychopathology (Monroe & Simons, 1991). Stressors and supports exacerbate and attenuate a child's inherited or acquired vulnerability (diathesis) to internalizing symptom development. Scientific findings indicate various etiological sources for children's susceptibility to mental health problems, including biological (e.g., neural development), personality (e.g., temperament), and cognitive (e.g., perceived support) (Auerbach et al., 2011; Belsky & Pluess, 2009; Gibb & Coles, 2005; Loginova & Slobodskaya, 2021). Findings from an investigation among 935 African American adolescents indicated that youth cortisol levels, a biological characteristic shaped by both genetic and pre-natal factors, moderated the association between parent–child conflict and adolescent internalizing problems (Shakiba et al., 2022). In addition to the inherent vulnerabilities that moderate children's risk for developing internalizing symptoms, external factors may further act upon children's vulnerable attributes in ways that compound susceptibility and further increase risk. Macrosystemic attitudes and social structures may also have profound influences on children whose diatheses are exacerbated by systemic societal inequities, such as historically prejudiced attitudes toward people of color in the U.S. When children endorse multiple marginalized personal attributes, such as female sex-assignment, minoritized racial and ethnic identities, and non-binary gender identities, intersecting impacts of discrimination confer additive effects on children's susceptibility

to developing internalizing symptoms and more serious mental health problems (Combahee River Collective, 1995; Crenshaw, 1989; Velez & Spencer, 2018) .

**Etiological Development of Children's Internalizing Symptoms**

The etiology of internalizing symptoms is complex; however, it may be construed broadly as a spectrum of symptoms characterized by problems with emotion from internally (as opposed to environmentally) stimulated experiences of distress and fear (Watson et al., 2022). To accurately impart seminal facets of an extensive body of literature, as they relate to research constructs explored herein, I will begin by identifying and clarifying key terms and concepts employed throughout this dissertation. Categorical, dimensional, and syndromic classifications have been employed to better understand and treat symptoms that cluster and progress in distinguishable and often predictable ways (American Psychiatric Association, 2013). However, internalizing symptoms are distinct from the problems and/or formal psychiatric disorders that they typically underlie. Among children and adolescents, also collectively referred to as youth, internalizing symptoms may or may not coalesce around formal diagnostic criteria for internalizing problems common to depressive and anxiety-related disorders. Notwithstanding, associations in the literature, between youth internalizing symptoms and later psychopathology, are clear and provide support for scientific and public health priorities to moderate risk (Copeland et al., 2009; Kwong et al., 2019). Given this investigation's focus on symptom progression throughout various stages of childhood among individuals under age 18, the term *adolescent* is utilized in contexts where it is important to distinguish between older children between ages 12 and 18 and children under age 12.

Internalizing symptoms that develop during childhood are associated with a range of mental health disorders that frequently co-occur and that share features of inwardly directed distress, including depressive and anxiety-related conditions such as Major Depressive Disorder (MDD), Generalized Anxiety Disorder (GAD), Post-Traumatic Stress Disorder (PTSD), and Obsessive-Compulsive Disorder (OCD). Internalizing symptoms and associated mental health disorders have neurodevelopmental (Doering et al., 2022; Tucker et al., 2015); genetic, epigenetic, biological (Gibb et al., 2013; O'Donnell & Meaney, 2020; Scorza et al., 2019; Shapero et al., 2017); cognitive (Hammen, 2018; Joormann & Tanovic, 2015; Wagner et al., 2015); psychosocial (Belsky et al., 2012; Bush et al., 2020; Gorostiaga et al., 2019; Marshal et al., 2013), and environmental (Gałecki & Talarowska, 2018; Lorant et al., 2003) etiologies. These diverse factors include neural networks that bias attention, memory consolidation, and self-regulation toward internal stimuli (Pettersson et al., 2013; Tucker et al., 2015); genes that regulate neuroendocrinological responses to stress (Normann & Buttenschøn, 2019; Schwabe et al., 2019); pre- and post-natal effects of maternal depression (Goodman, 2020); health behaviors, such as sleep (Irwin & Opp, 2017; Zhai et al., 2015); the effects of parental psychopathology on childrearing practices (McKinney et al., 2018); and peer interactions that play a vital role in youth development (Buck & Dix, 2012; Ha et al., 2019).

**Factors Influencing Internalizing Symptom Development**

Given the myriad contributors to contextual influences on youth internalizing symptoms, it is important to identify vulnerabilities within the domains that contribute to early life symptom development and environmental factors that attenuate risk. Influential

factors central to this investigation include parent–child relationships, socioeconomic status, and child sex assigned at birth. Other meaningful correlates of the study's outcome include child externalizing symptoms, child race and ethnicity, and parent depressive symptoms.

Research that examines internalizing symptom trajectories provides important information about individual susceptibility and environmental factors that modulate children's risk. Longitudinal studies that have used latent class growth models to predict heterogenous growth patterns across youth development have indicated some similar trends that include symptom trajectories that start low and remain stable; trajectories characterized by early elevation of symptoms; and a diversity of increasing, decreasing, and stable growth patterns that typically fall in between latent classes characterized by low and high symptom levels (Lazarevic et al., 2020; Papachristou & Flouri, 2020; Sterba et al., 2007; Weeks et al., 2014; West et al., 2021). Growth trajectories vary according to the temporal windows included in study analyses. Studies that focus on early to late childhood (Lazarevic et al., 2020; Sterba et al., 2007), early to mid-adolescence (Cotter et al., 2016; West et al., 2021), and adolescence and/or transitions to adulthood (Costello et al., 2008; Ferro et al., 2015) identify valuable information about symptoms development, including the effects of maternal psychopathology (Sterba et al., 2007) and maternal identity-related stress (Lazarevic et al., 2020) on symptom development across early to middle childhood; and differences in symptom class membership according to sex-assignment and peer relations (Cotter et al., 2016; West et al., 2021). Fewer studies, however, have examined changes in internalizing symptoms that cover several important stages of development between childhood and adolescence. The present study seeks to

fill this gap by examining the effects of early childhood predictors (ages 18 months–5 years) on symptom development that spans middle childhood (ages 7–8), early adolescence (ages 11–13), and later adolescence (ages 15–17).

### Parental Hostility

Children's home environments, among the most proximal microsystemic influences on internalizing symptom development and other developmental processes, may include interactions with caregivers, siblings, and other household members that contribute to the environment. This dissertation focuses on caregiver factors, specifically, hostile parenting. Among many bioecological factors that can affect the progression of internalizing symptoms throughout childhood, parenting has a profound influence on children's mental health. The importance of the role of parenting is well-supported by landmark theories that have guided the child development literature, including those focused on attachment, social interactions, and family systems (Rinaldi & Howe, 2012). Parents or other primary caregivers, in particular, play a unique role in teaching, shaping, and modeling important behaviors and approaches to coping with life challenges (Dishion et al., 2012). Early attachment relationships with primary caregivers provide formative blueprints for children's attributional styles and interpersonal approaches, and steer temperamental dispositions in ways that can mitigate or exacerbate susceptibility to developing internalizing symptoms in childhood and adolescence (Brumariu & Kerns, 2010).

Parenting behaviors are associated with multiple child development outcomes; research findings have illustrated that parents' affective presence (e.g., hostility, aggression, warmth, positivity) has a profound impact on the emotion regulation and

brain development that play a central role in adolescent-onset depression (Schwartz et al., 2017). Warmth–cold (Baldwin, 1955) and warmth–hostility (Schaefer, 1959) dimensions of parent–child relationships are characterized by high levels of parental affection, positive reinforcement, and attunement to child wants and needs on one end of the spectrum, and by parental rejection and hostility on the other end (Domitrovich & Bierman, 2001; MacDonald, 1992). Parental warmth describes the quality of the emotional bond between parent and child (Jun et al., 2013; Khaleque, 2013). Parenting practices and parent behaviors characterized by high levels of parental warmth include displays of affection, giving praise, and positive involvement (Brody & Shaffer, 1982; Domitrovich & Bierman, 2001). Parental warmth has been associated with prosocial behaviors in children, lower levels of hostility and aggression, self-esteem, social adjustment, and emotional stability (Domitrovich & Bierman, 2001; Khaleque, 2013; Padilla-Walker et al., 2016).

Conversely, parental hostility (PH) is typified by non-supportive and controlling parenting practices, displays of anger and disappointment in children, punitive discipline, and perceived parental detachment (Domitrovich & Bierman, 2001; Padilla-Walker et al., 2016). Parents that rely on hostility use guilt, humiliation, blaming, criticism, insults, coercion, and lack reasoning in their approaches to discipline (Gorostiaga et al., 2019; Masarik & Congers, 2017; Rinaldi & Howe, 2012; Rhoades et al., 2011; Stocker & Youngblade, 1999). Parent hostility toward a child is identified as the behavioral driver of many negative child outcomes (MacDonald, 1992; Padilla-Walker et al., 2016), including aggressive problem-solving approaches, poor peer relations, child aggression (Domitrovich & Bierman, 2001; Khaleque, 2013), and other behavioral and emotional

problems (Gao et al., 2012; Gorostiaga et al., 2019; Khaleque, 2013). Hostile parenting has been associated with internalizing symptoms that link to depression (Gorostiaga et al., 2019; Rinaldi & Howe, 2012); therefore, this dissertation focuses specifically on the parental hostility dimension of parenting.

Research focused on contextual conditions that predict harsh parenting has identified several meaningful factors that include sociocultural and socioeconomic variables, such as acculturative stress, racism, and poverty. Family process models provide useful insight into microsystemic interactions that influence children's mental health (Franck & Buehler, 2007); research that has adopted the framework to examine influences on other levels of children's bioecosystems has gone further to explore how practical challenges posed by economic hardship add pressure to family systems (Emmen et al., 2013; Landers-Potts et al., 2015). These pressures negatively impact relationships among household members, which include parent–child interactions where levels of warmth are diminished and hostility increases. Among families that disproportionately experience economic hardship, to greater degrees and for longer periods of time, these effects are more pronounced. Finding from Landers-Potts and colleagues (2015) longitudinal examination of socioeconomic effects among 422 African American families indicated associations with harsh parenting and children's internalizing symptoms, as well as other motivational and behavioral indicators of child adjustment (Landers-Potts et al., 2015).

In addition to the clear direct influence of socioeconomic stressors on the rearing environment that disproportionately affect individuals and families with certain marginalized identities, other studies have examined the added strain posed by unique

stressors related to those identities. Acculturative stress reflects experiences of stigmatization—often along observable identities variables, such as race and ethnicity, language, and religious affiliations—and other adjustment challenges faced by individuals whose cultural norms, values, and self-identities differ from the norms and values reflected in the communities where they live (Padilla & Perez, 2003). Among an immigrant and nonimmigrant ethnic minority sample in the U.S. and a non-U.S. ethnic minority sample, parents' acculturative stress (Emmen et al., 2013) and parent–adolescent acculturative conflict (Huq et al., 2015) were associated, respectively, with parenting behaviors and children's psychosocial outcomes. Given these inextricable macrosystemic influences on parenting, an exploration of broader social factors is salient to the present study.

### Socioeconomic Stress

Associations have also been identified between socioeconomic stress (SS) and risk for internalizing problems (Ursache et al., 2017), such as depression. Socioeconomic stressors are characterized by appreciable disadvantages associated with factors that may include parental educational attainment, parental employment status and occupational prestige, proportion of family income to household members, public assistance eligibility and other measures of financial hardship, neighborhood safety (Beardslee et al., 2021; Fuller-Rowell et al., 2018, p.; Generaal et al., 2019; Helbich et al., 2020; Kim, 2008; Lorant et al., 2003; Masarik & Conger, 2017; Richardson et al., 2015; Stevenson et al., 2005; Yildiz et al., 2019)**,** and other variables associated with socioeconomic status (SES). Notwithstanding, SES is a complex variable that can be challenging to assess due to its ubiquitous influences on life experiences. At the most basic level, economic wealth

acquired through earned income and other monetary resources is a chief driver of a person's ability to acquire tangible resources and access services, including housing, food, educational materials, quality healthcare, and childcare (Braveman et al., 2005; Capistrano et al., 2016; F. Reiss et al., 2019; Yoshikawa et al., 2012). Inability to access resources that meet basic needs predisposes individuals to more stressful life events and increases the burden they shoulder under difficult circumstances (F. Reiss et al., 2019).

Other facets of socioeconomic variables have known moderating effects on associations between stressful life events and children's mental health problems, such depression and anxiety. Parent educational attainment, for example, may influence employment options that relate not only to income but to future opportunities for economic and social mobility (Braveman et al., 2005; F. Reiss et al., 2019). Neighborhood safety is also considered a facet of SES and affects physical and mental health in varied ways. Among a wide range of factors that characterize safety in the neighborhood environment are levels of community violence, air pollution, traffic noise, social cohesion, and access to parks and other green spaces (Beardslee et al., 2021; Generaal et al., 2019). Individually and collectively, these community-level characteristics have profound effects on physical and mental health and well-being, including cardiovascular health and the developmental of symptoms of depression and other psychiatric disorders (Braveman et al., 2005; Generaal et al., 2019).

Disadvantages along any of these socioeconomic dimensions may provoke stress and increase the risk of mental health problems. Among children and adolescents, challenges that result from socioeconomic stressors may be directly experienced through limited access to resources or indirectly through their relationship with caregivers

(Gorostiaga et al., 2019) or environmental conditions shaped by socioeconomic factors (McLaughlin et al., 2012). Socioeconomic disadvantages also commonly align with the experiences of communities and individuals who are marginalized based on racial, ethnic, and other cultural and personal identities (Braveman et al., 2005). Social and political infrastructures, historically designed to directly and tacitly harm and disadvantage non-White individuals in the U.S., contribute to the inextricable systemic linkages between socioeconomic status and racial and ethnic identification. The influence of race and ethnicity is, thereby, germane to any investigation examining the role of socioeconomic stress on human welfare.

**Sex Assigned at Birth**

Studies examining internalizing symptom development among youth have identified important differences in risk factors for symptom progression among females as compared with males. Internalizing symptom trajectories in adolescent females follow heterogenous patterns that differ from internalizing symptom trajectories in adolescent males. Stable–moderate, increasing (Lewin-Bizan et al., 2010), late onset, and early high symptom trajectories (Costello et al., 2008; Kwong, López-López, et al., 2019; Olino et al., 2010) are more prevalent among females. Earlier and higher symptom peaks (Adkins et al., 2009; Ge et al., 2001; Kwong, López-López, et al., 2019; Natsuaki et al., 2009) and higher symptom trajectories (Ge et al., 2006; Kwong, López-López, et al., 2019; Natsuaki et al., 2009; Wu & Lee, 2020), attributable to caregiver attachment, pubertal development, and other biopsychosocial differences, have also been observed among females, as compared with males. The prevalence of MDD, for example, increases

significantly for both females and males throughout adolescence; however, these increases are higher among females (Avenevoli et al., 2015).

Various social and developmental factors contribute to these differences. The differential impact of relational stressors according to sex assigned at birth (SAB) is indicated by stronger associations between depression and parental and peer attachment among females (Brumariu & Kerns, 2010; Shaw & Dallos, 2005). Differences in the relational needs of females and males become even more pronounced during puberty. Early pubertal onset is more common among females and can result in distress when children and adolescents experience physical development that is out sync with their individual cognitive and emotional development (Ullsperger & Nikolas, 2017). Gender-based social demands, roles, and expectations also result in higher exposure to stressful life events among female adolescents, and higher depressive symptomology in relation to those events (Adkins et al., 2009; Patil et al., 2018; Shaw & Dallos, 2005).

Among females and males, associations between the timing of pubertal onset and internalizing and externalizing symptoms have been identified in the literature. Pubertal maturation relative to peers plays a role in moderating the effects of stress on adolescent internalizing symptom development. Among adolescent females that experience psychosocial stressors, such as peer rejection, more depressive symptoms are likely to be reported by females that go through early pubertal development than females with normative developmental profiles (McGuire et al., 2019). Early development may also increase risk for externalizing symptoms among females influenced by behaviors associated with older peer groups (Negriff & Susman, 2011). Akin to female adolescents who have social experiences that are incongruent with peers due to early pubertal

development, male adolescents experience similarly high depressive symptoms when puberty is delayed (Ullsperger & Nikolas, 2017).

### Racial and Ethnic Identity

Among populations with high levels of cultural heterogeneity, such as many communities in the U.S., the effects of socioeconomic stressors on mental health outcomes may heighten risk among youth with minoritized racial and ethnic identities (Christophe et al., 2019). Cultural norms, practices, and values that relate to racial and ethnic identity, sexuality, gender identification and roles, and systems of religious and spiritual belief also play a significant role in shaping both physical and social environments in which children spend their time (Bush et al., 2020; Hope et al., 2022; Klaczynski et al., 1998; Padilla & Perez, 2003; Velez & Spencer, 2018). Children who have minoritized identities, for example, within their school and/or home communities, may be exposed to overt stigmatization; less observable but constant microaggressions or stereotype threat from peers and adults; and the xenophobic behaviors of others, each of which may contribute to increased risk for mental health problems (Padilla & Perez, 2003; Vaid & Lansing, 2020; Velez & Spencer, 2018).

Racial and ethnic identities may also uniquely intersect with other key factors, such as parenting practices, in ways that increase or mitigate risk for internalizing symptom development. Studies among Latinx communities, for example, demonstrated greater protection from depressive symptom development among female adolescents that reported higher levels of familial cultural values (*familism*), as compared with their adolescent male counterparts (Cupito et al., 2015); parental familism associated with increased parental warmth, also predicted lower depressive symptoms among children

between ages 6–10 (Bustos & Santiago, 2022). Although examinations of children's cognitive appraisal of their social environments and phenomenological experiences of their own identity characteristics are beyond the scope of this dissertation research, these factors are, nevertheless, operative and essential to consider in this investigation's analytic approaches.

### Externalizing Symptoms

Internalizing and externalizing symptoms have shared etiologies and frequently co-occur in children and adolescents (Achenbach et al., 2016); externalizing symptoms are, thereby, important to account for when examining youth internalizing symptom outcomes. Whereas internalizing symptoms are considered to be inwardly directed experiences of distress, externalizing symptoms are characterized by external expressions of distress and challenges with behavioral regulation that have observable effects on children's environments (Tucker et al., 2015). Although affective experiences that typify internalizing symptoms are also present among children that endorse externalizing symptoms, such as anger and irritability, salient features of externalizing symptomology often involve hyperactive behavioral symptoms, such as those commonly associated with the hyperactive presentation of Attention–Deficit/Hyperactivity Disorder (ADHD), socially disruptive behaviors that underlie Oppositional Defiant Disorder (ODD), or the more severe patterns of aggression and violence among adolescents with Conduct Disorder (CD) (American Psychiatric Association, 2013).

Provided the well-established comorbidity of internalizing and externalizing symptoms in children, both are important to consider in any investigation. Finding from a longitudinal population-based study of 17,318 children in the U.K. indicated parallel

growth in children's internalizing and externalizing symptoms between early childhood and middle adolescence (ages 3–14) after controlling for socioeconomic stressors and maternal psychological distress (Papachristou & Flouri, 2020). Despite shared vulnerabilities for developing internalizing and externalizing symptoms, certain neural correlates distinguish externalizing from internalizing symptom expression. From an executive function standpoint, effortful control is important to children's cognitive-affective and behavior regulation. Different aspects of effortful control, however, are implicated in internalizing and externalizing problems. Children with externalizing problems tend to have more difficulty with inhibitory control, as compared with children with internalizing problems who have increased deficits in the attentional control and activation dimensions of the effortful control construct (Santens et al., 2020). Researchers have also explored behavioral consequences of underlying problems with effortful control that help to explain how other child characteristics, such as race, ethnicity, and gender, influence the expression of shared neurodevelopmental factors.

One cross-sectional investigation that examined risk factors associated with externalizing reported differential associations between low distress tolerance and child race and sex. Distress tolerance was operationalized as the ability to remain goal-directed while experiencing emotional distress. Low distress tolerance among children in the sample resulted in differential outcomes, including self-directed risk-taking behaviors among White children (alcohol use), externally directed problem behaviors among African American children, and internalizing symptoms among female children (Daughters et al., 2009). While the cross-sectional nature of the study limits the conclusions that can be drawn, its findings suggest that factors from childrens' direct and

indirect environments, as well as personal attributes like race and sex, play a meaningful role in how shared vulnerabilities for internalizing and externalizing are expressed.

Externalizing symptoms that are expressed within children's microsystems also have reciprocal effects on environmental variables, such as parental hostility. Findings from the Fragile Families and Child Well-Being Study, which collected data from 4,192 families, revealed predictive associations between harsh parenting and higher externalizing symptoms (Wiggins et al., 2015). Extensive research on gene–environment correlations (*rGE*) also elucidates the role of evocative correlations; environmental factors, such as parenting behaviors, can have a profound effect on children's externalizing symptom development and may simultaneous be shaped by children's genetically influenced behaviors (Gorostiaga et al., 2019; Pasman et al., 2021; Patterson & Fisher, 2002; Wiggins et al., 2015).

### Parent Depressive Symptoms

Parent and caregiver mental health plays an integral role in their daily functioning and can influence factors that directly and indirectly impact children's rearing environments. These factors may include parenting practices associated with children's internalizing symptoms (Marceau et al., 2015), as well as socioeconomic factors, such as parent education, employment status, income, and healthcare access (Kwong, 2019). Research findings have illustrated that parent mental health and affective presence (e.g., hostility, aggression, warmth, positivity) have profound influences on the emotion regulation and brain development that play a central role in adolescent-onset depression (Schwartz et al., 2017). Direct causal links between paternal mental health and childhood internalizing symptoms are more difficult to investigate; however there is substantial

evidence that paternal and maternal depression and other psychopathology are significantly associated with children's internalizing symptoms and the intergenerational transmission of depression, even when children are not biologically related to their rearing parents (Allen et al., 2007; E. D. Barker et al., 2011; Cadman et al., 2020; Clark et al., 2018; Elgar et al., 2007; Mahon & Agius, 2019; Marmorstein & Iacono, 2004; Natsuaki et al., 2014; Pearson et al., 2013; Taraban et al., 2019).

## Present Study

### Study Relevance and Literature Gap

This review of the literature on factors influencing child and adolescent internalizing symptom development demonstrates the need to identify and implement targeted preventative supports and interventions that address their long-term impacts on communities, including those hardest to reach. Early life depression, as one example, is strongly linked to suicidal behavior, job loss, substance use, and parenting practices that contribute to the intergenerational transmission of psychosocial problems associated with long-term, adverse life outcomes (S. H. Goodman, 2020). Socioeconomic barriers implicate systemic shortfalls and highlight the need to attend to these barriers alongside treatment efforts. Attention to socioeconomic stressors that increase risk is an insufficient, but necessary component of the cadre of solutions needed to address the complex and interconnected factors that contribute to the ever-increasing mental health crisis in the U.S. This dissertation uses a person-centered analysis approach, specifically, growth mixture modeling, to identify distinct developmental symptom trajectories and factors that determine membership in each unique, heterogenous class (Jung & Wickrama, 2008). Given the focus of the present investigation on symptom growth

patterns, the person-centered approach of growth mixture models facilitates the identification of heterogeneous within-person development, as well as between-person variations that allow for the estimation of group membership among other individuals who demonstrate similar features of changes in internalizing symptoms over time. Findings from this investigation contribute evidentiary support for the vital need to invest in more resources, programs, and policy efforts that mitigate structural barriers to accessing education and treatment for internalizing symptoms, depression, anxiety, and other mental health problems that develop in childhood and adolescence.

The present study investigated ways in which distinct bioecological stressors that occur during early childhood, specifically parental hostility (PH) and socioeconomic stress (SS), impact the progression of internalizing symptoms during the critical developmental stages from childhood to adolescence across three time points, ages 7–8, 11–13, and 15–17. Unlike cross-sectional approaches focused on associations between factors, the longitudinal approach of this research endeavored to identify whether these key microsystemic and contextual factors heighten risk for developing internalizing symptoms between childhood and adolescence. The present study additionally utilized two unique datasets that provided a nationally representative sample that was diverse in terms of geography, socioeconomic status, race, and ethnicity. Prior research has identified distinct trajectories; however, few studies have examined temporal windows that include the range of critical developmental periods and transitions from childhood through adolescence (Kwong, López-López, et al., 2019). Analytic approaches were devised to fill these gaps by predicting internalizing symptom classes in a large, diverse sample that is made possible by the ECHO program's cohort–wide data.

### Research Aims and Hypotheses

**Aim 1:** The first aim of the present study was to estimate internalizing symptom trajectories from childhood to adolescence (ages 7–17) using latent class growth mixture modeling (Figure 1). This investigation further sought to understand how trajectories vary by child sex assigned at birth (SAB) and examined female and male class membership using a moderator approach (Figure 2).

**Aim 2:** The second aim investigated impacts of two early childhood factors on internalizing symptom trajectories—parental hostility (PH) as an interpersonal stressor measured between ages 4–5 years, and socioeconomic stress (SS) as a structural stressor measured between ages 18–27 months.

**Hypotheses:** Based on the literature on the development of childhood and adolescent internalizing symptoms, four hypotheses were tested:

(1) First, 3–5 distinct developmental trajectories in children's internalizing symptoms will be identified (Davis et al., 2015; Kwong, López-López, et al., 2019; Lewin-Bizan et al., 2010; Nivard et al., 2017; Olino et al., 2010).

(2) A higher proportion of females, compared with males, will be represented in trajectories characterized as high or increasing (Kwong, Manley, et al., 2019).

(3) Parental hostility and socioeconomic stress measured during early childhood will predict internalizing symptom class membership; further, higher levels of parental hostility in the parent–child relationship and socioeconomic stress during early childhood will each be associated with membership in classes characterized by higher internalizing symptoms (Landers-Potts et al., 2015; Masarik & Conger, 2017)

(4) Based on the literature exploring the relative impact of socioeconomic stress on children's internalizing symptoms, a mediational model will test the indirect effect of socioeconomic stress on internalizing symptom class membership mediated by parental hostility, in addition to the direct effect in hypothesis 3 (Cadman et al., 2020; Masarik & Congers, 2017; Piko et al., 2013).

# CHAPTER II

# METHOD

## Study Design and Procedure

The present study uses data from two unique cohorts of the Environmental influences on Child Health Outcomes (ECHO) program, Early Growth and Development Study (EGDS; Leve et al., 2019) and Family Life Project (FLP; Blair, 2010). EGDS is an adoption design of 561 children who were adopted at birth and live in an adoptive home with genetically unrelated parents. The unique study design allows for exploration of relational, environmental, and prenatal influences on childhood health and psychosocial development, as well as the role of genetic influences. In this dissertation, the genetic attributes of the study design are not a focus. Biological and adoptive caregivers were initially recruited through adoption agencies and enrolled in the study between 2003 and 2009. Assessment of family participants is ongoing and takes place in 9-month intervals among adoptees under age 3, and in 1-year and 2-year intervals from ages 3 through 18. Eligibility required that families enrolled following the birth of an EGDS adoptee who lived in the adoptive home and whose biological parents were not deceased and who also agreed to participate in the research study (Leve et al., 2019).

The Family Life Project (FLP) is an ongoing, longitudinal study involving 1,292 families living in rural communities in eastern North Carolina and central Pennsylvania. FLP is a statistically representative stratified sample of every family with a mother that gave birth to a baby within the 1-year period between September 2003 and September 2004 and living within one of six, predominantly low-wealth communities targeted for the study. African American families were oversampled to align with FLP research goals

to examine the effects of economic resources, rural residency, and family relationships on youth development (Burchinal et al., 2008; Odom & Vernon-Feagans, 2010). FLP participant families were assessed at baseline, when children were 2 months old, during 2.5-hour home visits that included interviews, questionnaires, and observation of children and caregivers. Families were excluded from participation if English was not the primary spoken language and if the target child was not in the custody of the birth family (Odom & Vernon-Feagans, 2010; Vernon-Feagans et al., 2008).

**Participant and Sample Characteristics**

The broader EGDS sample includes linked sets of participants that comprise adopted children, birth mothers and fathers, and adoptive mothers and fathers. Among caregivers, there are 41 same-sex parent families, and 14 additional male and female caregivers that joined families which included the original pair of adoptive caregivers (Leve et al., 2019). On average, adoptive family income is higher than birth family income. Median adoptive family annual income exceeds $100K, whereas median birth family annual income is less than $15K among birth mothers and between $15K and $25K among birth fathers (Leve et al., 2013). EGDS participants sampled for the present study include original study adoptees ($n$ = 561). Among the original adoptees, over half are male and White, 57.2% and 54.5%, respectively (Leve et al., 2013). Other racial and ethnic identities among children adopted at the start of the study include 17.8% Multiracial, 13.2% Black, 13.4% Hispanic/Latinx, and 1.1% Other Race/Ethnicity, including Asian and American Indian (Leve et al., 2019; D. Reiss et al., 2022). Among the 481 participants sampled for the present study, 55% identified as White and 43% identified as female sex assigned at birth.

Among the 1,292 families in the FLP sample, participant racial demographics were proportional to demographic characteristics of the recruitment counties. Child participants were roughly equally divided between females (49%) and males. Among maternal caregivers, African Americans, primarily from North Carolina, accounted for 40% of the FLP sample; other participants resided in Pennsylvania. Approximately 78% of families are considered low-income based on reporting household income below two times the federal poverty line (Burchinal et al., 2020). Given the relevance of caregiver characteristics in socioeconomic variables, some caregiver demographics are noteworthy. Average caregiver age was 26 years (*SD* = 5.9) at the start of the study. Caregiver relationship status included married (48%), single (46%), and either separated, divorced, or widowed (6%). 81% of caregivers either graduated from high school or earned a GED; 14% had earned at least a 4-year college degree (Odom & Vernon-Feagans, 2010; Vernon-Feagans et al., 2008). Among the 1,074 participants sampled for the present study, 51% identified as White and 50% identified as female sex assigned at birth. Given the variations in EGDS and FLP participant characteristics, cohort was included in analyses as a control variable to account for racial and socioeconomic differences between the two ECHO cohorts that comprise the sample.

## Measures

### *Internalizing Symptoms (IS)*

**Harmonization.** Internalizing symptom scale scores were measured at three time points (child ages 7–8, 11–13, and 15–17) to assess the outcome. The Child Behavior Checklist–School (CBCL-Sch; Achenbach & Rescorla, 2001) instrument was administered to EGDS caregivers in the sample; the Strengths and Difficulties

Questionnaire (SDQ-4 and SDQ-11; R. Goodman, 2001) was administered to FLP caregivers. ECHO consortium completed a data harmonization project providing detailed technical instructions for linking CBCL to SDQ scale scores. The present study harmonized CBCL-Sch internalizing scale sum scores with sum scores from the SDQ-4 (for ages 4-10) and SDQ-11 (for ages 11–17). The harmonized CBCL/SDQ data is used in this dissertation (Mansolf et al., 2022).

**Child Behavior Checklist.** The CBCL-Sch is a 119-item instrument that assesses children's internalizing and externalizing behaviors and social functioning between ages 6–18. Caregivers rated how well each item described their child within the past six months on a 3-point scale, including 0 (not true), 1 (sometimes true), and 2 (very true or often true). Raw sum scores for empirically derived syndrome scales were used to assess observed child internalizing characteristics and behaviors for the outcome measure. A 32-item internalizing syndrome scale from the CBCL-Sch comprised 3 subscales, including Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints. Parent reporters rated their children on attributes, behaviors, and affective symptoms that included items such as, "Feels worthless or inferior," "Withdrawn, doesn't get involved with others," "Too fearful or anxious," and "Physical problems without known medical cause: e.g., stomachaches." Raw scores ranging from 11–14 are considered to be in the clinical range. Inter-item alphas have been found to be acceptable between caregiver raters. Cronbach's alphas for the empirically based Anxious/Depressed and Withdrawn/Depressed subscales indicated good internal consistency reliability, $\alpha = .84$ and $\alpha = .80$, respectively (Achenbach & Rescorla, 2001). Internal consistency reliability for the DSM-5 oriented Affective Problems subscale (a clinical scale not used in analyses

but noted for comparison with the related syndrome scale) was similarly high, $\alpha = .82$. Validation study results also indicated very high test–retest reliability (*ICC* = .95, $p < .001$) among all item scores.

**Strengths and Difficulties Questionnaire.** The SDQ-4 and SDQ-11are 25-item brief behavioral screening questionnaires that utilize the same 0–2 scale as CBCL items. The SDQ-4 and SDQ-11 were administered to parent reporters to assess child emotions and behaviors over the past six months among children ages 4–10 and ages 11–17, respectively. Among five subscales, scores from the 5-item Emotional Problems scale and the 5-item Peer Problems scale were used to derive internalizing sum scores. Similar to the CBCL, these scales assessed worries, mood, somatic symptoms, and social engagement as key facets of child and adolescent internalizing problems. Items included, "Many worries or often seems worried," "Often complains of headaches, stomach-aches or sickness," as well as "Rather solitary, prefers to play alone" on the SDQ-4 and "Would rather be alone than with other youth" on the SDQ-11. The psychometric properties of the instrument are acceptable (R. Goodman, 2001), including internal consistency reliability for different scores and reporters (mean Cronbach's alpha = .73); interrater reliability of .86;  higher interrater correlations between reporters above the meta-analytic mean used as a benchmark for both internalizing subscales (Achenbach et al., 1987; R. Goodman, 2001); and high discriminant validity between community and psychiatric clinical samples (R. Goodman et al., 2000). A Dutch validation study testing the instrument's psychometric properties among a child and adolescent community similarly reported satisfactory mean reliability among SDQ scales (mean Cronbach's alpha = .70);

Emotional Problems and Peer Problems subscales reliabilities were acceptable, respectively, $\alpha = .70$ and $\alpha = .66$ (Muris et al., 2003).

### *Parental Hostility (PH)*

**Parenting Scale.** The Parenting Scale (Arnold et al., 1993) was used to assess parental hostility in the parent–child relationship during early childhood between child ages 4–5. The instrument was designed to identify parenting behaviors with known effects on child development and has been utilized in population studies examining associations between harsh discipline practices and children's internalizing symptoms (Prinzie et al., 2007). Using a 30-item scale ranging from 1 (always) to 7 (never), caregivers reported the frequency of affectionate and combative interactions with their children over the past month. Items from the Hostility subscale were used to assess hostile parent behaviors toward children, including "When my child misbehaves, I spank, slap, grab, or hit my child," "When my child misbehaves, I use bad language," "When my child does something I don't like, I insult my child, say means things, or call my child names," and "After there's been a problem with my child, I often hold a grudge." Based on other validated measures of parental hostility, including the Iowa Family Interaction Rating Scale (IFIRS; Melby & Conger, 2001), three additional items from the Parenting Scale were selected to increase the robustness of the validated 5-item Hostility subscale. In addition to features of hostility and overreactivity already represented in the Hostility subscale (Lorber et al., 2014; Rhoades & O'Leary, 2007), the 8-item Hostility scale used for the present study also included items similar to those in the IFIRS that represented parent behaviors related to criticism, shouting, and anger, including "When I'm upset or under stress, I am picky and on my child's back," "When my child misbehaves, I raise

my voice or yell," and "When my child misbehaves, I get so frustrated or angry that my child can see I'm upset." Item scores were summed to derive a hostility scale ranging from 0 to 7 with higher scores indicating more parental hostility. Internal consistency reliability for the 8-item hostility subscale was minimally acceptable (α = .64). In other study samples, internal consistency reliability for the 5-item hostility scale was excellent (α = .93; Matthews et al., 1996).

***Socioeconomic Stress (SS)***

**Child and Family Demographics.** Socioeconomic status-related variables, measured in early childhood, between child ages 18 months and 27 months, were assessed though demographic data collection for both sample cohorts. Potential factors that could contribute to socioeconomic stress were explored, including household income, economic hardship, parent education, and parent occupation. Income and education variables were retained while other factors under consideration were excluded from analyses due to data availability across both sample cohorts. Socioeconomic stress was computed across both cohorts as a reverse–scored standardized mean composite of household income and the educational attainment of one parent reporter and, when available, a second parent reporter. Socioeconomic data, initially planned to correspond with predictor variable assessment points, were not available at child ages 4–5 years. Socioeconomic stress was, thereby, assessed at earlier data collection time points.

Family income reflects the total combined household income (including wages, salaries, self-employment income, government assistance, interest, and dividends) of all household members that contributed to household expenses during the last calendar year. Five-category values for annual income ranged from 1 (less than $30,000) to 5 ($200,000

or more). Parent educational attainment, measured at child age 27 months, is a six-category variable that assessed the highest level of school completed, ranging from 1 (less than high school) to 6 (master's, professional, and/or doctoral degrees). Among EGDS participants, parent education data is typically collected at each wave; therefore, any available parent education data were used if participant data was missing at 27 months.

### *Sex Assigned at Birth (SAB)*

Child sex assigned at birth was assessed using demographic data collected for both cohorts during the study enrollment period. Sex assigned at birth categories include female-assigned and male-assigned.

### *Covariates*

**Child Externalizing Symptoms.** Child externalizing symptoms were measured at all outcome time points using the same analytic approaches to assessing internalizing symptoms in the present study and the same instrumentation, which included the Child Behavior Checklist (CBCL-Sch; Achenbach & Rescorla, 2001) and the Strengths and Difficulties Questionnaire (SDQ-4 and SDQ-11; R. Goodman, 2001). A 35-item externalizing syndrome scale from the CBCL-Sch were drawn from 2 subscales: Rule-Breaking Behavior and Aggressive Behavior. Sample items include, "Can't concentrate, can't pay attention for long" and "Destroys things belonging to his/her family or others." Five-item Conduct Problems and Hyperactivity/Inattention scale scores comprised SDQ-4 and SDQ-11 externalizing raw sum scores included as a covariate in analyses. Those subscale items include, "Often loses temper" and "Easily distracted, concentration wanders." As aforementioned, psychometric properties of the instrument are acceptable,

(R. Goodman, 2001; Muris et al., 2003); however among the Dutch validation sample, the 5-item Conduct Problems scale reliability was low (α = 0.55) and noted as most likely attributable to the limited number of items used in SDQ subscales (Muris et al., 2003).

**Child Racial and Ethnic Identities.** Child racial and ethnic identities were assessed through demographic data collected for both cohorts during the study enrollment period. The present study used racial and ethnic identity data aggregated into mutually exclusive categories and further combined those classifications to consider three racial and ethnic subgroups represented by two dummy codes, i.e., Black/African American (1 = Black/African American, 0 = Other), and Other (1 = Latina/o/x/e, and/or Hispanic, and/or Other Race and/or Ethnicity, 0 = Else), with White serving as the reference group.

**Parent Depressive Symptoms.** The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) is a widely used 20-item adult self-report of depressive symptoms. Caregivers self-rated the frequency of symptoms they experienced over the past week using a 4-point scale that ranges from 0 (rarely or none of the time) to 3 (most or all of the time). Items respondents rated include, "I felt depressed," "I felt that everything I did was an effort," "My sleep was restless," and "I thought my life had been a failure." A depressive symptom mean score was assessed at child ages 4–5 and included as a covariate in the present study's multinomial regression model. Substantial evidence for construct validity was reported, and included reasonable discriminant validity with scales designed to assess depressive symptoms, and excellent concurrent validity by clinical and self-report criteria (Radloff, 1977). The instrument demonstrated high internal consistency in non-clinical samples (α = .85) and test-retest stability was acceptable for most non-clinical populations (*ICC* = .40 – .70), with the exception of

African Americans and the under 25 age group (Radloff, 1977). Other validation research among a community sample of African American adults provided supportive evidence for the instrument's validity among this population but suggests that ethnic differences may be relevant to some construct factors (Torres, 2012).

**Analytic Approach**

To test the first hypothesis, growth mixture modeling (Figure 2) was conducted in Mplus version 8.8 to identify distinct developmental trajectories of internalizing symptoms across three time points spanning middle childhood (ages 7–8; T1), early adolescence (ages 11–13; T2), and late adolescence (ages 15–17; T3). Full information maximum likelihood was used to account for missing data. The growth mixture model comprises a univariate latent growth curve of internalizing symptoms formed by observations at T1, T2, and T3 with an intercept (I) and slope (S), and a categorical variable for class (C); quadratic parameters were not estimated, as only 3 time points were considered. Time intervals between measurement occasions were not equally spaced; as such, slope factor loadings of 0, 5.5, and 9.5 were specified to reflect years, since T1 is based on mean age. The zero factor loading at T1 defines the intercept growth factor as an initial status for internalizing symptoms. Intercept factor loadings were fixed at 1. A series of both unconditional and conditional models were tested as part of a multi-step approach wherein no covariates were initially considered, and T1, T2, and T3 externalizing symptoms were later included as a time-varying covariate to account for comorbid presentations at T1–T3, respectively. Growth mixture models are a person-centered approach that completely model between- and within-person covariance structures, in contrast to latent class growth models which do not, by constraining the

variance of the growth factors to zero and treating variability around the estimated classes as within-person error that is additionally constrained to be equal across time. Implementing such covariance equality constraints attenuates the distinctiveness of the classes and permits only mean differences in the within-class trajectories (Bauer & Curran, 2003).

In order to determine the number of classes, an unconditional growth mixture model that included two classes was initially specified. Using an iterative approach, one additional class at a time was added and model fit was compared to that of the previous model to determine the best solution. Multiple fit indices were used to assess the number of classes; specifically, BIC was used to narrow down the number of classes initially and the Vuong–Lo–Mendell–Rubin (VLMR) test was then used to further narrow the remaining plausible models (Nylund, Asparouhov, & Muthen, 2007). Moreover, successful convergence, entropy, percent of total count assigned to classes, and posterior probabilities were considered to determine the best class solution. This data-driven approach allowed for the probabilistic categorization of individuals into latent classes; each individual received a probability of belonging to each class and was assigned to their most likely class. Conditional models were then conducted, and class solutions were compared to the unconditional models. Class assignments from the final conditional model were saved and used in subsequent multinominal logistic regression and mediation analyses.

Multinomial logistic regressions were conducted in Mplus version 8.8 to test hypotheses 2 and 3, examining the relationship between child sex assigned at birth, socioeconomic stress, and parental hostility and likelihood of internalizing symptom

trajectory class assignment, respectively. Full information maximum likelihood was used to account for missing data. Probabilities of class assignments based on the aforementioned predictors were compared, with one class serving as the reference category to which probability of assignment to the other classes was compared. Sex assigned at birth, cohort, Black/African American, and Latinx and/or Hispanic and/or Other racial and ethnic groups dummy codes, with White as the reference group, were included as covariates in all multinomial logistic regressions. Parental depression was included as an additional covariate in tests of the association between parental hostility and class assignment.

Mediation analyses were conducted in Mplus version 8.8 to test the fourth hypothesis examining whether parental hostility mediated the relationship between socioeconomic stress and internalizing symptom class membership. Full information maximum likelihood was used to account for missing data. The "model indirect" command was used to generate estimates and significance tests of total, indirect, and direct effects. If the indirect effect is significant and the direct effect is not, this indicates full mediation; if both the indirect and direct effects are significant, this indicates partial mediation. Sex assigned at birth, cohort, Black/African American, and Latinx and/or Hispanic and/or Other racial and ethnic groups dummy codes, with White as the reference group, were included as covariates on all paths. Parental depression was included as a covariate on the b path, from parental hostility to internalizing symptom class assignment.

# CHAPTER III

# RESULTS

## Preliminary Analyses

**Descriptive Statistics.** Means, standard deviations, minimums, maximums, skewness, and kurtosis for all study variables are presented in Table 1. On average, children exhibited internalizing symptom sum scores of 6.67 (*SD* = 7.40), 7.49 (*SD* = 8.60), and 7.83 (*SD* = 9.01) at T1 in middle childhood (ages 7–8), T2 in early adolescence (ages 11–13), and T3 in late adolescence (ages 15–17), respectively. On average, children exhibited externalizing symptom sum scores of 10.94 (*SD* = 13.40), 8.20 (*SD* = 11.90), and 6.46 (*SD* = 10.06) at T1, T2, and T3, respectively. The mean score for socioeconomic stress in early childhood (ages 18–27 months) was 1.57 (*SD* = .90). On average, parents reported hostility scores of 2.33 (*SD* = .80) and depression scores of .54 (*SD* = .48) when children were approximately 4–5 years of age.

**Correlations**. Zero-order correlations are presented in Table 2. Females exhibited significantly higher internalizing symptoms than boys at T1 ($r$ = .08, $p$ < .01) and T3 ($r$ = .10, $p$ < .01) and significantly lower externalizing symptoms at T1 ($r$ = -.12, $p$ < .001) and T2 ($r$ = -.11, $p$ < .001). Internalizing and externalizing symptoms were positively and significantly correlated at all time points ($r$ = .27–.67, $p$ < .001). Children whose parents experienced high socioeconomic stress exhibited significantly higher internalizing symptoms at T1 ($r$ = .25, $p$ < .001) and T2 ($r$ = .07, $p$ < .05), and children exposed to more parental hostility exhibited significantly higher internalizing problems at all time points ($r$ = .12–.20, $p$ < .001). Parental hostility was not significantly correlated with

socioeconomic stress but was significantly and positively correlated with parental depression ($r = .32$, $p < .001$).

## Growth Mixture Model

**Estimation of Internalizing Symptom Latent Classes.** Fit indices for all growth mixture models are presented in Table 3. An unconditional growth mixture model was used to estimate 2–4 class solutions. BIC and SABIC decreased through the 4-class model, whereas VLMR values indicated preference for the 3-class solution. Average latent class probabilities and entropy values indicated support for a 4-class solution. For the conditional growth mixture models, BIC and SABIC decreased through the 4-class model, whereas VLMR values indicated preference for the 3-class solution. Average latent class probabilities and entropy values also indicated support for a 3-class solution. Taken together, a 3-class solution was retained and latent class assignments from the 3-class conditional growth mixture model were saved and used in subsequent analyses.

Figure 3 presents the observed individual values for internalizing symptoms and estimated internalizing means for classes 1–3. Mean scores for the growth factors of the 3-class conditional growth mixture model are presented in Table 4. The first class, comprising 41% of the sample, demonstrated the lowest level of internalizing symptoms with a mean intercept of .79 ($SE = .54$, $p$ = ns) and linear slope of .13 ($SE = .07$, $p$ = ns). The second class (39%) demonstrated a moderate level of internalizing symptoms with a significant mean intercept of 4.78 ($SE = .80$, $p < .001$) and slope of .149 ($SE = .10$, $p$ = ns). Finally, the third class (20%) demonstrated a higher level of internalizing symptoms with a significant mean intercept of 9.02 ($SE = 1.14$, $p < .001$) and slope of .161 ($SE = .20$, $p$ = ns). All classes exhibited relatively stable trajectories with nonsignificant slope

values. Females represented 49% of class one, 49% of class two, and 43% of class three. Characteristics of the classes are presented in Table 5. Participants assigned to class 3 had higher mean scores on socioeconomic stress and parental hostility compared to classes 1 and 2.

## Multinomial Regression Models

**Prediction of Class Membership by Child Sex Assigned at Birth.** Odds ratios are presented in Table 6. Multinomial logistic regression models indicated that the odds of being assigned to class 1 versus class 3 and to class 2 versus class 3 were 35% and 39% higher for females compared to males, respectively. Follow-up analyses were conducted to determine if the same pattern of results would hold when examining class assignment from the unconditional growth mixture model. Conversely, odds of being assigned to class 1 versus class 3 and to class 2 versus class 3 were 39% (95% CI, .457, .823) and 25% (95% CI, .564, 1.008) lower for females compared to males, respectively.

**Prediction of Class Membership by Parental Hostility.** Multinomial logistic regression models indicated that the odds of being assigned to class 1 versus class 3 and to class 2 versus class 3 decreased by 41% and 22%, respectively, for a one unit increase in parental hostility.

**Prediction of Class Membership by Socioeconomic Stress.** Multinomial logistic regression models indicated that the odds of being assigned to class 1 versus class 3 and to class 2 versus class 3 decreased by 60% and 43%, respectively, for a one unit increase in socioeconomic stress.

## Mediation Analysis

**Indirect Effect of Socioeconomic Stress on Class Membership.** Mediation analysis contrasting class 1 and class 3 membership is represented in Figure 4. The model indicated that the total effect of socioeconomic stress on class 3 membership was positive and significant (β = .745, $p < .001$). Socioeconomic stress was not significantly associated with parental hostility, though the association was at trend level (β = .075, $p = .065$). In turn, parental hostility was significantly associated with class 3 membership (β = .552, $p < .001$). The direct effect of socioeconomic stress on class 3 membership remained positive and significant, but the magnitude of the effect was attenuated (β = .706, $p < .001$). Finally, the indirect or mediated effect was not significant, though the estimate demonstrated a trend toward significance (β = .039, $p = .087$).

Mediation analysis contrasting class 2 and class 3 membership indicated that the total effect of socioeconomic stress on class 3 membership was positive and significant (β = .512, $p < .001$). Socioeconomic stress was positively and significantly associated with parental hostility (β = .081, $p < .05$). In turn, parental hostility was significantly associated with class 3 membership (β = .274, $p < .01$). The direct effect of socioeconomic stress on class 3 membership remained positive and significant, but the magnitude of the effect was attenuated (β = .490, $p < .01$). Finally, the indirect or mediated effect was not significant (β = .022, $p = .112$).

# CHAPTER IV

# DISCUSSION

## Summary of Results

The aims of the present study were to examine patterns in internalizing symptom development from childhood to adolescence; identify differences in symptom class membership according to child sex assigned at birth; and examine the influence of two important and distinct bioecological factors—interpersonal stressors due to hostile parenting and structural stressors related to socioeconomic factors—on the progression of children's internalizing symptoms between middle childhood and late adolescence. Hypotheses testing these aims were partially supported.

Three distinct heterogenous internalizing symptom classes were identified and defined by relative intercept values, including low (41%); moderate (39%); and higher (20%) symptom scores, consistent with hypothesis 1. The unconditional model that initially tested class membership likelihood by sex assigned at birth yielded results that aligned with hypothesis 2; the odds of membership in the higher symptom class, versus the low and moderate classes, were higher for females than they were for males. However, females were more likely than males to belong to the low symptom class when controlling for externalizing symptoms in the model, which was an unexpected result. The influences of parental hostility and socioeconomic stress on class membership aligned with hypothesis 3. As parental hostility and socioeconomic stress each increased, the likelihood of belonging to the higher symptom group increased.

There was a trending mediational effect wherein parenting behaviors partially mediated the influence of socioeconomic factors on symptom class membership ($p$ =

.087), consistent with hypothesis 4. While the effect of socioeconomic stress on parental hostility was nonsignificant, parental hostility as a mediator significantly increased the likelihood of belonging to the higher symptom class when compared with the low symptom class. Accounting for the mediating effect of parental hostility, the direct effect of socioeconomic stress on the outcome was significant. The total effect of socioeconomic stress without mediation was also significant and even higher than the direct effect attenuated by hostile parenting behaviors.

### *Estimating Internalizing Symptom Classes*

Observed symptom classes resulting from the growth mixture model align with predictions in hypothesis 1 that at least three unique developmental trajectories would be identified among the study sample. Significant parameter values for the intercept, children's internalizing symptom levels at T1, indicated that the classes represent unique differences in symptoms levels. Slope values for each class were slightly positive and, therefore, increasing; however nonsignificant coefficient values signal that these positive slopes may be no greater than zero. Given the nature of latent class assignment models that are used to estimate growth, it is possible that children's internalizing symptoms scores with the highest deviations (very high or very low) from the symptom class means were constrained to fit estimations that were not representative of their unique growth trajectories (Jung & Wickrama, 2008). For example, mean internalizing symptom scores at T1–T3 ranged from 6.67 to 7.83; however, minimum and maximum scores (0 and 64.2) fell at the opposite ends of the range at any given time point.

Another consideration is the potential effect of controlling for externalizing symptoms. Internalizing and externalizing symptoms were moderately to strongly

correlated at all timepoints; therefore, including externalizing as a cofounder in analyses may have had a more pronounced effect on the class outcomes than anticipated. Given the prevalence of symptom cooccurrence, the trajectories may not fully represent children's internalizing symptom growth in the absence of comorbid externalizing symptoms.

Another notable feature of the sample distribution was the percentage of children in the low symptom class (41%). While the present study did not examine a clinical sample, certain sample characteristics aligned with risk factors indicated in the scientific literature. A majority of children in the sample from the FLP cohort live in rural settings, live in households that fall at or below the federal threshold for poverty, and most participants fitting those demographics are also Black or African American. Each of these factors, on their own, confer risk for myriad health outcomes, including childhood internalizing symptom development (Van Voorhees et al., 2009; Vernon-Feagans et al., 2013).

Along similar lines, while the average household income for children from the EGDS cohort was higher than that of FLP, these children face unique risks as adoptees. Adopted children may face psychosocial challenges related to their identities as adopted children, as well as unknown risks of inherited genetic factors from their biological parents, and prenatal exposures associated with children's internalizing symptoms, such as maternal substance use (Marceau et al., 2015). Notwithstanding these risks, a larger proportion of the children in the study sample belonged to the low symptom class, signaling potentially important factors of protection from the rearing environment. Parent depressive symptom scores were very low and moderately correlated with parental

hostility ($r$ = .32), as compared with other study variables; together this enriched rearing environment may have provided an important buffering effect and underscores the important influence of the rearing environment.

### *Class Membership Moderated by Child Sex Assigned at Birth*

Some of the results of the present study related to child sex assigned at birth deviated from my expectation (hypothesis 2) that a larger proportion of females, as compared with males, would belong to internalizing symptom classes characterized by higher symptoms. Likelihood of membership in the higher symptom class was only indicated when externalizing symptoms were not accounted for in the statistical model. When externalizing was included, the pattern of results for SAB was reversed. Study results indicate that class membership was heavily influenced by shared variance among children's internalizing and externalizing symptoms and underscore the importance of controlling for externalizing in investigations where child and adolescent internalizing is a focal construct. They also suggest several possible explanations for these effects.

A broad perspective is useful in first considering the shared genetic liability and other vulnerability factors among children that experience internalizing and externalizing symptoms. Research utilizing latent transition analysis has employed developmental perspectives to further understand factors associated with membership in latent classes characterized by internalizing symptoms, externalizing symptoms, or both, as well as the likelihood of changing class membership during childhood development (Isdahl-Troye et al., 2022).

In addition to findings that have identified risks for internalizing symptom development, other studies provide value in highlighting the high level of comorbidity of

internalizing and externalizing symptoms during childhood. One investigation among an early childhood sample of children between kindergarten and second grade identified that nearly half of children endorsed comorbid symptoms, and the remaining 40% of children that experienced symptoms were divided somewhat evenly between the externalizing symptom class and the internalizing symptom class (Willner et al., 2016). While internalizing symptom group members had a 20% probability of experiencing symptom remission over the course of early childhood, members of the externalizing group were 25% likely to transition membership to the comorbid symptom group, which remained largely stable across early childhood development.

Among the present study sample, children's internalizing symptoms at T1 (ages 7–8) were most highly correlated with externalizing symptoms at T1 and with internalizing symptoms at the T2 (ages 11–13). Although the study examined internalizing symptoms as the outcome of interest, a recognition of the prevalence of symptom co-occurrence sheds light on the clear influence of externalizing symptoms on class membership observed and suggests that internalizing symptoms that do not co-occur with externalizing may represent distinctive aspects of the construct.

Research findings have also indicated that internalizing and externalizing symptoms may be differentially reported based on several factors. Externalizing child characteristics and behaviors are typically more noticeable than internalizing characteristics and behaviors and more accurately identified by observers, such as parent/caregiver reporters (Comer & Kendall, 2004; Dwyer et al., 2006). Issues related to measurement may also be salient to the type of information that caregivers report. Using the CBCL and SDQ instruments administered in the present study to assess child

internalizing and externalizing symptoms, caregivers were typically asked to report on observable or noticeable features of externalizing, such as screaming, temper tantrums, disobedience at home, and other behaviors outside the home that commonly elicit social consequences, such as fighting and truancy. Conversely, the scale assessing internalizing symptoms comprised more items related to inwardly experienced emotional factors. Parents were asked to provide their assessment of whether their child prefers solitude, has thoughts of suicide, and feels worthlessness, inferior, or unloved. Less observable or attention-seeking internalizing symptoms may thereby bias caregiver reports.

In addition to differences in the observability of child internalizing and externalizing symptoms, scientific findings further indicate that there are discrepancies between caregiver and child reports of children's symptoms, with even less correspondence between parent and child reports about internalizing symptoms, as compared with externalizing symptoms (De Los Reyes & Kazdin, 2005; Duhig et al., 2000). Differences in reporting on children's socioemotional problems are even more pronounced between adolescents and their adult reporters, as compared with younger children (Achenbach et al., 1987; De Los Reyes et al., 2015), and evidence further suggests that discrepancies in anxiety symptom reporting in particular may reflect differences in the aspects of internalizing symptoms that children and parents pay attention to (Nauta et al., 2004). Although the present study only used parent reports to assess child symptoms, biases in reporting could potentially skew results.

Sex assigned at birth and factors related to gender-roles may also be relevant in understanding the lower likelihood of membership in the higher symptom class among females in this study. Some research findings reported that parents are less sensitive to

children's depressive symptomology overall, and the effect is significantly more pronounced among female children (Angold et al., 1987). However, other study findings indicate that gender role-based expectations accounted for mothers' disproportional attribution of internalizing behaviors to their female children, as compared with males, and externalizing behaviors with their male children, as compared with females (Najman et al., 2001).

### *Influence of Parental Hostility and Socioeconomic Stress on Class Membership*

The scientific literature substantiates study results that predicted membership in the higher symptom class according to increases in parental hostility and increases socioeconomic stress (hypothesis 3). Among children sampled in the present study, where average scores for parental hostility were fairly low, results indicated that the influence of harsh parenting behaviors were meaningful regardless of the frequency at which they occurred. Among all study variables, parenting behaviors correlated most strongly with parent depressive symptoms, in alignment with research findings that have suggested various factors linking parent and child mental health, including heritable influences, health behaviors, and biological factors that impact parents' physical wellbeing.

Environmental factors acting upon parents may also profoundly influence the socioemotional resources they have access to and can bring to bear in their parenting (Brumariu & Kerns, 2010). Macrosystemic influences shape a caregiver's experience of their environments based on individual identity variables, such as race, ethnicity, sex assigned at birth, and gender; as well as interrelated contextual factors that may include

cultural perspectives regarding discipline and the impact of acculturative stressors on parenting demands (Emmen et al., 2013; Pinderhuges et al., 2000).

The significance of socioeconomic stress in predicting children's internalizing symptom classes also suggests that there are exosystemic factors that impact children's psychological wellbeing. Some direct influences may include unsafe neighborhood and school environments that can pose daily threats to safety and elicit hypervigilant psychosocial responses to navigating the local environment. However, in the present study, variables used to measure socioeconomic stress indicate a meaningful influence of the socioeconomic environment, by way of parents' educational attainment and income that supports a child's household. Factors that influence the formal levels of education that parents attain can have rippling impacts on employment options and vocational advancement (Darity, 2003; Fergusson et al., 2007), as well as income. Income alone can profoundly affect caregivers' access to tangible resources that directly and indirectly support child development, including accessibility of needed transportation, healthy foods, medical care, and essential childcare (Dearing et al., 2001).

The mediational analysis in the present study also tested whether the stressors caregivers experienced from these exosystemic factors influenced children's mental health directly as well as indirectly through parenting behaviors (hypothesis 4). Although the effect of socioeconomic stress on parenting was trending and not found to be statistically meaningful, parental hostility did significantly influence children's internalizing symptoms in the mediation model. This result suggests that there could be other contributors to harsh parenting behaviors that better explain the relationship between socioeconomic stress and internalizing symptoms. It is also possible that the

constructs used to measure socioeconomic stress don't fully capture the array of exosystemic and microsystemic stressors that could impact a parent's socioeconomic status. In the present study, parent educational attainment and household income were the only factors that contributed to the socioeconomic stress variable; however, other nuanced factors could be relevant to the way this construct is measured. Caregivers navigating daily microaggressions in the workplace, for example, may endorse higher levels of stress that undermine mental health. Other exosystemic factors, such as housing affordability and security, align with a multitude of difficulties and expose household members to myriad adversities that negatively influence mental health (McLoyd, 1998).

**Limitations**

Limitations related to analytic approaches, data availability and missing data, operationalizing constructs, and theoretical models were identified. First, in terms of limitations related to analytic approaches, nonsignificant slope values associated with observed categorical outcomes suggest that there may be other growth models that could fit these data in ways that allow for greater interpretation of within-person variability. Additionally, child-reported symptom data is considered more reliable than parent reports, particularly during adolescence (Barch et al., 2018; Ford & McCoy, 2022). Therefore, parent reports used for the outcome variable for the present study may have skewed the data at the third outcome measurement. Furthermore, statistical models used were not equipped to account for factorial invariance due to item-level differences between early childhood CBCL and SDQ instruments; therefore, early childhood internalizing symptom measurements were not included in final analyses. Including a

fourth outcome measurement would have allowed for estimation of a quadratic growth effect; however, there are drawbacks and benefits to both approaches.

Limitations related to missing data resulted from differences in data collection and measurement times across study cohorts; limited availability to certain data at measurement time points resulted in systematic missingness. In addition, some instruments were not uniformly available and resulted in exclusion of certain constructs from statistical modeling. Pubertal development, for example, was identified as a potential confounder impacting child internalizing symptom development but was not assessed at the same child ages in both cohorts and was ultimately excluded as a covariate. Parental depression was an important covariate that was included in analyses given its known influence on parenting behaviors. However, its inclusion resulted in a fair amount of listwise deletion of data and limited considerations for including other potentially important covariates, such as parental anxiety. In addition to the potential issue of covariation with parental depression, parental anxiety could have posed similar missing data concerns and was not included a confounder in the present study.

Limitations were also identified in the way constructs could be operationalized and measured. In regard to the socioeconomic stress construct, income-to-needs data (Dearing et al., 2001; McLoyd, 1998), a more sensitive assessment of family economic wellbeing than income alone, were not available for use during analyses. Similarly, measures of economic strain (Pearlin, 1981) were not uniformly available in both sample datasets and could not be included in a composite variable measuring socioeconomic stress. Regarding parent educational attainment data that did contribute to the socioeconomic stress composite variable, small percentages of EGDS cohort adoptive

parents reported either slightly higher (6.5%) or lower (4%) educational attainment at a second collection wave. Data exploration revealed that education levels across the cohort remained largely stable and this minor limitation did not impact the plan of analysis. In addition to these considerations for construct operationalization, additional measurement timepoints to assess the potential effects of changes in socioeconomic status over time could have been informative. Similar to socioeconomic stress, commonly used approaches were employed to assess children's racial and ethnic identities. However, race and ethnicity data aggregation approaches such as these, that group unique racial and ethnic communities into broader classifications of race and ethnicity, are aptly criticized for potentially masking important within group differences (Braveman et al., 2005; Kauh et al., 2021).

More broadly, the bioecological framework employed limited the theoretical scope of the present study to constructs focused on bioecological levels of influence on children's internalizing symptom development. Accounting for the influence of children's experiential processes, which may inform their stress appraisal, on internalizing symptom development, was beyond the scope of the present study.

**Future Directions**

Future studies could address aforementioned limitations to the study's analytic approaches, data availability and missingness, operationalizing constructs, and theoretical foundation. First, other analytic approaches could be beneficial. Modeling both internalizing and externalizing symptom growth, rather than controlling for externalizing symptoms, could allow for informative comparisons between symptom classes. Additionally, an alternative to estimating latent classes, which constrains potentially

informative sample variance, could include modeling the slope and intercept. This approach could still allow for the examination of various risk and protective factors, as well as more nuanced findings, and may be considered for future studies. Shifting-indicator models may also be considered to address factorial invariance between the early childhood internalizing symptom instruments. These investigations could use second-order latent growth modeling to account for item-level changes across repeated measurements to insure that the construct is being reliably measured across assessment time points (Hong & Ho, 2005; Sayer & Cumsille, 2001).

In regard to concerns about data missingness and availability, when working with a large multi-site dataset, it could be useful to include approaches to analysis plans that consider and compare multiple approaches to handling missingness, such as multiple imputation (MI) and full information maximum likelihood, FIML (Lee & Shi, 2021). Some data that were excluded based on availability, such as timing of pubertal development, should be included or considered for inclusion if available for future research. Puberty is an important factor to control for when investigating child development; there is support in the scientific literature for significant associations between pubertal status and internalizing symptom development (Hankin & Abramson, 2001; McGuire et al., 2019; Ullsperger & Nikolas, 2017). Social roles and related youth experiences have an important impact on child mental health during puberty in particular and outcomes are further differentiated according to pubertal development among and between female and male adolescents. Parental anxiety is another potential confounder that would be useful to include in future analyses with attention paid to covariation with parental depression. Similar to depressive symptoms, parental anxiety symptoms

associated with parenting behaviors and family conflict warrant consideration (Ahmadzadeh et al., 2019)

Future investigations may also consider construct measurement approaches that could better represent the complexity of macrosystemic influences on certain data. Income-to-needs, for example, would have been a more contextualized and preferred income-related factor contributing to the socioeconomic stress construct. Financial strain is another measure of economic resource availability, with the additional inclusion of an individual's subjective appraisal of how financial limitations contribute to life stress (Pearlin et al., 1981). Augmenting objective measures with subjective measures of stress can be particularly useful in research designs that seek to understand the experiences of people with minoritized identities. Among the populations sampled in the present study, subjective measures of stress could help to parse the impact of tangible resource limitations from the influence of coping styles, experiences of discrimination, and other intangible contributors to perceptions of financial security (Angel et al., 2003; Glei et al., 2018). Future studies could consider including these additional factors in a variable measuring socioeconomic stress, in addition to examining the effects of changes in family socioeconomic status that occur across children's development. Similarly nuanced approaches may be considered in measuring racial and ethnic constructs and/or the influence of minority stress on internalizing symptom outcomes. In addition to study design approaches that might investigate race and ethnicity as moderating factors on symptom development, future examinations could also consider more nuanced, intersectionality-sensitive, and equitable approaches to race and ethnicity data disaggregation (Braveman et al., 2005; Kauh et al., 2021).

In regard to theoretical limitations identified, bioecological and diathesis–stress models may not be best suited to account for meaning-making processes underlying self-referent variables influencing caregivers' perceptions about circumstances that contribute to their stress or children's phenomenological experiences that influence internalizing symptom expression. Theoretical frameworks such as the Phenomenological Variant on Ecological Systems Theory (PVEST) may be useful in conceptualizing individual perceptions subject to influences from the macrosystem. PVEST includes the social and environmental contexts within the bioecological framework and additionally accounts for the role of a child's phenomenological experience operating as an individual–level factor moderating influences from other levels of the bioecosystem (Spencer et al., 1997; Velez & Spencer, 2018). This type of framework is sensitive to the influences of children's cognitive styles, perspective-taking, and experiential processing on differences in symptom expression. While race, ethnicity, and gender operate as social constructs on the macrosystemic level, PVEST acknowledges that an individual's self–concept is developed through a sense of identification with larger sociocultural factors and accounts for how a child makes meaning of the structures, processes, interactions, and other individuals that reflect their society's values (Hope et al., 2022).

**Implications for Counseling and Clinical Psychology Practice**

Counseling and clinical psychologists are uniquely positioned to access a feedback loop of information unique to their roles as scientist-practitioners. Findings from the present study suggest that internalizing symptoms that can develop into anxiety-related and depressive disorders may be masked by commonly co-occurring externalizing symptoms that draw more attention to disruptive behaviors. Clinicians skilled in

differential diagnosis and assessment, and further attuned to children's treatment needs, may select approaches that target affective problems and mood dysregulation that manifest as inwardly focused distress, outwardly expressed behaviors, or both. Study findings provide even stronger indications that children's psychological wellbeing is inherently linked to the wellbeing of the people and communities with the most proximal influences on their development. Focusing exclusively on child-centered interventions may miss more sustainable, systems-based approaches to providing care for their caregivers and bolstering community supports (Stormshak et al., 2021).

Families predictably seek treatment for their children when children's behaviors noticeably limit their functioning or result in problems at home or school. Trained clinicians are equipped to address and intervene upon both bioecological levels of influence on children's mental health, individual and macrosystemic. Contextually focused assessment can reveal cognitive and neurodevelopmental contributors to children's problems with socioemotional function, such as ADHD diagnoses that compound the effects of affective problems related to anxiety. Effective assessment may also ascertain the contribution to children's symptoms from caregiver behaviors and socioeconomic factors that impact children's home environments and basic needs. Assessment models such as the well-validated Family Check Up use a diverse combination of data, including parent- and child-reported measures; clinical interviewing; and clinician observation of parent-child interactions in the home environment in order to develop treatment plans specific to children's developmental needs. Important considerations about treatment implementation and settings are also within the purview of counseling and clinical psychology scientist-practitioners and can determine treatment

accessibility. Findings from the present study emphasize the need for practitioners to engage with scientifically informed interventions that effectively treat children's symptoms, integrate the needs of caregivers, and attend to structural barriers that impede access to child-centered family-based care.

## Conclusion

Increasing understanding about factors that exacerbate and attenuate risk for children's internalizing symptom development serves an essential wellness promotion goal with interdependent objectives. This means that accessible clinical approaches that target assessment and individual-level symptom reduction and management must operate in collaboration with the development and honing of effective preventative approaches to addressing social, environmental, and ideological contributors to long-term outcomes of childhood internalizing problems, such as depression and anxiety. The global scale and public health burden of the long-term sequelae of early internalizing problems underscores the need to prioritize both approaches. Community-based participatory action, mixed methods, and other creative and interdisciplinary research approaches are a productive way forward for preventionists investigating systemic contributors to childhood and adolescent internalizing problems.

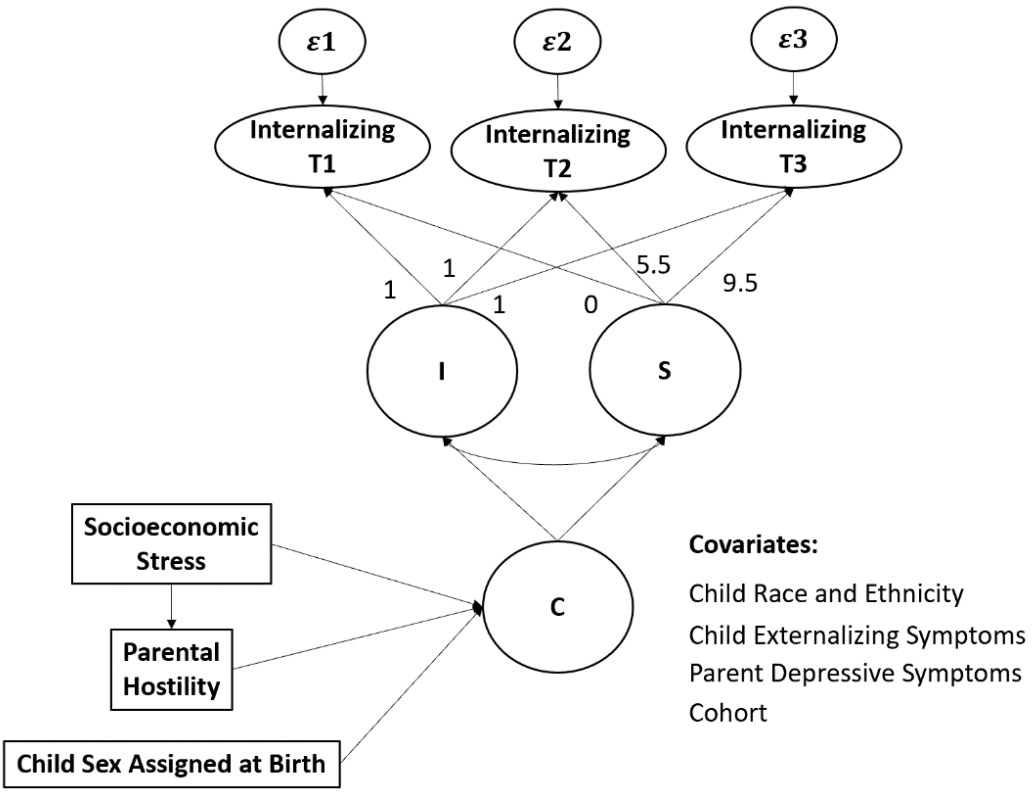
For researchers studying internalizing symptom development from childhood to adolescence, this includes challenging the assumptions about who is vulnerable, giving consideration to the ripple effect of community transmission of negative outcomes over time, and rethinking how and among whom outcomes are measured (Castelli et al., 2009; Cooper et al., 2022). Unfortunately, data is still disproportionately collected; communities that are already marginalized (Bynum et al., 2008; Dunn et al., 2016)

thereby continue to lose out on the greatest benefits of scientific inquiry. Prioritizing intentionality in incorporating anti-racist approaches into the research process, however, will lend itself to regenerative outcomes for the science through the identification of theories sensitive to systemic and intersecting issues of equity and discrimination; approaches to measurement and analysis that identify and correct for overlooked biases in instrumentation and interpretive conventions; and attention to the sustainability of wellness outcomes on systemic levels that heavily impact communities, caregivers, and rearing environments that nurture children's development.

# APPENDICES

## Figure 1

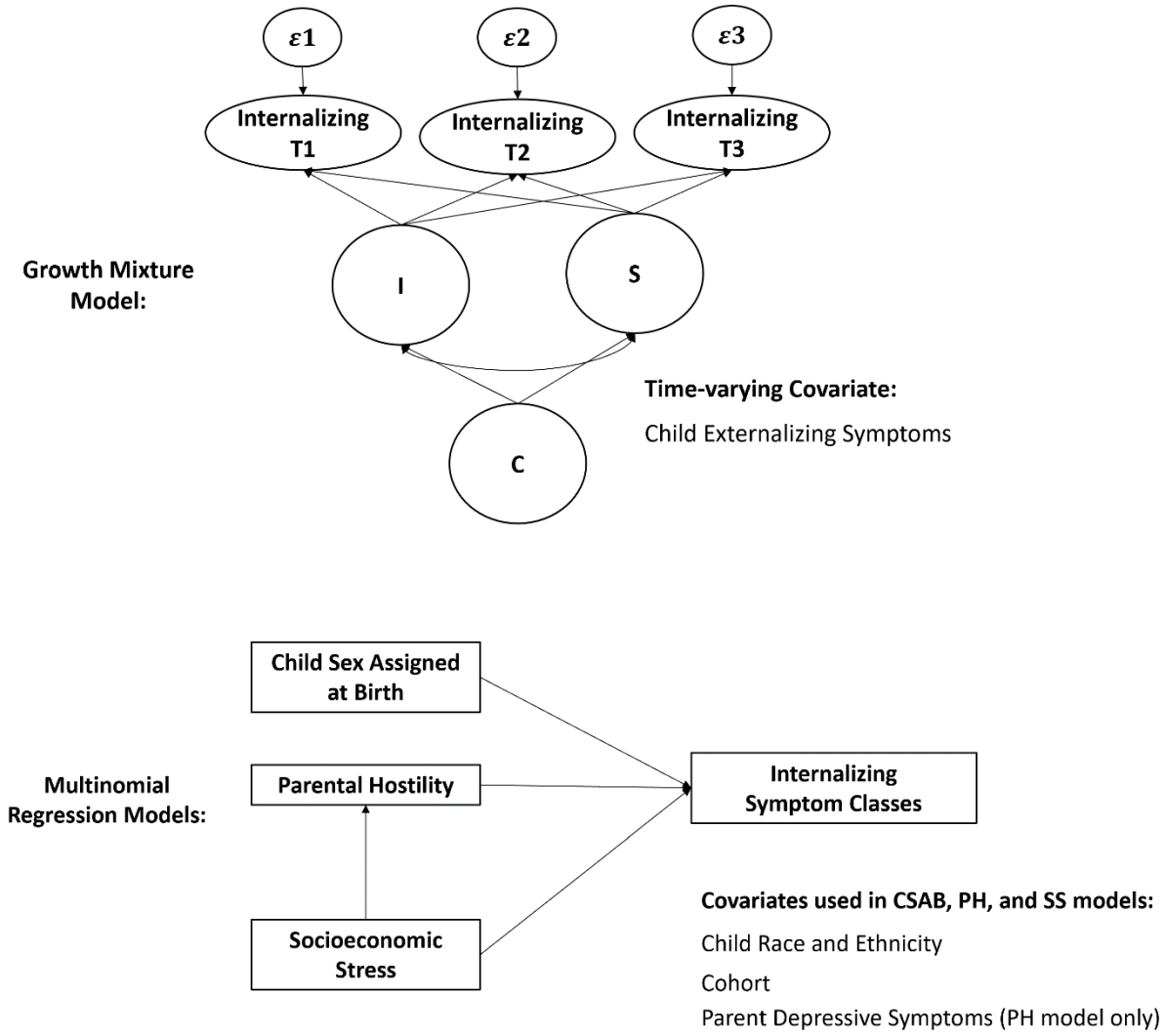
*Latent Class Growth Mixture Model to Identify Developmental Trajectories of Internalizing Symptoms*




*Note.* Conceptual model of all study variables used in analyses, including path coefficients for the latent class growth mixture model, intercept parameters fixed at 1, and slope coefficients fixed according to average time intervals (in years) between time 1 and time 2 (5.5 years) and between time 1 and time 3 (9.5 years).

**Figure 2**

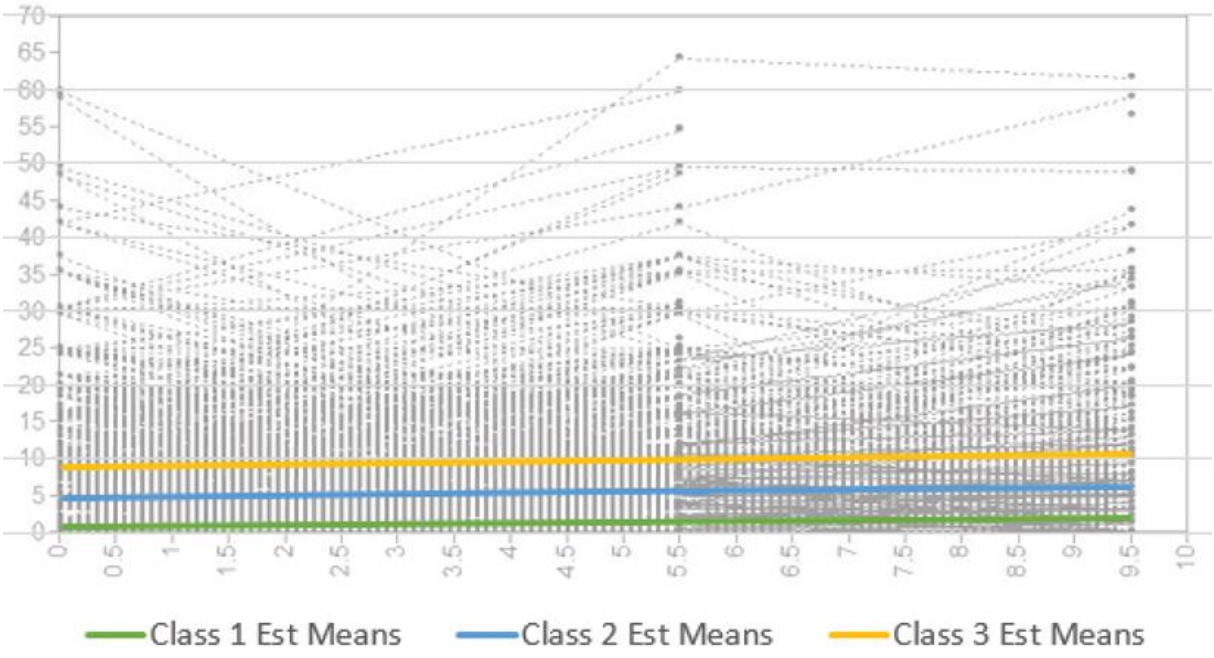
*Simplified Path Diagrams of Growth Mixture Model and Multinomial Regression Models*




*Note*. Growth mixture model diagram (above) represents the latent class growth model used to estimate internalizing symptom classes. Multinomial regression diagram (below) represents analyses used to regress one categorical predictor, sex assigned at birth, and two continuous predictors, parental hostility, and socioeconomic stress, onto the outcome variable, internalizing symptom latent classes. The mediational regression analysis testing the indirect effect of socioeconomic stress on the outcome, is represented by the upward vertical arrow between the two measured continuous predictor variables, socioeconomic stress, and parental hostility.

**Figure 3**

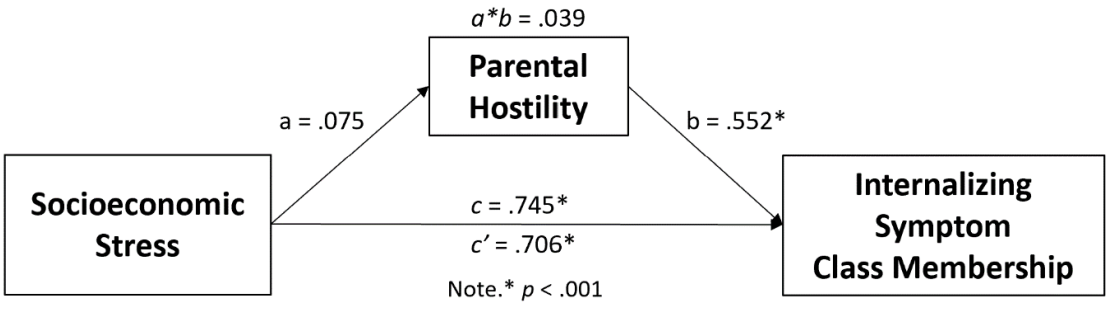
*Three-Class Internalizing Symptom Trajectories by Sex Assigned at Birth*




*Note.* Gray lines represent 1,555 distinct observed growth trajectories of children's internalizing symptom scores, as represented by the y-axis, with age represented (in years) by the x-axis between time 1 (mean age = 7.25), time 2 (mean age = 12.68), and time 3 (mean age = 16.47). The three prominent colored lines represent estimated mean internalizing symptom scores among children assigned to latent class 1, 2, and 3 based on heterogeneous symptom development.

**Figure 4**

*Mediation Model Contrasting Class 1 and Class 3 Membership*




*Note.* Mediational model depicting path coefficients corresponding to "a*b path" representing the indirect effect, "c path" representing the total effect, and "c' path" representing the direct effect of socioeconomic stress on the internalizing symptom class outcome variable.

**Table 1**

*Study Variable Descriptive Statistics*

| | N (%) | | | | |
|---|---|---|---|---|---|
| FLP | 1074 (69%) | | | | |
| Female | 743 (48%) | | | | |
| Black | 502 (32%) | | | | |
| Latinx/Other | 241 (16%) | | | | |
| White | 812 (52%) | | | | |
| | Mean (SD) | Min | Max | Skew | Kurtosis |
| Socioeconomic Stress | 1.57 (.90) | 0 | 3.35 | .012 | -1.211 |
| Parental Hostility | 2.33 (.80) | 1 | 6.13 | .516 | .536 |
| Parental Depression | .54 (.48) | 0 | 2.65 | 1.388 | 1.709 |
| T1 Internalizing | 6.67 (7.40) | 0 | 59.7 | 2.455 | 9.076 |
| T1 Externalizing | 10.94 (13.40) | 0 | 69.8 | 2.162 | 4.443 |
| T2 Internalizing | 7.49 (8.60) | 0 | 64.2 | 2.303 | 7.511 |
| T2 Externalizing | 8.20 (11.90) | 0 | 66.8 | 2.636 | 7.330 |
| T3 Internalizing | 7.83 (9.01) | 0 | 61.5 | 2.146 | 5.917 |
| T3 Externalizing | 6.46 (10.06) | 0 | 70.4 | 2.871 | 9.669 |

*Note*. Cohort coded 0 = Early Growth and Development Study, 1 = Family Life Project (FLP); Sex-assigned coded 0 = male, 1 = female; Black = dummy coded race/ethnicity where 1 = Black/African American, 0 = Other; Other = dummy coded race and ethnicity where 1 = Latinx, and/or Hispanic, and/or other race and/or ethnicity, 0 = else; White = dummy coded race and ethnicity where 1 = White, 0 = Other.

**Table 2**

*Study Variable Zero-Order Correlations*

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. FLP | - | | | | | | | | | | | | |
| 2. Female | .06* | - | | | | | | | | | | | |
| 3. Black | .26*** | .01 | - | | | | | | | | | | |
| 4. Lx/Oth | -.27*** | .00 | -.30*** | - | | | | | | | | | |
| 5. White | -.04 | -.01 | -.72*** | -.45*** | - | | | | | | | | |
| 6. SS | .74*** | .05* | .41*** | -.18*** | -.26*** | - | | | | | | | |
| 7. PH | -.07* | -.02 | -.01 | -.03 | .03 | -.01 | - | | | | | | |
| 8. PD | .17*** | .02 | .09** | -.01 | -.08* | .28*** | .32*** | - | | | | | |
| 9. T1 Int | .19*** | .08** | .11*** | -.09** | -.04 | .25*** | .20*** | .33*** | - | | | | |
| 10. T1 Ext | .18*** | -.12*** | .06* | -.07* | -.01 | .25*** | .18*** | .28*** | .51*** | - | | | |
| 11. T2 Int | .03 | .06 | -.04 | -.05 | .08* | .07* | .12*** | .30*** | .50*** | .35*** | - | | |
| 12. T2 Ext | .02 | -.11*** | -.03 | -.03 | .05 | .11** | .13*** | .24*** | .32*** | .58*** | .51*** | - | |
| 13. T3 Int | -.02 | .10** | -.03 | -.01 | .03 | .05 | .17*** | .27*** | .41*** | .29*** | .64*** | .41*** | - |
| 14. T3 Ext | -.01 | -.07 | .00 | -.04 | .03 | .13** | .17*** | .24*** | .27*** | .46*** | .40*** | .67*** | .56*** |

*Note*. * $p < .05$; ** $p < .01$, *** $p < .001$; Cohort coded 0 = Early Growth and Development Study, 1 = Family Life Project (FLP) ($n$ = 1,555); Sex-assigned coded 0 = male, 1 = female ($n$ = 1,555); Black = dummy coded race/ethnicity where 1 = Black/African American, 0 = Other ($n$ = 1,555); Other = dummy coded race and ethnicity where 1 = Latinx, and/or Hispanic, and/or other race and/or ethnicity, 0 = else ($n$ = 1,555); White = dummy coded race and ethnicity where 1 = White, 0 = Other ($n$ = 1,555); SS= socioeconomic stress ($n$ = 1,361); PH = parental hostility ($n$ = 1,075); PD = parental depression ($n$ = 954); T1 Int = time 1 internalizing symptom sum score (N = 1,305); T1 Ext = time 2 externalizing symptom sum score ($n$ = 1,305); T2 Int = time 2 internalizing symptom sum score ($n$ = 967); T2 Ext = time 2 externalizing symptom sum score ($n$ = 967); T3 Int = time 3 internalizing symptom sum score ($n$ = 798); T3 Ext = time 3 externalizing symptom sum score ($n$ = 798).

**Table 3**

*Fit Indices for Two- to Four-Class Growth Mixture Models*

| Fit Indices | 2 Classes | 3 Classes | 4 Classes |
|---|---|---|---|
| AIC | 39335.366 | 38532.381 | 38214.027 |
| BIC | 39570.732 | 38864.033 | 38641.966 |
| Adjusted BIC | 39430.954 | 38667.074 | 38387.824 |
| Entropy | .844 | .750 | .717 |
| LMR *p*-value | < .001 | < .01 | .699 |
| ALRT *p*-value | < .001 | < .01 | .699 |

*Note.* AIC = Akaike information criterion; BIC = Bayesian information criterion; Adjusted BIC = sample size-adjusted Bayesian information criterion; LMR = Vuong–Lo–Mendell–Rubin test; ALRT = Adjusted Lo–Mendell–Rubin test.

**Table 4**

*Mean Scores for Growth Factors of Three-Class Growth Mixture Model*

| Growth Factors | Class 1 | | Class 2 | | Class 3 | |
|---|---|---|---|---|---|---|
| | Mean | *SE* | Mean | *SE* | Mean | *SE* |
| Intercept | .79 | .54 | 4.78*** | .80 | 9.02*** | 1.14 |
| Linear Parameter | .13$^{+}$ | .07 | .149 | .10 | .161 | .20 |

*Note.* *** $p < .001$; * $p < .05$; $^{+}$ $p < .10$.

**Table 5**

*Characteristics of Internalizing Symptom Trajectory Classes*

| | Total Sample N = 1,555 (100%) | Class 1 N = 633 (41%) | Class 2 N = 614 (39%) | Class 3 N = 308 (20%) |
|---|---|---|---|---|
| | | | N (%) | |
| FLP | 1074 (69%) | 438 (69%) | 384 (63%) | 252 (82%) |
| Female | 743 (48%) | 310 (49%) | 302 (49%) | 131 (43%) |
| Black | 502 (32%) | 183 (29%) | 199 (32%) | 120 (39%) |
| Latinx/Other | 241 (16%) | 116 (18%) | 96 (16%) | 29 (9%) |
| White | 812 (52%) | 334 (53%) | 319 (52%) | 159 (52%) |
| | | | Mean (SD) | |
| Socioeconomic Stress | 1.57 (.90) | 1.44 (.86) | 1.49 (.91) | 1.97 (.85) |
| Parental Hostility | 2.33 (.80) | 2.13 (.70) | 2.37 (.77) | 2.60 (.89) |
| Parental Depression | .54 (.48) | .36 (.35) | .56 (.47) | .78 (.58) |
| T1 Internalizing | 6.67 (7.40) | 2.37 (2.06) | 7.14 (4.92) | 13.96 (11.09) |
| T1 Externalizing | 10.94 (13.40) | 3.26 (2.54) | 8.69 (5.52) | 30.07 (17.81) |
| T2 Internalizing | 7.49 (8.60) | 2.15 (1.89) | 7.57 (5.71) | 14.97 (12.20) |
| T2 Externalizing | 8.20 (11.90) | 1.63 (1.62) | 6.29 (4.82) | 20.85 (17.75) |
| T3 Internalizing | 7.83 (9.01) | 2.71 (2.41) | 8.47 (6.52) | 16.92 (13.42) |
| T3 Externalizing | 6.46 (10.06) | 1.37 (1.61) | 4.76 (3.84) | 20.42 (15.22) |

*Note*. Cohort coded 0 = Early Growth and Development Study (EGDS), 1 = Family Life Project (FLP); Sex-assigned coded 0 = male, 1 = female; Black = dummy coded race/ethnicity where 1 = Black/African American, 0 = Other; Other = dummy coded race and ethnicity where 1 = Latinx, and/or Hispanic, and/or other race and/or ethnicity, 0 = else; White = dummy coded race and ethnicity where 1 = White, 0 = Other.

**Table 6**

*Odds Ratios for Predictors and Likelihood of Class Membership*

| | Class 1 vs Class 3 | Class 2 vs Class 3 |
|---|---|---|
| Variable | OR (95% CI) | OR (95% CI) |
| Female | 1.345 (1.019, 1.775) | 1.392 (1.052, 1.841) |
| Parental Hostility | . 591 (.471, .741) | . 784 (.639, .961) |
| Socioeconomic Stress | . 402 (.307, .524) | . 569 (.437, .740) |

*Note.* If 95% confidence interval includes 1, effect is not significant.

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