Genetic and Environmental Influences on Youth Externalizing Behaviors across Racial/Ethnic Groups

by

Angel Trevino

A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Approved April 2023 by the
Graduate Supervisory Committee:

Jinni Su, Chair
Kathryn Lemery-Chalfant
José Causadias

ARIZONA STATE UNIVERSITY

May 2023

ABSTRACT

This study investigated whether the patterns of direct association, and of gene-environment interaction (GxE), between family variables (i.e., parenting, family conflict, and attitudinal familism) and youth externalizing behaviors differed across racial/ethnic groups. The sample was composed of 772 twin pairs from the Adolescent Brain Development Study (ABCD) and analyses were run on three racial/ethnic groups (White [n=1023], Black/African American [n=220], Hispanic [n=152]; Mage=10.14 years). Youth reports of parental warmth, parental monitoring, family conflict, parent-reported attitudinal familism, and parent reports of youth externalizing behaviors were collected at baseline when children were 10 years old. Regression analyses tested the direct association between the family variables and youth externalizing behaviors, and moderated heritability models tested for GxE. Family conflict was associated with more externalizing behaviors for White youth, and parental warmth was associated with fewer externalizing behaviors for Hispanic youth. Parental attitudinal familism composite and familism support were associated with fewer externalizing behaviors for Black youth but more externalizing behaviors for Hispanic youth. We found no effects for parental monitoring, familism obligations, and familism referent on youth externalizing behaviors. Additive genetic and non-shared environmental influences explained the variance in youth externalizing behaviors across all groups. For White youth, parental warmth, parental monitoring, and familism support moderated additive genetic (A), shared-environmental (C), and non-shared environmental (E) influences on externalizing behaviors, and familism obligations moderated C and E influences. Results from

exploratory moderated heritability analyses conducted for the Black/African American and Hispanic samples are discussed. Altogether, these findings highlight the multiple avenues through which the family context can impact the development of youth externalizing behaviors, and reinforce the need to examine how these relations differ across racial/ethnic groups.

ACKNOWLEDGMENTS

Data used in the preparation of this thesis were obtained from the Adolescent Brain Cognitive Development[SM] (ABCD) Study (https://abcdstudy.org), held in the NIMH Data Archive (NDA). This is a multisite, longitudinal study designed to recruit more than 10,000 children age 9-10 and follow them over 10 years into early adulthood. The ABCD Study® is supported by the National Institutes of Health and additional federal partners under award numbers U01DA041048, U01DA050989, U01DA051016, U01DA041022, U01DA051018, U01DA051037, U01DA050987, U01DA041174, U01DA041106, U01DA041117, U01DA041028, U01DA041134, U01DA050988, U01DA051039, U01DA041156, U01DA041025, U01DA041120, U01DA051038, U01DA041148, U01DA041093, U01DA041089, U24DA041123, U24DA041147. A full list of supporters is available at https://abcdstudy.org/federal-partners.html. A listing of participating sites and a complete listing of the study investigators can be found at https://abcdstudy.org/consortium_members/. ABCD consortium investigators designed and implemented the study and/or provided data but did not necessarily participate in the analysis or writing of this report. This thesis reflects the views of the authors and may not reflect the opinions or views of the NIH or ABCD consortium investigators.

The ABCD data repository grows and changes over time. The ABCD data used in this report came from Curated Annual Release 4.0 (DOI: 10.15154/1523041). DOIs can be found at https://dx.doi.org/10.15154/1523041.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

LIST OF FIGURES

INTRODUCTION

Childhood externalizing behaviors represent a cluster of behavioral problems consisting of aggressive, rule-breaking, and/or disruptive actions (Hinshaw, 1987). Childhood externalizing behaviors are developmental precursors to adolescent and adult problems such as criminal and violent behavior (Betz, 1995; Farrington, 1989; Moffitt, 1993) and substance use (Timmermans et al., 2008; King et al., 2004; Thompson et al., 2011). Understanding the etiology of externalizing behaviors in childhood has important implications for the development of early interventions that can alleviate behavioral problems in childhood and may prevent the emergence of associated adolescent and adult problem behaviors. Both environmental and biological influences drive the development of externalizing behaviors, not just in additive but in multiplicative ways (Liu, 2004). Highlighting this, the family environment serves as an important social context for children that not only predicts the emergence of externalizing behaviors directly (e.g., Ruiz-Hernández et al., 2019; Stormont, 2016), but also interacts with genetic influences (i.e., gene-environment interaction; GxE) by either exacerbating or attenuating the effect of genetic risk on externalizing behaviors (e.g., Cheung et al., 2014). However, given that the patterns of association between the family context and childhood externalizing behaviors may vary across racial/ethnic groups (e.g., Kang et al., 2022, Pachter et al., 2006, Yildirim, & Roopnarine, 2014), it is unclear whether these environmental influences exacerbate or attenuate genetic risk for externalizing behaviors equally or distinctly across racial/ethnic groups. A family variable that highlights the potential differences in function across racial/ethnic groups is attitudinal familism, a promotive

Hispanic[1] cultural value that captures attitudes regarding how important family is to individuals (Burgess & Locke, 1945; Sabogal et al., 1987). That is, although it has primarily been found to protect against youth externalizing behaviors in Hispanic populations (Cahill et al., 2021), its universal applicability and function across racial/ethnic groups is questioned (e.g., Schwartz, 2007, Smith et al., 2019, Christophe & Stein, 2022). The proposed study aims to identify whether the patterns of direct association, and of gene-environment interaction, between family variables (i.e., parenting, family conflict, and attitudinal familism) and youth externalizing behaviors differ across racial/ethnic groups.

Significance

Importance of Studying Externalizing Behaviors in Childhood. Childhood externalizing behaviors represent a form of psychopathology where children manifest problem behaviors outwardly toward the environment (e.g., disruptive behavior, aggression, rule-breaking; Liu, 2004). The prevalence of these behaviors varies by the specific type but they are relatively common. Prevalence rates of childhood physical and verbal aggression have been reported at 9.9% and 6.3%, respectively, (Meysamie et al., 2013) and rates of childhood conduct disorder, a disorder where children disregard common social rules and norms, have been reported at 8% (Mohammadi et al., 2021).

[1] Parents in the current study (described in the methods section [pg 19]) answered the question "Do you consider the child Hispanic/Latino/Latina?". There are multiple terms that could have been used to refer to people of Latin American or Hispanic origin. *Latinx,* for example, has been commonly adopted as a gender-neutral term that can be used in place of the gendered terms *Latino* and *Latina.* The term Hispanic is used throughout this article for consistency and simplicity and to match with parental reports of their child's ethnicity. Nevertheless, it should be noted that the term Hispanic captures individuals from multiple diverse nationalities. More details are provided on the multiple Hispanic origin nationalities and ethnicities captured in the current sample in Supplemental Table (S4).

Childhood externalizing behaviors are common and strain the family context, with parents of children with externalizing problems reporting more negative parenting experiences, poorer social life, and higher levels of child-related stress (Donenberg and Baker, 1993; Meltzer et al., 2011).

There are several reasons why childhood is an important developmental stage to study externalizing behaviors. First, individuals with childhood-onset externalizing behaviors tend to have more severe neurocognitive, behavioral, and socioeconomic issues in adulthood than individuals who develop externalizing behaviors later in life (Moffitt et al., 2002; Moffitt & Caspi, 2001; Connor et al., 2007). Understanding the etiology of childhood-onset externalizing behaviors and targeting them through intervention may lead to greater benefits than addressing adolescent-onset or adult-onset externalizing behaviors. Second, prior research has found a high degree of comorbidity among childhood externalizing behaviors. For example, there is a high degree of correlation between two of the more common childhood externalizing diagnoses, oppositional defiant disorder (ODD) and conduct disorder (CD) (phenotypic correlation: $r = .25$-$.42$; Dick et al., 2005; Tuvblad et al., 2009). The overlap across externalizing behaviors suggests that, in childhood, genetic and environmental factors that impact one externalizing behavior impact others as well. Thus, childhood offers a unique opportunity to identify transdiagnostic environmental (e.g., Lynch et al., 2021) and genetic factors (e.g., Krueger et al., 2002; Kendler et al., 2003) that can be targeted with intervention to address externalizing behaviors broadly. Lastly, marking the end of childhood is puberty, a dynamic and challenging life transition that is associated with a higher frequency of

stressors and greater distress that typically leads to increases in psychopathology (Mendle, 2014). Understanding and addressing these behaviors in childhood, before or at the onset of puberty, may reduce the overall burden associated with this life transition. Thus, in this study, I focus on externalizing behaviors broadly in late-childhood.

Importance of Studying GxE on Childhood Externalizing Behaviors. It may be insufficient to identify and target genetic and environmental transdiagnostic factors separately to prevent the development of externalizing behaviors in childhood. The biosocial interaction model of externalizing behaviors (Liu, 2004) suggests that psychosocial factors and biological risk factors can have effects on externalizing behaviors directly or through their interaction. That is, the effect of environmental influences on externalizing behaviors can vary as a function of one's genes, and vice versa. For children with a genetic proclivity for externalizing behaviors, environmental influences can exacerbate or buffer against the development of externalizing behaviors and disorders. Thus, in this study, I focus on important and potent social contexts for children, family behaviors and family-related attitudes captured by familism, and on how these factors interact with genetic influences on externalizing behaviors.

Importance of Focusing on Differences in Patterns of Effects across Racial/Ethnic Groups. There are three major reasons for why I will be focusing on how the pathways that lead to the development of childhood externalizing behaviors vary or are similar across racial/ethnic groups. First, genetic science has historically over-focused on populations of European descent (Dick et al., 2017; Popejoy & Fullerton, 2016) and this lack of diversity has potential to exacerbate health disparities given that any

interventions derived from this research will disproportionately benefit non-Hispanic White populations (Bentley et al., 2017). Including diverse populations in genetically-informed research can increase our understanding of how development coincides or differs across groups and how interventions must be tailored to fit individuals with higher precision. Second, youth from different racial/ethnic groups develop in distinct social and economic contexts which may have important implications for how externalizing behaviors manifest. For example, in the United States, European American groups tend to have higher socioeconomic status (SES) than racial/ethnic minority groups (Williams et al., 2010). These disparities in SES result in racial/ethnic minority groups experiencing more stress, and being exposed to more discrimination, violence, and health/occupational barriers compared to European American groups (APA, 2017). Disparities in SES may potentially alter the development of externalizing behaviors in racial/ethnic minority children as a result of the impact of SES on brain connectivity (Ramphal et al., 2020) and on the development of executive functioning (McNeilly et al., 2021). Thus, racial/ethnic groups in the United States are imbedded in distinct social and economic contexts, and these differences may modify how externalizing behaviors develop across groups. Third, although some parenting behaviors may be universally adaptive across racial/ethnic groups (i.e., physically feeding and protecting infants), other aspects of the family context and parenting behaviors may differ across groups (Lansford, 2022). In delineating their conceptual model for the study of child development in minority populations, García Coll (1996) stated the following:

> Minority families tend to have certain characteristics that differentiate them from mainstream families and that affect family processes in very profound ways. Among these characteristics ... the structure and roles of the family; family beliefs, values, and goals; racial socialization; and socioeconomic status and resources. (p. 1906)

These differences in family processes may play a role on how externalizing behaviors manifest in youth across groups. For example, a study found that, in White and Latino individuals but not in Black individuals, the association between maternal depression and child behavior problems was mediated by the parenting a child received at home (i.e., home observations of emotional support and cognitive stimulation; Pachter et al., 2006). For Black youth, a mother's depression did not impact the quality of parenting they received at home. The authors suggest that racial/ethnic groups may differ in how they structure their household (i.e., how many people live in a home) and on how they distribute childrearing responsibilities among family members which may explain these associations. Thus, given that there is a societal need to increase diverse representation in genetic science, that racial/ethnic groups are differentially exposed to socio-economic environments that are associated with externalizing behaviors, and that the patterns of effect and processes linking family context to youth externalizing behaviors may differ across groups, in this study, I examine how the patterns of direct associations and GxE interactions on the development of externalizing behaviors vary across racial/ethnic groups.

Family Influences on Childhood and Adolescent Externalizing Behaviors

The family environment is a powerful environmental context that influences the development of childhood externalizing behaviors. Bronfenbrenner's bioecological model (1979; 1994) places the family within the microsystem, a system where development is produced and sustained as a result of a child's interactions with their immediate environment. Yet the nature of the child's development depends on the structure and content of the microsystem. In other words, whether or not a child is set on a course for normative or psychopathological development depends in large part on the nature of the family environment and a child's interactions with it.

Family Behaviors. There is vast literature showing the associations between parenting and child externalizing behaviors and disorders (e.g., Ruiz-Hernández et al., 2019; Stormont, 2016). Here I focus on three behavioral components of family processes: parental monitoring, parental warmth, and family conflict.

Parental monitoring refers to a constellation of parenting behaviors involving the tracking, surveillance, and knowledge of a child's behavior and activities (Sattin & Kerr, 2000). Parental monitoring may be especially important at preventing the development and continuation of externalizing behaviors in middle childhood and adolescence by imparting constraints and control over a child's behavior (Reid & Patterson, 1989). Children who are highly monitored may have less freedom to express their tendency for aggressive, rule breaking, and hyperactive behavior. Higher parental monitoring is associated with fewer externalizing problems in child and adolescent offspring (Booker et al., 2020; Lopez-Tamayo et al., 2016; Beyers et al., 2003; Pettit et al., 1999; Goldner et al., 2016; Van Loon et al., 2014). Parental monitoring is also associated with less

substance use in late-childhood and adolescent offspring (Pereyra & Bean, 2017; Yamada et al., 2016). There is even some evidence that the negative association between parental knowledge and adolescent externalizing behaviors persists after accounting for confounding genetic influences (Marceau et al., 2019).

Parental warmth has been conceptualized as a major parenting dimension with parental acceptance (i.e., parental nurture, support, sensitivity) at one end and parental rejection (i.e., parental hostility and aggression and/or parental indifference and neglect) at the other (Rohner & Rohner, 1981). Generally, children who experience parental warmth exhibit lower externalizing behaviors than children who experience parental rejection. Higher family hostility (Booker et al., 2020), lower parental warmth (Goagoses & Schipper, 2021; Ucus et al., 2019), lower parental acceptance (Kochanova et al., 2021; Owens and Shaw, 2003), and higher parental rejection (Putnick et al., 2015) are associated with more externalizing behaviors in child and adolescent offspring.

High levels of conflict within the family context are also related to childhood externalizing behaviors. The emotional security hypothesis (Davies & Cummings, 1994) suggests that although exposing children to some family conflict, and its resolution, is adaptive and can promote emotion regulation capacities, constant and destructive conflict can lead to emotional insecurity and adjustment problems in children. In the literature, higher levels of family conflict tend to be associated with more externalizing behaviors in youth (Ucus et al., 2019; Li et al., 2017, Rabinowitz et al., 2016; Flores et al., 2014; Helland et al., 2017; Skeer et al., 2009; El-Sheikh & Elmore-Staton, 2004). These effects

may persist even after accounting for confounding genetic influences (Schermerhorn et al., 2011).

Familism. First defined in the mid 1940s by Burgess and Locke (1945), familism refers to a group of attitudes where family membership is prioritized over other group memberships, where non-family members are seen as outsiders, where family members aim their individual pursuits to be in line with the family goals, and where family members share all resources and support one another in times of need. Heller (1970; 1976) further stated that familial attitudes, or a family member's perceptions of their requirements to meet family obligations, are a key component of familism alongside familism at the behavioral level (or a family member's actions to meet family obligations) and familism at the social-organizational level (or the way families structure themselves). Although the behavioral and social-organizational levels of familism are important, the present study focuses on *attitudinal familism,* and the terms attitudinal familism and familism will be used interchangeably unless otherwise stated.

Familism was identified as a multidimensional cultural value important to Hispanic populations (Sabogal et al., 1987). For Hispanic families, familism reflects a set of attitudes where priority is placed on the family over oneself, and where family is seen as a source of support, obligation, and as behavioral and attitudinal referents (Sabogal et al., 1987). These values are believed to be important to maintain harmonious and supportive relationships within Hispanic family units.

As a cultural value, familism can be studied at two levels of analysis, the individual and cultural level (Berry et al., 1997). The individual level refers to whether

variations in the value at the individual level (i.e., individual differences in familism) reflect as variation on other attributes of the individual. The cultural level refers to whether differences in the value between cultures drive differences in either the culture or the individuals belonging to that culture. The literature reviewed here will focus on the individual level of analysis and reflect how familism at the individual level is associated with individual differences in externalizing behaviors. However, as a cultural value, it is important to highlight that there likely is variation in the effect of familism on externalizing behaviors both between and within cultures.

Familism is theorized to impact youth externalizing behaviors by strengthening family bonds between parents and children, fostering more harmonious family environments, and encouraging youth to engage in more prosocial behaviors with peers and with family members while discouraging them from engaging in risky behaviors (Hernández & Bámaca-Colbert, 2016). Parents who hold high familism values may modify their parenting behaviors to encourage more harmonious, nurturing, and protective parent-child relationships. For example, levels of parental familism values were found to be associated with how much mutuality existed between parent and child (i.e., how attuned each reported being to their relationship; Baumann et al., 2010). Zeiders et al. (2016) found evidence that father's levels of familism were associated with how much time they spent with their daughters. A child's own levels of familism may also be important for maintaining strong family harmony and engaging pro-socially with family members. For example, Lorenzo-Blanco et al. (2012) found evidence that for Hispanic youth, higher levels of familism and *respeto* (i.e., a cultural value associated

with the need to maintain family harmony) were associated with greater family cohesion and less family conflict. Additionally, youth familism values may also discourage youth from engaging with deviant peers and from engaging in risky behaviors (Hernández & Bámaca-Colbert, 2016), but it may also protect youth who do engage with deviant peers from developing externalizing behaviors (Germán et al., 2009).

The theorized negative association between externalizing behaviors and familism was supported by Cahill et al. (2021). They conducted a systematic-review and meta-analysis of studies that examined familism as a promotive and risk factor for externalizing behaviors (among other individual adjustment outcomes) in Hispanic/Latino individuals. They found a significant and negative association between familism values and externalizing outcomes (r=-.10). However, moderators of this relation were noted. Among them, the nativity status of both parents and youth moderated the relationship between familism and externalizing behaviors. The association between familism and externalizing became more negative (more promotive) as the percentage of parents and participants born outside the United States increased. This to suggest that, although familism appears to promote better externalizing outcomes in Hispanic/Latino children, there is within-group variation in these effects.

Although most prior research on familism has been conducted on Hispanic populations, there have been studies that attempt to assess the prevalence and effect of familism values across racial/ethnic groups. Schwartz (2007) found evidence that familism, and in particular attitudes towards prioritizing family members above oneself, exist and function similarly across White, Black/African American, and Hispanic ethnic

groups. However, their racial/ethnic minority samples were small, their Hispanic subsample did not include Mexican Americans nor Puerto Ricans (i.e., two highly prominent groups), and their participants were college students, which may have excluded non-English speaking or under-resourced racial/ethnic minority participants. Some studies have found protective effects of familism in non-Hispanic racial/ethnic groups but have lacked a Hispanic comparison sample. For example, Smith et al. (2019) found that levels of familism obligations (combined with other collectivistic values) did not differ in mean level nor in their negative association with childhood problem behavior between African American and European American children. Similarly, Soli et al., (2009) found that for African American children, those with strong familism values *and* higher sibling relationship harmony displayed the lowest levels of depressive symptoms. However, all of these findings should be interpreted with caution as Christophe and Stein (2022) report that the validation of familism measures across racial/ethnic groups may not be extensive enough to differentiate between real differences across groups and measurement biases. Altogether, these findings suggest that there may be differences in the effects of familism at both the between-culture (i.e., differences in mean levels and effects across racial/ethnic groups) and within-culture (i.e., differences in mean levels and effects within racial/ethnic groups) levels.

Genetic Risk of Childhood and Adolescent Externalizing

Genetic risk for externalizing behaviors can be assessed with molecular methods (i.e., assessing the impact of specific genetic variants on a trait) or with quantitative methods (i.e., inferring the impact of latent genetic influences on a trait using family

designs). This project focuses on the latter. Heritability estimates (h^2) calculated with twin and family designs refer to the proportion of population-level variance in a trait that can be explained by genetic influences. These designs have found that genetic influences account for a substantial portion of population-level variation in externalizing behaviors and disorders (see Barr & Dick, 2020 for review); As examples, in childhood and adolescence aggressive behaviors are 65% heritable (Burt, 2009), non-aggressive rule breaking behaviors are 48% heritable (Burt, 2009), and antisocial behaviors are 41% heritable (Niv et al., 2013).

The high comorbidity and symptom overlap between externalizing behaviors and disorders has prompted researchers to conceptualize a latent externalizing factor. Externalizing behaviors and disorders (e.g., antisocial behavior, conduct disorder) all load well onto a heritable latent externalizing factor (Krueger et al., 2002; Kendler et al., 2003). Moreover, not only is the latent externalizing factor highly heritable (e.g., ~80% in late adolescence; Krueger et al., 2002), but research on this factor has also indicated that genetic influences are largely shared among externalizing behaviors. For example, a latent externalizing factor explains 61% of the variance in adolescent antisocial behavior and 34% of the variance in conduct disorder (Krueger et al., 2002). Additionally, Dick et al. (2005) found a substantial degree of correlation between the genetic influences of oppositional defiant disorder and conduct disorder in adolescent Finnish twins (genetic correlation = .58; Dick et al., 2005). Although each externalizing behavior and disorder has unique genetic etiological influences, a substantial portion of their genetic influences are shared between them. In this project, I focus on genetic influences associated with

externalizing behaviors broadly and not those unique to specific aggression or rule breaking behaviors.

GxE: Moderated Heritability. Heritability estimates are subject to change across populations and environmental contexts. This variability in heritability is captured by gene-environment (GxE) interactions, which refer to a specific type of gene-environment interplay where the effect of genetic influences on the phenotypic expression of a trait can vary as a function of the environmental contexts and vice versa (Gottlieb, 2007; Shanahan & Hofer, 2005). Twin studies can be used to calculate whether or not the population level variance explained by genetic influences changes across environmental contexts (Dick, 2011). In other words, in some environments, genetic influences will be more responsible for explaining why people differ on a trait than in other contexts.

There are different theoretical models that seek to explain the underlying developmental mechanisms of how these GxE interactions function on the emergence of youth externalizing behaviors. The diathesis-stress model sets forth the idea that for individuals with a genetic predisposition, experiencing high levels of stress from adverse environmental contexts exacerbates their risk for the development of mental illness, disease, and poorer well-being (Monroe and Simons, 1991). Given that heritability estimates reflect the population-level variability that can be attributed to genetic influences and not specific genetic predispositions to disease, the diathesis-stress model in heritability studies may instead be reflected by finding that genetic influences are better able to explain why people differ on externalizing behaviors within adverse environmental contexts but not in nurturing, higher quality environments. The social push

hypothesis[2] (Raine, 2002) predicts GxE interactions in the opposite direction. Here, genetic influences play a larger role in explaining the development of behavioral problems in environments without substantial social risk factors. In favorable environments, there may be a narrower range of environmental exposures associated with externalizing behaviors, which may lead to less variability explained by the environment, and a higher proportional amount of variance explained by genetic influences.

Shanahan and Hofer (2005) considers various processes through which social contexts can protect against or lead to the development of youth externalizing behaviors given that an individual has high genetic risk for externalizing behaviors. Social context can *trigger* or *compensate* for a genetic diathesis, *control* for the behavioral expression of genetically-influenced traits, or *enhance* the development of adaptive traits. As examples, family environments high in conflict may *trigger* the expression of heritable conflict-related adolescent behaviors, highly nurturing family environments may *compensate* for the potential effects of high genetic risk for youth externalizing behaviors, parents may be able to *control* for genetically-influenced substance use behaviors by monitoring and limiting access to substances in the household, and harmonious family environments may *enhance* the development of positive heritable traits such as youth emotion-regulation and coping mechanisms which may then decrease the probability of youth externalizing behaviors manifesting.

GxE: Family Processes

[2] The type of GxE interaction captured by the social push hypothesis has also been also referred to as a bioecological interaction by Pennington et al. (2009).

Family Behaviors. Evidence of GxE using twin studies generally support the idea that heritability estimates for externalizing behaviors are higher within family contexts with fewer behavioral constraints, that are less nurturing, and with lower quality family relationships, supporting the diathesis-stress model. For example, for antisocial behavior, heritability is higher in environments higher in parental negativity and lower in paternal warmth (Feinberg et al., 2007), and higher in paternal punitive discipline (Button et al., 2008). Similarly, the heritability of externalizing behaviors is higher in environments with low parental emotional support (Cheung et al., 2014), higher levels of parent-child conflict (Samek et al., 2015), and with higher levels of maternal disengagement (Boutwell et al., 2012).

It is important to note that not all GxE interactions on heritability support the diathesis-stress model. For antisocial behavior, heritability was higher in environments with lower levels of maternal punitive discipline (Feinberg et al., 2007) and lower family dysfunction (Button et al., 2008), providing support for the social push hypothesis of GxE interaction. Similarly, for conduct problems, lower parent-child conflict was associated with higher heritability (Burt & Klump, 2014).

There are a couple of factors that may play a role in driving these diverging results. First, there are age-related changes in heritability across developmental stages. In general, the heritability estimates for externalizing behaviors increase throughout adolescence and emerging adulthood (Bergen et al., 2007). In their meta-analysis, Bergen et al., (2007) propose that being older allows for greater genetic expression by having fewer environmental constraints and greater choice. Thus, it could be that patterns of

GxE interaction may not be consistent across developmental stages. Findings of GxE interaction in childhood may differ from those in adolescence or adulthood. Secondly, the strength of any given environmental variable as a moderator may depend on the larger environmental context in which an individual is embedded. In support of this, Tucker-Drob & Bates (2016) found that the effectiveness of SES as a moderator of the heritability of intelligence and academic achievement varied by the greater cultural context. They found that in the United States, but not in the Netherlands, increasing levels of SES were associated with increasing heritability of intelligence and educational attainment. The authors suggested that the differences in the strength of SES as a moderator might be explained by the differences in access to medical and educational resources and in social mobility and income support between the US and the Netherlands. In countries with significant governmental social support, SES may be less impactful on developmental outcomes. Thus, the effect of an environmental variable in a GxE interaction may vary depending on the larger social-environmental context.

Familism. One prior study has examined the role of familism in moderating genetic influences. Rea-Sandin (2022) found that, although behavioral aspects of familism (conceptualized as family orientation values) directly promoted greater childhood executive functioning and effortful control, neither familism behaviors nor values moderated the genetic or environmental influences on childhood self-regulation. However, no prior study has examined the role of familism as a moderator of the heritability of externalizing behaviors, and, there are several reasons why it may be important to do so. First, cultural processes are rarely integrated with genetically-

informed designs to study psychological outcomes (Causadias and Korous, 2017; Causadias, 2013). Several factors have been identified driving this lack of integration. For example, lack of trust in using genes in cultural research, fear of genetic determinism, and lack of training opportunities in both cultural and genetic methodologies are all highlighted as reasons for the divide between cultural and genetic research. This lack of integration is ultimately detrimental to both genetic and cultural research areas and to the study of psychopathology. Biological factors and environmental influences correlate and interact on the emergence of psychopathology, and this interplay is complex, bidirectional, pervasive, and continuous across development (Gottlieb, 2007). Research that disentangles these influences is crucial for understanding trajectories of normal and abnormal psychological development across cultural contexts.

Second, values and attitudes associated with familism may be targeted through intervention. Although research has not examined the malleability of familism values, interventions have been effective in modifying other human values (e.g., Kerr & Erb, 1991; Arieli et al., 2013). Additionally, family associated values have been shown to change after significant life events. For example, aviation industry employees after 9/11 (Murphy et al., 2004) and individuals after receiving a cancer diagnosis (Greszta & Sieminska, 2011) both reported higher levels of Family Security, or the desire to take care of their loved ones. Interventions aimed at increasing familism in youth or their parents may result in higher quality parent-child relationships, more family harmony and cohesion, less youth engagement with deviant peers, less youth engagement in risky

behaviors, and ultimately better youth psychological outcomes (Hernández & Bámaca-Colbert, 2016).

Third, familism has the *potential* to mitigate genetic risk for externalizing. The Behavioral Process Model of Familism (BPMF; Hernández & Bámaca-Colbert, 2016) assumes that the prime mediating mechanism between parental attitudinal familism and youth psychological adjustment are parenting behaviors. Increases in parental attitudes of familism are predicted to increase a parent's support and warmth, monitoring, and consistent discipline. As previously established, these factors are associated with decreases in the heritability of externalizing behaviors. Additionally, the BPMF states that parental attitudes of familism are predicted to increase youth attitudes of familism which can then drive the youth to decrease risky peer associations and engage more with prosocial peers. Although this last path is not explicitly tested in this project, it is important to note as an additional pathway through which familism attitudes could mitigate genetic risk for externalizing behaviors.

Current Study

There are two primary aims in the study. The first is to investigate whether the direct associations between four family factors (i.e., parental warmth, parental monitoring, family conflict, and parental attitudes of familism) and externalizing behaviors in youth vary across racial/ethnic groups. Based on previous research, I hypothesize that greater parental warmth, greater parental monitoring, less family conflict, and greater attitudes of familism will be associated with fewer externalizing behaviors in youth. The second is to examine whether parenting, family conflict, and

attitudinal familism differentially moderate the heritability of youth externalizing behaviors across racial/ethnic groups. Based on previous research and theory, I hypothesize that estimates of heritability for youth externalizing behaviors will be higher when parental warmth is low, when parental monitoring is low, when family conflict is high, and when parental attitudes of familism are low. There is a lack of research examining how these patterns of effect vary by racial/ethnic group and, thus, I will not hypothesize on how these effects will vary. Instead, this research will explore these relations where the goal is not to compare groups on the magnitude of these effects but to assess the degree to which the pattern of effects differs or coincides across groups.

Method

Participants

Data for this project will be drawn from the Adolescent Brain Cognitive Development (ABCD) Study (N = 11,875; youth = 9–10 years old at baseline; 47.8% female; 52.1% non-Hispanic White, 15.0% non-Hispanic Black/African American, 20.3% Hispanic/Latino, 2.1% Asian, and 10.5% other [e.g., biracial]). The ABCD Study is an ongoing study following youth across the United States on their behavioral and cognitive development from the ages 9-10 into their 20s. The current study will use data from the twin subsample, consisting of 772 same-sex twin pairs (49.4% female, 64.3% non-Hispanic White, 13.8% Black/African American, 11.7% Hispanic, .4% Asian, and 9.8% other [e.g., biracial]). The average combined income for both the primary and secondary caregivers for the twin sample was between $50,000 and $99,999. The average level of education completed by the parents of the twins was an associate's degree.

Participants from the twin sample were separated into three different groups for analyses (i.e., White, Black/African American, Hispanic; see Table 1 for sample sizes). Analyses were run separately for these groups given that they represent the three largest race/ethnicity categories in the ABCD and that preliminary analyses indicated a lack of measurement invariance across groups for many of our measures (see Tables 7 & 8).

Procedure

The ABCD recruited eligible children from a set of 21 nationally distributed study sites using probability sampling of schools within the study site areas with less than 10% of the final sample recruited using alternative procedures such as mailing lists and referrals (Garavan et al., 2018). The twin subsample was recruited through the creation of a consortium between four twin-research sites: the Colorado Twin Registry (CTR), the Minnesota Center for Twin and Family Research (MCTFR), the Mid-Atlantic Twin Registry (MATR), and Washington University. Twins were identified through publicly available birth records at each site's state. Baseline data collection occurred between September 1, 2016 and November 15, 2018. The ABCD study collects neurocognitive, mental, and physical health assessments, environmental and cultural measures, structural and functional brain imaging, as well as whole genome genotyping and shares data with the research community through annual data releases via the NIMH Data Archive. Data used in the present study came from ABCD data release 4.0 which was made available on the NIMH data archive in October 2021. Release 4.0 includes full cohort data at the baseline, 1-year, and 2-year waves as well as partial data from the 3-year follow up. For the present study, I will be using data collected from surveys given to parents and

children at baseline regarding parenting behaviors, the family environment, and the child's externalizing behaviors.

Measures

Externalizing Behaviors. At baseline data collection, parents were asked to complete the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001). The CBCL asks parents to report on their child's externalizing behaviors and includes two related subscales: rule-breaking behavior and aggressive behavior. Parents were asked to report on 33 externalizing behavioral items (e.g., "my child gets in many fights" and "my child is impulsive or acts without thinking") and assess the degree to which they believed the item applied to their child from *not true* (scored as 0) to *very true/often true* (scored as 2). The parents were asked to consider their child's behavior during the preceding 6 months when assessing the relevance of the items. The CBCL provides Externalizing Syndrome raw scores that combine the Rule-Breaking and Aggressive Behavior syndrome scales. Higher scores indicate higher levels of behavioral problems. [3]

Parental Warmth. At baseline data collection, youth were asked to complete a subscale of the Child Report of Behavior Inventory (CRPBI; Schaefer, 1965; Schludermann & Schludermann, 1988) that measured their perceptions of their caregiver's warmth, acceptance, and responsiveness (e.g., "my caregiver makes me feel better after talking over my worries with him/her" and "my caregiver smiles at me often"). The ABCD study's warmth subscale utilizes 5 of the original scale's 10 items with the highest factor loadings (Gonzalez et al., 2021). The participants were asked to

[3] Cronbach's alpha values for key variables are presented in Tables 2-4 broken down by racial/ethnic group.

respond to items related to the perceived warmth levels of their two primary caregivers. The participants reported the extent to which they agreed with each item based on a scale ranging from 1 (not at all) to 3 (very much). A total parental warmth score was calculated by averaging the scores on the five items across the two caregivers.

Parental Monitoring. At baseline data collection, youth completed the Parental Monitoring Scale which assessed parents' monitoring and knowledge of their children's whereabouts and who their children were spending time with (Gonzalez et al., 2021). The scale consists of a total of 5 items (e.g., "how often do your parents/guardians know where you are?" and "how often do your parents know who you are with when you are not at school and away from home?"). The participants were asked to indicate the extent to which they agreed with each item based on a scale ranging from 1 (not at all) to 5 (very often). Total scores were calculated by averaging the individual's responses across all five items.

Family Conflict. At baseline data collection, youth completed 9 items from the Family Conflict subscale of the Moos Family Environment Scale (FES), which assessed the amount of openly expressed conflict among family members (Moos & Moos, 1976). Participants were asked to indicate whether statements about conflict in the family were true or false in their home environment (e.g., "we fight a lot in our family" and "family members sometimes get so angry they throw things"). Items were scored either 1 or 0 (i.e., true or false) with appropriate reverse coding for certain items (e.g., "family members hardly ever lose their temper"). Raw scores were calculated by adding up all the individual items (with appropriate reverse coding). Prorated scores were calculated by

multiplying the raw scores by the total number of items and dividing by the number of items completed by the participant. If a participant answered less than 5 items, their scores were not counted and coded as missing. Higher scores indicate more conflict within the family environments.

Parent-Reported Familism. At baseline data collection, parental familism was assessed using a subscale of the Mexican American Cultural Values Scale (MACVS; Knight et al., 2010). Parents were assessed at baseline using three MACVS subscales: a) family support subscale, b) family obligation subscale, and c) family referent subscale. The family support subscale consisted of six items (e.g., "parents should teach their children that the family always comes first" and "family provides a sense of security because they will always be there for you"). Participants were asked to rate each item on the degree to which it was applicable to them from *not at all* (scored as 1) to *completely* (scored as 5). The family support subscale score was calculated by averaging all six responses with higher scores indicating higher support values. All six responses needed to be answered for a score to be calculated. The family obligations subscale consisted of 5 items (e.g., "children should be taught that it is their duty to care for their parents when their parents get old" and "if a relative is having a hard time financially, one should help them out if possible."). The parent was asked to quantify the degree to which they agreed with the statements from *not at all* (scored as 1) to *completely* (scored as 5). The obligations subscale score was calculated as the mean of all 5 items with higher scores indicated higher obligations values among the parents. Answers on all five items were required in order for a total score to be calculated. The family referent subscale consisted

of 5 items (e.g., “children should always do things to make their parents happy” and “when it comes to important decisions, the family should ask for advice from close relatives”) where the parent was asked how much they agreed with the statements from *not at all* (scored as 1) to *completely* (scored as 5). The referent subscale score was calculated as the mean of all five items with higher scores indicating higher referent values among the parents. Answers on all five items were required in order for a total score to be calculated. Lastly, the familism composite score is calculated by taking the average score of all three familism subscales (support, referent, and obligations).

Covariates. Covariates included socio-economic status indexed by family income and parental education, twin sex at birth, twin age, and twin race/ethnicity status. For educational status, parents were asked to report on the highest grade or level of school they and their partner had completed on a scale of from “Never attended/Kindergarten Only” to “Professional Degree”. Scores for both parents and partners were combined. For economic status, parents were asked to report on their total combined family income for the past 12 months before taxes from all sources from “less than $5,000” to “$200,000 and greater”. Sex at birth of the child, age at the time of interview, and race/ethnicity were all reported through a parent survey.

Analytic Plan

Descriptive statistics are presented for every variable using IBM SPSS Statistics (Version 27). Zero order correlations are presented for every variable. Preliminary analyses included analysis of variance (ANOVA) tests for mean level differences of key variables across White, Black/African American, and Hispanic subsamples. OpenMX

(Boker et al., 2011; Boker et al., 2014) was used for all twin modeling. Missing data was handled in OpenMX with full information maximum likelihood (FIML) estimation.

Given the importance of attitudinal familism to Hispanic populations, its status as a cultural value, and the limited prior research applying the familism measure to other racial-ethnic groups, measurement invariance for the attitudinal familism composite, familism support, familism obligations, and familism referent measures was tested. The configural, metric (weak), scalar (strong), and strict measurement invariance models were tested on the White, Black/African American, and Hispanic subsamples to assess whether attitudinal familism represents the same construct in the same scale across racial/ethnic groups. Subsequently, measurement invariance was tested across White, Black/African American, and Hispanic subsamples for the other family variables (i.e., parental warmth, parental monitoring, and family conflict).

Regression analyses were conducted to assess the direct association between the family variables and youth externalizing behaviors. Parallel models tested the associations between parental warmth, parental monitoring, family conflict, attitudinal parental familism composite, as well as familism subscales (i.e., familism support, familism referent, and familism obligations), and childhood externalizing behaviors while accounting for child age, sex, combined parental income, combined parental education, ABCD data collection site, and family clustering. A final model included parental warmth, parental monitoring, family conflict, and parental familism composite in the same model to test whether the association between a family variable and youth externalizing behaviors occurred above and beyond the associations with the other family

variables. Regression models were run separately for White, Black/African American, and Hispanic samples.

Univariate twin designs were used to decompose the variance of youth externalizing behaviors into additive genetic effects (A), shared-environmental effects (C), and non-shared environmental effects (E) for each group, while accounting for twin sex and age. Twin designs contrast the resemblance of monozygotic twin pairs (MZ; i.e., twins who share all of their DNA) to dizygotic twin pairs (DZ; i.e., twins who share half of their segregating genes) to estimate the amount of variance explained by genetic and environmental factors on a given trait (Neale & Maes, 2004). Generally, if MZ twins are more similar to each other on their externalizing behaviors than DZ twins (i.e., higher intraclass correlation for MZ twins than DZ twins), that suggests that genetic influences are at play. Structural equation modeling will be conducted to obtain a univariate twin model that decomposes the variance of childhood externalizing behaviors into three subcomponents (*Figure 1*): Additive genetic variance (A) or the variance that is explained by the aggregate effect of genetic influences, shared environmental variance (C) or the variance that can be explained from the environmental experiences common to family members, and non-shared environmental variance (E) or the variance explained by the experiences unique to individuals. Given the differences in shared DNA between MZ and DZ twins, the covariance between the additive genetic component (A) for MZ twins is set to 1 and for DZ twins it is set to 0.5. The covariance for the shared environmental component (C) for both MZ and DZ twins is set to 1. The non-shared environmental component (E) is not set to co-vary for either the MZ or DZ twin pairs.

Moderated heritability models (*Figure 2;* Purcell, 2002) were used to test whether family factors moderate the ACE estimates of youth externalizing behaviors. Family conflict, parental warmth, parental monitoring, and parental familism, as well as familism subdimensions (i.e., familism support, familism obligations, familism referent), were independently tested as moderators (M) of the A, C, and/or E components of externalizing behaviors. Gene-environment correlations (rGE) represent scenarios where individuals are disproportionately exposed to particular environmental influences as a result of genetic factors. Unless accounted for, this type of gene-environment interplay can be difficult to disentangle from GxE effects in a moderation model. By allowing rGE to be a main effect in the model, we can disentangle rGE effects from GxE effects allowing us to examine moderation effects even in the presence of gene-environment correlations. In the current model (*Figure 2*), gene-environment correlations appear as the main effect, β_M, between the moderator and externalizing behaviors, and gene-environment interactions will appear in the model as β_X, where an interaction exists when β_x is significantly non-zero (Purcell, 2002). β_Y and β_Z represent the moderator's effect on the shared environmental and nonshared environmental influences respectively. The moderation models were run for the White sample, and, although underpowered, exploratory analyses were run to test the moderation models on the Black/African American and Hispanic samples.

Results

Preliminary Analyses

Descriptive statistics and correlations for all the key variables are presented for White, Black/African American, and Hispanic subsamples in Tables 2-4.

Parenting and Family Conflict Correlations. For the White and Hispanic samples, parental monitoring and parental warmth correlated positively with each other and negatively with family conflict. For the Black/African American subsample, parental warmth correlated positively with parental monitoring and negatively with family conflict, but parental monitoring was not correlated with family conflict. For the White sample, youth externalizing behaviors correlated negatively with parental monitoring and parental warmth, and correlated positively with family conflict. For the Black/African American subsample, parental monitoring, parental warmth, and family conflict were not correlated with youth externalizing behaviors. For the Hispanic subsample, youth externalizing behaviors correlated negatively with parental warmth and positively with family conflict but were not correlated with parental monitoring.

Attitudinal Familism Correlations. Across all samples, familism composite, familism support, familism obligations, and familism referent were positively correlated with each other. Across all samples, familism variables were not correlated with parenting or family conflict. For the White sample, familism variables were not correlated with youth externalizing. For the Black/African American subsample, familism composite, support, and obligations were negatively correlated with youth externalizing behaviors, and familism referent was not correlated with youth externalizing behaviors. For the Hispanic subsample, familism composite and familism

obligations were positively correlated with youth externalizing behaviors, but familism support and familism referent were not correlated with youth externalizing behaviors.

Mean Level Differences in Key Variables by Racial/Ethnic Groups. A one-way ANOVA test was used to examine whether the mean levels of key variables differ across White, Black/African American, and Hispanic groups (Table 5). There were no mean level differences in parental warmth ($F(2,1391) = 1.41$, $p = .25$) and childhood externalizing behaviors ($F(2,1389) = 1.11$, $p = .33$) across racial/ethnic groups. There was a statistically significant difference in mean levels of family conflict ($F(2, 1391) = 4.43$, $p = .012$), parental monitoring ($F(2, 1390) = 3.77$, $p = .023$), familism composite ($F(2, 1392) = 32.55$, $p < .001$), familism support ($F(2, 1392) = 6.81$, $p = .001$), familism referent ($F(2, 1392) = 44.74$, $p < .001$), and familism obligations ($F(2, 1392) = 26.68$, $p < .001$) across racial/ethnic groups.

For key variables with a significant one-way ANOVA, Tukey's HSD test for multiple comparisons was used to compare mean levels between the racial/ethnic groups (Table 6). For family conflict, the mean levels of the Black/African American (mean = 2.46) sample were significantly higher than the White sample (mean = 2.03; $p = .009$, 95% C.I. = [-.76, -.09]), but the mean of the Hispanic sample (mean = 2.07) did not significantly differ from the Black or White means. For parental monitoring, the mean levels of the Black/African American (mean = 4.33) sample were significantly lower than the White (mean = 4.43) sample ($p = .018$, 95% C.I. = [.01, .19]), but there was no significant difference between Black/African American and Hispanic (mean = 4.39) or Hispanic and White samples. For familism composite, there was a significant difference

between the mean levels of all three groups (Black/African American [mean = 3.94], White [mean = 3.63], Hispanic [mean = 3.77]). For familism support, the mean levels of the Black/African American (mean = 4.26) sample were significantly higher than those of the White (mean = 4.12) sample (p = .002, 95% C.I. = [-.24, -.04]), but there was no significant difference between Black/African American and Hispanic (mean = 4.21) or White and Hispanic samples. For familism referent, there was a significant difference between the mean levels of all three groups (Black/African American [mean = 3.74], White [mean = 3.25], Hispanic [mean = 3.47]). For familism obligations, the mean levels of the Black/African American (mean = 3.83) sample were significantly higher than those of the White (mean = 3.50) sample (p <.001, 95% C.I. = [.22, .43]) and those of the Hispanic sample (mean = 3.63) (p = .005, 95% C.I. = [.05, .35]), but there was no significant difference between the White and Hispanic samples.

Measurement Invariance. The measurement invariance of familism composite, familism support, familism obligation, and familism referent were tested across the White, Black/African American, and Hispanic subsamples. Model fit statistics for the configural, metric (weak), scalar (strong), and strict invariance models are provided in Table 7. Configural invariance models for familism support and familism referent are consistent with the data and reflect an adequate fit. The configural models for familism obligation and familism composite reflect a weaker overall fit, which may represent that the number of factors and patterns of loadings varies across groups. Across all familism variables, the metric invariance model, which constrained the factor loadings to be equal across the groups, fit significantly worse than the configural model; however, given that

the incremental and absolute fit indices showed minimal change it is unclear whether the magnitude of the item loadings are the same across groups. The scalar invariance model was then fit and, across all familism variables, fit significantly worse than the metric invariance model. This would suggest that the scale of our familism variables differs across groups. However, the incremental and absolute fit indices for familism referent did not drop significantly, which may suggest that the scalar invariance model may be reasonable for familism referent. Lastly, the strict invariance model was fit. Across all groups, the strict model fit significantly worse than the scalar model suggesting that the unique factor variances were likely different across racial/ethnic groups.

Measurement invariance results for parental warmth of the primary caregiver, parental monitoring, and family conflict across White, Black/African American, and Hispanic samples are presented in Table 8. In summary, scalar invariance was suggested for parental warmth, metric invariance was suggested for parental monitoring, and no measurement invariance was suggested for family conflict. Given that measurement invariance was not established for most of the key variables, analyses were run separately for White, Black/African American, and Hispanic samples.

Predicting Youth Externalizing Behaviors from Parenting, Family Conflict, and Familism

Parenting. Results from regression analyses that predicted youth externalizing behaviors from parental warmth and parental monitoring are presented in Tables 9 and 10 respectively. Analyses were run across the White, Black/African American , and Hispanic subsamples while accounting for age, sex, parental education, family income,

ABCD site of data collection, and family clustering. Consistent with the hypothesis, greater parental warmth was associated with fewer externalizing behaviors. However, this association was only found in the Hispanic subsample. For every standard deviation increase in parental warmth, youth externalizing behaviors decrease by 0.16 standard deviations ($p = .03$), holding all covariates constant. Contrary to the hypothesis, parental monitoring was not associated with youth externalizing behaviors for any group, after accounting for covariates.

Family Conflict. Results from the regression analysis predicting youth externalizing behaviors from family conflict are presented in Table 11. Consistent with the hypothesis, greater family conflict was associated with greater youth externalizing behaviors, after accounting for covariates. However, this association was only found when testing the White subsample. An increase of one standard deviation of family conflict was associated with an increase .18 standard deviations of youth externalizing behaviors for the White subsample ($p<.001$).

Familism. Results from the regression analysis predicting youth externalizing behaviors from composite parental attitudinal familism are presented in Table 12. For the White sample, composite familism was not associated with youth externalizing behaviors. For the Black/African American subsample, greater composite familism was associated with lower youth externalizing behaviors, consistent with the hypothesis. Every standard deviation increase in composite familism was associated with a .19 standard deviation decrease in youth externalizing behaviors ($p=.03$). However, contrary to the hypothesis, familism composite was positively associated with youth externalizing

behaviors for the Hispanic sample, after controlling for covariates (p=.04). A standard deviation increase in composite familism predicted a .18 standard deviation increase in Hispanic youth externalizing behaviors.

To test the multidimensionality of attitudinal familism, further regression analyses were conducted predicting youth externalizing behaviors from parental attitudinal familism support, obligations, and referent separately across all groups (Tables 13-15). Familism obligations and referent were not significantly associated with youth externalizing behaviors, after accounting for covariates. For Black/African American youth, familism support was negatively associated with youth externalizing behaviors (p=0.02). For a one standard deviation increase in parental familism support, youth externalizing behaviors were expected to decrease by .25 standard deviations. For the Hispanic sample, familism support was positively associated with youth externalizing behaviors (p=0.03). Counter to the hypothesis, for a standard deviation increase in familism support, youth externalizing was predicted to increase by .17 standard deviations, after accounting for covariates. No associations were found for the White subsample.

Parenting, Family Conflict, and Familism. In the final regression model, parental warmth, parental monitoring, family conflict, and parental composite familism were tested in the same model as predictors of youth externalizing behaviors across all groups alongside covariates (Table 16). For the White subsample, family conflict was the sole predictor of youth externalizing behaviors. A one standard deviation increase in family conflict was associated with a .17 standard deviation increase in youth

externalizing behaviors (p <.001), after controlling for covariates, parenting, and familism variables. Familism composite was the only significant predictor of youth externalizing behaviors in the Hispanic and Black/African American sample, after accounting for covariates, parenting, and family conflict. However, it operated in opposite directions between the two groups. In the Black/African American sample, a standard deviation increase in parental composite familism predicted a .19 standard deviation decrease in youth externalizing behaviors (p=.04). For the Hispanic sample, a standard deviation increase in parental composite familism predicted a .18 standard deviation increase in youth externalizing behaviors (p=.04).

Quantitative Genetic Analyses

Twin Interclass Correlations. Twin intraclass correlations (ICCs) are shown in Table 17. Intraclass twin correlations for youth externalizing behaviors range from 0.50 (Hispanic Sample) to 0.84 (Black/African American Sample) for MZ twins and from .34 (White Sample) to .61 (Black/African American) for DZ twins. MZ twin correlations were higher than DZ twin correlations across all groups suggesting the role of additive genetic influences on youth externalizing behaviors. However, all MZ ICCs were below 1.0, suggesting that non-shared environmental influences also play a role on youth externalizing behaviors.

Saturated Models. Saturated models were built for youth externalizing behaviors for each group separately. The saturated models placed no constrains on the means, variances, or covariances of MZ or DZ twins. The saturated models were then tested against three constrained models which test basic data assumptions: model 1 constrained

the expected means to be equal across twin order, model 2 constrained the expected means *and* variances to be equal across twin order, and model 3 constrained the expected means and variances to be equal across twin order *and* zygosity. For the White and Black/African American groups, the three constrained models did not fit significantly worse than the saturated model satisfying the assumption that the means and variances could be equated across twin order and zygosity. For the Hispanic sample, model 1 and 2 did not fit significantly worse than the saturated model, but model 3 had a significantly worse fit. In other words, the Hispanic sample did not meet the assumption of equal means and variances across twin order and zygosity. Higher variance in externalizing behaviors was found in the DZ groups than in the MZ groups. This may be suggestive of assimilation/contrast effects (Neale & Maes, 2004; Carey, 1986) on parent reporting (i.e., a reporter may assign more dissimilar values to DZ twins by contrasting them against each other than they would with MZ twins) or of within twin-pair influence (i.e., where the trait level of a twin influences the trait level of the other, and that this influence varies by MZ and DZ twins). This effect may inflate heritability estimates.

Univariate ACE Models. Model fit statistics and standardized estimates of additive genetic (A), shared-environmental (C), and non-shared environmental (E) factors for youth externalizing behaviors are presented in Table 18 by group. All models accounted for youth sex and age as covariates. Across all groups, the AE (no shared-environmental influence) model was the best fitting and most parsimonious. However, although the AE model was selected for the Black/African American sample, the twin interclass correlations and results from the ACE model both suggest that shared-

environmental influences could be playing a role in explaining some of the variance of externalizing behaviors. Heritability estimates were .71, .89, and .70 for the White, Black/African American, and Hispanic samples, respectively, highlighting the role of additive genetic effects. Non-shared environmental influences also play a role on youth externalizing behaviors with estimates ranging from .11 (Black/African American sample) to .29 (for both White and Hispanic samples).

Moderated Heritability Models. Moderated heritability models were conducted for the White sample. Subsequently, exploratory analyses were conducted for the Hispanic and Black/African American samples. As previously mentioned, the sample sizes for the Black/African American and Hispanic samples are relatively small and results should be interpreted with caution. Model fit statistics for the White, Black/African American, and Hispanic samples are presented in Tables 19, 20, and 21, respectively.

First, models were built that allowed for moderation on the A, C, and E paths as well as the direct effect from the moderator on youth externalizing behaviors (ACE Moderated with rGE in Tables 19-21). These models were first compared to a model that dropped the direct effect from the moderator on youth externalizing behaviors (ACE Moderated without rGE in Tables 19-21) to test for the presence of gene-environment correlation. If dropping the path resulted in a significant loss of fit ($p<.05$), then the presence of gene-environment correlation was suggested, and to account for the rGE, the full moderation model with rGE was maintained as the comparison model against which further models would be tested. If dropping the path did not produce a significant loss in

model fit (p>.05), gene-environment correlation was not suggested, and the ACE moderation model without rGE was maintained as the comparison model against which further models would be tested. Gene-environment correlation was suggested, and accounted for, in the parental warmth and family conflict models for the White sample, in the familism composite and familism obligations model for the Black/African American sample, and in the familism support and familism obligation model for the Hispanic sample. rGE was not suggested in any other models. Additionally, for the Black/African American sample, the family conflict model did not converge so no additional testing was performed.

Then, the comparison model (with or without rGE depending on the prior test) was tested against a no-moderation model where moderation was set to 0 on the A, C, and E paths. If the no-moderation model *did not* fit significantly worse than the full ACE moderation model (p>.05), no further tests were performed and the no-moderation model was selected as the best fitting and most parsimonious model. For the White sample, the no-moderation model was selected for familism composite, familism referent, and family conflict. For the Black/African American sample, the no-moderation model was selected for parental warmth and parental monitoring. For the Hispanic sample, the no-moderation model was selected for familism referent, family conflict, parental warmth, and parental monitoring. It was suggested that these variables did not moderate genetic and environmental influences on youth externalizing behaviors in their respective groups. Thus, further model testing only continued for the remaining variables.

Next, the full ACE moderation models were tested against models that systematically dropped different ACE moderation paths. If dropping moderation paths from the full model resulted in a significant decrease in model fit ($p<.05$), then it was suggested that moderation did occur on those paths and that they should be maintained. Power was lacking to determine the best fitting model for familism support, parental warmth, and parental monitoring for the White sample, familism composite and familism obligations for the Black/African American sample, and familism composite, familism support, and familism obligations for the Hispanic sample. Therefore, the full ACE model was maintained for these variables. In the White sample, the CE moderation model was the best fitting model for familism obligation. In the Black/African American sample, the AC moderation model for familism support and the AE model for familism referent were the best fitting models. For the Hispanic sample, dropping A and AC in familism support, dropping AC in familism obligation, and dropping ACE in familism referent resulted in a negative (rather than positive) change in -2LL, and so those results should be interpreted with caution.

In the White sample, as parental familism support (*Figure 3*), familism obligations (*Figure 4*), parental warmth (*Figure 5*), and parental monitoring (*Figure 6*) increased, the total variance of youth externalizing behaviors decreased and the proportional amount of variance explained by additive genetic effects (A) increased (higher heritability). Counter to what was found in the White sample, in the Black/African American sample, as familism composite *(Figure 7)*, familism support *(Figure 8)*, familism obligations *(Figure 9)*, and familism referent *(Figure 10)* increased

the overall variance of externalizing behaviors decreased, and the proportional variance explained by additive genetic effects (A) decreased (lower heritability). The exact direction of moderation for models for Hispanic youth is more difficult to interpret than for prior groups due to some U-shaped moderation in the familism composite and familism obligations models *(Figures 11 and 13).* For familism support *(Figure 12),* the overall variance of externalizing behaviors increased as family support increased, counter to what was found across the White and Black/African American groups. The proportional contribution of additive genetic effects (A) to the variance of externalizing behaviors is higher at high levels of familism support (higher heritability) than at low levels of familism support.

Discussion

There were two primary aims in this study. The first was to investigate whether the direct associations between four family factors (i.e., parental warmth, parental monitoring, family conflict, and parental attitudes of familism) and externalizing behaviors in youth varied across racial/ethnic groups. The second was to examine whether parenting, family conflict, and attitudinal familism differentially moderated the genetic and environmental etiology of youth externalizing behaviors across racial/ethnic groups. Generally, externalizing behaviors in youth were associated with parental warmth, family conflict, and parental attitudes of familism, however these relations varied across racial/ethnic groups. Externalizing behaviors could be explained by additive genetic and nonshared environmental influences across racial/ethnic groups. Parental warmth, parental monitoring, and parental attitudes of familism moderated the genetic

and environmental influences on youth externalizing behaviors, however these moderating effects varied across racial/ethnic groups.

Direct Effect of Family Influences on Childhood Externalizing Behaviors

The first aim of this study was to examine whether the patterns of associations between parental warmth, parental monitoring, family conflict, and parental attitudes of familism on childhood externalizing behaviors varied across racial/ethnic groups. It was hypothesized that low parental warmth, low parental monitoring, high family conflict, and low familism values would be associated with higher childhood externalizing, but no hypotheses were made regarding how the effects would vary across groups. Parental warmth, family conflict, and familism values did predict externalizing behaviors but the direction of association was not consistent nor was every association found across all groups. The current study highlights that the family context and its role on the development of childhood externalizing behaviors may not operate homogeneously across racial/ethnic groups.

Parental warmth reflects parenting that is high in acceptance, care, and support, and this type of parenting is generally believed to protect against the emergence of childhood externalizing behaviors, even across cultural groups (Rothenberg et al., 2020). Our results found that parental warmth was associated with fewer externalizing behaviors in childhood, but only for Hispanic youth. The lack of association in the White and Black/African American groups was surprising and a couple interpretations are considered. First, it should be noted that results from ANOVA testing revealed no significant differences in mean levels of parental warmth across groups, and

measurement invariance was suggested for parental warmth across racial/ethnic groups. A prior study found that parental warmth and acceptance are stronger negative predictors of adolescent substance use in Latino samples over Black/African American and White samples (Broman et al., 2006). Thus, it could be that parental warmth generally exerts a stronger effect on externalizing behaviors in Hispanic youth than White or Black/African American youth. Alternatively, prior meta-analysis (Pinquart, 2017), found that the association between parental warmth and externalizing behaviors becomes stronger past childhood and through adolescence. The current sample was aged 9-10, thus, it may be that parental warmth is more salient for Hispanic youth in childhood, and that parental warmth will become more strongly associated with externalizing behaviors in the White and Black/African American samples as the children age.

Contrary to the hypothesis and prior research, parental monitoring was not associated with youth externalizing behaviors in any racial/ethnic group. Prior research has found that parental monitoring tends to be associated with fewer externalizing problems (Booker et al., 2020; Beyers et al., 2003; Pettit et al., 1999; Van Loon et al., 2014), including some research on racial/ethnic minority youth (Lopez-Tamayo et al., 2016; Goldner et al., 2016). However, these prior studies tend to have older samples in early adolescence compared to the current sample in late childhood. Parental monitoring may become a stronger predictor of externalizing behaviors as children transition into adolescence and have more opportunities to engage in unsupervised time with peers and more freedom to engage in antisocial behaviors (Pettit et al., 1999, Patterson, Reid, & Dishion, 1998). In support of this idea, Pinquart's (2017) meta-analysis found that

parental behavioral control, a construct related to parental monitoring, was more negatively associated with externalizing behaviors in later adolescence than in childhood.

Family conflict was associated with more externalizing behaviors in childhood in the White sample but not in the Black/African American nor Hispanic samples. Prior research generally finds that youth exposed to higher levels of family conflict display higher levels of externalizing behaviors (Ucus et al., 2019; Li et al., 2017, Rabinowitz et al., 2016; Flores et al., 2014; Helland et al., 2017; Skeer et al., 2009; El-Sheikh & Elmore-Staton, 2004). However, there is limited research that examines whether this relation varies across racial/ethnic groups. Some studies have found no difference across racial/ethnic groups in the association between family conflict (Formoso et al., 2000) or marital conflict (Lindahl & Malik, 1999) with youth externalizing behaviors and conduct problems. Alternatively, Buehler et al. (1998) found that the relation between parental covert conflict (i.e., passive-aggressive conflict between parents) was more associated with externalizing behaviors in European American youth than in Mexican American youth. McLoyd et al. (2000) considers two reasons as to why family conflict may affect European American youth more strongly than racial/ethnic minority children. First, racial/ethnic minority youth are exposed to large amounts of economic, neighborhood, cultural, and social stressors, and, thus, the effect of family conflict will be relatively smaller in the context of all other stressors. Second, racial/ethnic minority youth may have greater access to support from extended family, and, this economic and financial support from extended kin may protect the child from the negative effects of parental and marital conflict. Fomby et al. (2011) found partial support for both these ideas when

assessing the effect of family instability on adolescent risk behavior across racial/ethnic groups. Although these explanations could be reflected in the current findings, these interpretations should be taken with caution given that it is unclear whether the measure of family conflict is capturing the same construct across racial/ethnic groups. In our current study, there was no measurement invariance for family conflict across White, Hispanic, and Black/African American samples signifying that the factor loadings of our measure and the latent means differ across groups, and, thus, the regression coefficients cannot be meaningfully compared to one another.

Two interesting findings emerged when testing the association between parental attitudes of familism and youth externalizing behaviors. First, familism composite and familism support were associated with youth externalizing behaviors in Hispanic and Black/African American children but not in the White sample. Familism values are theorized to strengthen family bonds and foster more harmonious family environments, and these effects are predicted to be stronger among minority children given the increased importance of the family unit to racial/ethnic minority children. Garcia Coll (1996), for example, argues that the family contexts plays an expanded role on the development of minority children given that they also protect them from the effects of economic hardship, racism, discrimination, social position, and other stressors that are common to minority individuals in the United States. Racial/ethnic minority families may differ in structure (i.e., the persons who live in the home with the child), may need to distribute child-rearing responsibilities even among extended family, may rely more on social and economic support amongst family members, and may need to engage in racial-

ethnic socialization with their children and prepare them for the stressors and barriers they will face as a minority. This expanded role of family in racial/ethnic minority youth may explain why parental attitudes of familism were only associated with externalizing behaviors for Black/African American and Hispanic but not White youth.

The second interesting finding was that, paradoxically, the direction of the association between familism composite and support and youth externalizing behaviors was different for Black/African American and Hispanic youth. For Black/African American children, having parents with higher attitudes of familism was associated with fewer externalizing behaviors. This finding runs in line with prior literature and theory. For Hispanic individuals, however, higher parental attitudes of familism and familism support were associated with more externalizing behaviors. Given that this finding contradicts much of the prior literature and theory, ideas for this finding are further considered. First, in their meta-analysis, Cahill et al. (2021) found that, although the overall association between familism values and externalizing outcomes was negative in Hispanic individuals, the nativity status of both parents and youth was a moderator of this relationship. Familism was associated with fewer externalizing behaviors when youth or parents were born outside of the US. In other words, the promotive effect of familism was diminished as the percentage of youth and parents born in the US in a given sample increased. When looking at the parental nativity status of our ABCD Hispanic twin sample compared to the full ABCD Hispanic Sample, we find that the percentage of parents born in the US is 1.7 times higher in the twin sample (36% of Hispanic children have a parent born in the US across all ABCD compared to 62% of Hispanic children in

the Twin sample; See Supplementary Table 1). Further, supplemental regression analyses using the full ABCD Hispanic sample showed no significant associations between familism composite or support on youth externalizing behaviors (See Table S2 and S3). Generation status, thus, may moderate the relation between familism and youth externalizing behaviors in Hispanic individuals. Where first generation immigrants struggle to adjust to a new culture (acculturative stress; (Smart & Smart, 1995)), second generation Hispanics and beyond may also struggle to see compatibility and switch between their heritage and host culture (bicultural identity; de Domanico et al., 1994). Thus, it may be that for some Hispanic individuals that are 2nd generation and beyond, being exposed and asked to retain their heritage culture may result in bicultural stress, which may increase risk for externalizing behaviors. Lastly, it should be noted that the ABCD Hispanic sample is heterogenous, with participants reporting multiple countries of origin (Table S3), and it is unclear whether familism operates identically across all reported nationalities. However, it should also be noted that measurement invariance was not established across racial-ethnic groups for familism composite nor for the familism subscales. Thus, the familism measure may not be capturing the same construct in the same way across White, Black/African American, and Hispanic groups, and we may be unable to meaningfully compare regression coefficients across racial/ethnic groups.

Genetic and Environmental Etiology of Youth Externalizing Behaviors

The second aim of the study was to examine whether parenting, family conflict, and attitudinal familism differentially moderated the heritability of youth externalizing behaviors across racial/ethnic groups.

The findings indicated that, across all racial/ethnic groups, genetic and non-shared environmental influences explained why youth varied on externalizing behaviors. Genetic influences accounted for a majority of the variance in externalizing behaviors across all racial/ethnic groups, which is in line with prior research (Barr and Dick, 2020), including prior findings using the ABCD sample (Maes et al., 2022). The non-shared environment explained the remaining variance in externalizing behaviors. Environmental influences that twins experience differently play a role on explaining why children differ on externalizing behaviors. Across all racial/ethnic groups, models that dropped the shared-environmental influence were preferred to models that maintained it, suggesting that environmental influences that both twins experienced equally did not play a role on explaining why children differ on externalizing behaviors. These patterns appeared to be similar across groups suggesting that the sources of variation in childhood externalizing behaviors may not differ across White, Hispanic, and Black/African American individuals.

The Role of Family Factors in Moderating Genetic and Environmental Influences on Youth Externalizing Behaviors

Parenting, family conflict, familism composite and its subdimensions were tested as moderators of the genetic and environmental etiology of childhood externalizing behaviors. It was hypothesized that higher parental warmth, higher parental monitoring, lower family conflict, and higher parental attitudes of familism would be associated with lower heritability estimates and a greater role of environmental influences on childhood externalizing behaviors.

For the White sample, parental attitudes of familism support, familism obligations, parental warmth, and parental monitoring, moderated the etiology of externalizing behaviors. As parental warmth, parental monitoring, familism obligations, and familism support increased, the overall variance in externalizing behaviors decreased, suggesting that these parental behaviors and attitudes may place a constraint on the expression of youth externalizing behaviors. In other words, children who grow up in environments high in parental warmth, parental monitoring, and familism obligations and support are generally more similar to each other on externalizing behaviors than children who grow up in environments low on those variables. Additionally, as parental warmth, parental monitoring, familism obligations, and familism support increase, the relative contribution of genetic influences in explaining the remaining variance increases. Contrary to the hypothesis, as the parenting and familism variables increase, the heritability of externalizing behaviors also increases. Interestingly, although parental warmth, parental monitoring, familism obligations, and familism support moderated the etiology of externalizing behaviors for the White sample, the previously tested regression analyses indicated that these variables did not affect mean levels of externalizing behaviors. Parenting and familism attitudes did not affect mean levels of externalizing behaviors but were able to constrain the variance of externalizing behaviors as well as modify their etiology. On the other hand, family conflict for the White sample was associated with increases in mean levels of youth externalizing behaviors but was not shown to moderate the etiology of externalizing behaviors. This to suggest that the relations between the family context and youth externalizing behaviors are complex, and

that there is not a single path through which the family context can influence youth externalizing behaviors.

However, two notes should be made on the current findings that the heritability of externalizing behaviors increases as parental warmth, parental monitoring, and familism support and obligations increase. First, given that in environments high in these parenting and familism variables, the variance of externalizing behaviors is constrained, the contributions of genetic and environmental influences are very small and thus is it difficult to make conclusions about whether genetic or environmental influences play a larger role in explaining the constrained variance. That is, although the models indicate that the heritability of externalizing behaviors increases, it is unclear whether we are sufficiently powered to make conclusions about the relative contribution of genetic and environmental influences when the variance of externalizing behaviors is highly constrained. Second, the underlying mechanisms through which heritability increases may differ across models. For example, in some of these models, heritability increases due to moderation of the environmental influences. For example, in the familism obligations model for the White sample, moderation was indicated on the C and E path but not the A path. Even though familism obligations was not shown to moderate the A path, as familism obligations increases, the variance explained by the shared and non-shared environments decrease, and thus the relative contribution of genetic influences increases. Nevertheless, the current findings for the White sample fall in line with what was predicted by the social-push hypothesis (Raine, 2002): in favorable environments that are lacking in social factors that may *push* an individual toward externalizing

behaviors, the behavioral expression of externalizing behaviors is constrained, and the remaining population-level variance in externalizing behaviors is more likely explained by genetic factors.

Although underpowered, exploratory moderated heritability analyses were run for the Black/African American and Hispanic samples. For the Black/African American sample, parenting and family conflict did not moderate the etiology of externalizing behaviors. When combined with the results of the regression analyses, this would suggest that parenting and family conflict were not predictive of the mean levels of externalizing behaviors in Black/African American youth, nor were they able to moderate the effect of genetic and environmental influences on the variance of externalizing behaviors. Parental attitudes of familism were shown to moderate the etiology of externalizing behaviors. As familism composite, familism support, familism obligations, and familism referent increased, the variance in externalizing behaviors decreased. However, contrary to the findings in the White sample, as attitudinal familism increased, the heritability of externalizing behaviors decreased, and the role of the environment in explaining the variance of externalizing behaviors increased. Combined with the results of the regression analyses, familism composite and familism support were not only shown to constrain the behavioral expression of youth externalizing behaviors and decrease their heritability, but they were also shown to be associated with decreases in mean levels of youth externalizing behaviors. In other words, Black/African American youth whose parents endorse higher levels of attitudinal familism tend to have lower levels of externalizing behaviors, less population-level variability in externalizing behaviors, and a

diminished effect of genetic influences on the etiology of externalizing behaviors, than youth whose parents report lower levels of attitudinal familism.

For Hispanic youth, parental warmth, parental monitoring, family conflict, and familism referent were not shown to moderate the etiology of externalizing behaviors. Although parental warmth was shown to be associated with decreases in mean levels of externalizing behaviors, it did not affect the influence of genes or the environment on the variance of externalizing behaviors. Familism composite, familism support and familism obligations were shown to moderate the genetic and environmental influences on youth externalizing behaviors. As familism support increased, the overall variance of externalizing behaviors increased as did the heritability. These findings contrast what was found in the other groups. As previously highlighted, familism support was also associated with increases in mean levels of externalizing behaviors which was a finding that was also counter to what was hypothesized and predicted by the literature. Familism composite and obligations appeared to have curvilinear effects on the variance of externalizing behaviors. There was more variance in externalizing behaviors at high levels and low levels of familism composite and obligations but less variance at mid-levels. To test whether this quadratic association on the variance was also reflected on the mean levels of externalizing behaviors, supplemental regression analyses were run to test the quadratic effect of familism composite on youth externalizing behaviors (Table S5). However, familism composite did not have a significant curvilinear relation with externalizing behaviors for Hispanic youth.

Strengths and Limitations

This study is the first to examine the role of parental attitudes of familism as a moderator of the genetic and environmental etiology of youth externalizing behaviors. Findings from the current study increase our understanding of how cultural processes and genetic influences interact on the development of youth externalizing behaviors. This study also examines how family factors influence the development of externalizing behaviors across racial/ethnic groups which may be important for the development of tailored racially-sensitive interventions. By testing the effect of the family context on not only the mean levels of externalizing behaviors but their variance, this study was also able to highlight the multiple paths through which the family can affect the development of externalizing behaviors.

One limitation of the current project is the use of cross-sectional data. The use of longitudinal data would allow for a clearer understanding of the directionality of the associations between family factors and youth externalizing behaviors. Second, there was a general lack of measurement invariance in the key measures across racial/ethnic groups. This lack of invariance generally suggests that the study measures may have different structure or meaning to the White, Black/African American, and Hispanic groups (Putnick & Bornstein, 2016). For example, some of the items in a given measure may load more strongly onto the construct for one group than for the others, certain items may be more prevalent and reported more frequently for one group than for the others, or the items may be structured and organized differently across groups. Therefore, we cannot be certain that the measures are tapping into the same underlying construct across groups. Third, the sample sizes for the Black/African American and the Hispanic samples were

small. Smaller sample sizes generally suggest less statistical power which equates to less certainty in being able to detect true population effects in the current sample. Therefore, caution must be taken when interpreting several of the findings.

Future Directions

It will be important to examine the relations between the family context, youth externalizing behaviors, and etiological genetic and environmental factors across adolescence. As children transition to adolescence, parent-child relationships may change, time spent with peers and significant others may increase, and youth may experience increased autonomy and choice (Laursen & Collins, 2009). As mentioned in Bergen et al. (2007), genetic influences are better able to explain why individuals differ on traits across adolescence due to the increases in independence and the decreases in environmental constraints. Additionally, it may be important to examine the bidirectionality of these relations across adolescence. Although this project focused on the effect of parenting on youth, children are active agents in their environment and can impact parenting behaviors (Pettit & Arsiwalla, 2008). It will also be important to replicate and/or further explore the paradoxical positive association between parental attitudinal familism and youth externalizing behaviors in Hispanic youth.

Conclusion

Overall, this study reinforces the idea that the family context is an important driver of youth externalizing behaviors, not just directly, but also through its interaction with genetic influences. These findings highlight that the effect of the family context on youth externalizing behaviors is complex and may not only affect mean levels of

externalizing behaviors but also their variance and etiology. Furthermore, this study highlights the need to carefully examine how these relations differ across racial/ethnic groups. Future work should continue to integrate racial and cultural diversity with genetically informed designs to aid the development of more precise interventions.

Table 1

Racial/Ethnic Group Sample Sizes

Group	**White**	**Black/African American**	**Hispanic**
MZ Twin Pairs	222	41	34
DZ Twin Pairs	287	69	41
Total n	1023	220	152

Table 2

Zero-Order Correlations and Descriptive Statistics among Key Study Variables for the White Sample

	1	2	3	4	5	6	7	8	9	10	11	12
1.Age	--											
2.Sex	0.01	--										
3.Parental Education	0.00	0.00	--									
4.Family Income	0.04	0.00	0.48**	--								
5.Parental monitoring	0.13**	0.19**	0.02	0.11**	--							
6.Parental warmth	0.06*	0.06	0.06	0.11**	0.36***	--						
7.Family conflict	-0.06	-0.06	-0.06*	-0.17**	-0.21***	-0.31**	--					
8.Familism Composite	-0.03	-0.04	-0.10**	-0.08*	-0.03	0.00	0.01	--				
9.Familism Support	-0.01	-0.01	-0.12**	-0.05	-0.03	0.03	-0.01	0.84**	--			
10.Familism Obligations	-0.02	-0.07*	-0.06	-0.12**	-0.04	0.00	0.02	0.86**	0.62**	--		
11.Familism Referent	-0.05	-0.02	-0.09**	-0.05	0.00	-0.02	0.01	0.88**	0.61**	0.62**	--	
12.Externalizing Score	-0.03	-0.12**	-0.06*	-0.23**	-0.08**	-0.12**	0.23**	-0.01	-0.02	0.01	-0.02	--
N	1023	1023	1023	972	1022	1022	1022	1023	1023	1023	1023	1020
Mean	121.98	0.49	17.30	8.47	4.43	2.74	2.03	3.63	4.12	3.50	3.25	3.46
SD	6.29	0.5	1.80	1.49	0.47	0.29	1.94	0.54	0.56	0.61	0.72	4.97
Cronbach's alpha	--	--	--	--	.43	.80	.68	.88	.79	.66	.79	--

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

Table 3

Zero-Order Correlations and Descriptive Statistics among Key Study Variables for the Black/African American Sample

	1	2	3	4	5	6	7	8	9	10	11	12
1.Age	--											
2.Sex	-0.10	--										
3.Parental Education	0.25**	0.01	--									
4.Family Income	0.23**	0.12	0.55**	--								
5.Parental monitoring	0.10	0.09	0.10	0.02	--							
6.Parental warmth	-0.03	0.07	-0.06	0.01	0.43**	--						
7.Family conflict	-0.12	-0.02	-0.12	-0.10	-0.08	-0.20**	--					
8.Familism Composite	0.03	0.13	-0.08	-0.09	0.05	-0.08	-0.06	--				
9.Familism Support	0.08	0.08	-0.10	-0.06	0.06	-0.09	-0.01	0.87**	--			
10.Familism Obligations	0.02	0.08	-0.08	-0.10	0.05	-0.07	-0.11	0.90**	0.68**	--		
11.Familism Referent	-0.01	0.17*	-0.04	-0.08	0.03	-0.05	-0.04	0.90**	0.67**	0.71**	--	
12.Externalizing Score	0.01	-0.18**	-0.16*	-0.21**	0.00	0.07	0.01	-0.18**	-0.23**	-0.15*	-0.12	--
N	220	220	220	204	219	220	220	220	220	220	220	220
Mean	120.78	0.56	15.55	5.77	4.33	2.77	2.46	3.94	4.26	3.83	3.74	3.73
SD	6.51	0.50	2.12	2.47	0.61	0.26	1.99	0.57	0.58	0.64	0.69	6.29
Cronbach's alpha	--	--	--	--	.53	.74	.64	.89	.83	.69	.69	--

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

Table 4

Zero-Order Correlations and Descriptive Statistics among Key Study Variables for the Hispanic Sample

	1	2	3	4	5	6	7	8	9	10	11	12
1.Age	--											
2.Sex	-0.01	--										
3.Parental Education	0.00	-0.24**	--									
4.Family Income	-0.02	-0.04	0.63**	--								
5.Parental monitoring	0.00	0.06	-0.04	0.06	--							
6.Parental warmth	0.11	-0.09	0.01	0.05	0.34**	--						
7.Family conflict	-0.12	0.11	-0.19*	-0.26**	-0.23**	-0.33**	--					
8.Familism Composite	0.14	0.04	-0.13	-0.04	0.06	-0.01	0.04	--				
9.Familism Support	0.11	0.04	-0.02	0.01	0.10	-0.02	0.01	0.88**	--			
10.Familism Obligations	0.07	0.08	-0.22**	-0.18*	0.02	0.03	0.08	0.83**	0.59**	--		
11.Familism Referent	0.17*	-0.01	-0.09	0.06	0.04	-0.03	0.01	0.88**	0.70***	0.58***	--	
12.Externalizing Score	-0.15	-0.06	-0.06	-0.26**	-0.11	-0.18*	0.16*	0.16*	0.15	0.18*	0.10	--
N	152	152	152	148	152	152	152	152	152	152	152	152
Mean	121.85	0.45	15.58	7.52	4.39	2.72	2.07	3.77	4.21	3.63	3.47	2.93
SD	7.54	0.50	2.40	1.71	0.52	0.33	1.71	0.53	0.59	0.61	0.64	4.13
Cronbach's alpha					.44	.83	.62	.87	.80	.64	.71	--

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

Table 5

ANOVA Testing Mean Level Differences on Key Variables across White, Black/African American, and Hispanic Groups

Variable Tested	SS_B	SS_W	df_B	df_W	MS_B	MS_W	F Value	p-value
Parental Warmth	.233	115.06	2	1391	.12	.08	1.41	.245
Family Conflict	32.93	5165.78	2	1391	16.47	3.71	4.43	.012
Parental Monitoring	1.89	348.64	2	1390	.95	.25	3.77	.023
Familism Composite	19.43	415.52	2	1392	9.72	.30	32.55	<.001
Familism Support	4.39	448.87	2	1392	2.20	.322	6.81	.001
Familism Referent	44.71	695.53	2	1392	22.36	.50	44.74	<.001
Familism Obligations	20.04	522.82	2	1392	10.02	.38	26.68	<.001
Externalizing Behaviors	57.90	36357.62	2	1389	28.95	26.18	1.11	.33

Note. SS_B = Sum of Squares Between, SS_W = Sum of Squares Within, df_B = Degrees of Freedom Between, df_W = Degrees of Freedom Within MS_B = Mean Sum of Square Between, MS_W = Mean Sum of Square Within.

Table 6

Tukey's HSD Test for Multiple Comparisons

Dependent Variable	Race Ethnicity (i)	Mean Level (i)	Race Ethnicity (j)	Mean Level (j)	Mean Difference (i-j)	p-value	95% Confidence Interval	
							Lower Bound	Upper Bound
Family Conflict	**White**	**2.03**	**Black**	**2.46**	**-0.42**	**0.01**	**-0.76**	**-0.09**
			Hispanic	2.07	-0.03	0.98	-0.42	0.36
	Black	2.46	Hispanic	2.07	0.39	0.13	-0.08	0.87
Parental Monitoring	**White**	**4.43**	**Black**	**4.33**	**0.10**	**0.02**	**0.01**	**0.19**
			Hispanic	4.39	0.03	0.73	-0.07	0.14
	Black	4.33	Hispanic	4.39	-0.07	0.40	-0.19	0.06
Familism Composite	**White**	**3.63**	**Black**	**3.94**	**-0.32**	**<.001**	**-0.41**	**-0.22**
			Hispanic	**3.77**	**-0.15**	**0.01**	**-0.26**	**-0.03**
	Black	**3.94**	**Hispanic**	**3.77**	**0.17**	**0.01**	**0.04**	**0.31**
Familism Support	**White**	**4.12**	**Black**	**4.26**	**-0.14**	**0.002**	**-0.24**	**-0.04**
			Hispanic	4.21	-0.09	0.13	-0.21	0.02
	Black	4.26	Hispanic	4.21	0.05	0.69	-0.09	0.19
Familism Referent	**White**	**3.25**	**Black**	**3.74**	**-0.48**	**<.001**	**-0.61**	**-0.36**
			Hispanic	**3.47**	**-0.22**	**0.001**	**-0.36**	**-0.07**
	Black	**3.74**	**Hispanic**	**3.47**	**0.27**	**0.001**	**0.09**	**0.44**
Familism Obligations	**White**	**3.50**	**Black**	**3.83**	**-0.33**	**<.001**	**-0.43**	**-0.22**
			Hispanic	3.63	-0.12	0.05	-0.25	0.00
	Black	**3.83**	**Hispanic**	**3.63**	**0.20**	**0.005**	**0.05**	**0.35**

Table 7

Testing for Measurement Invariance on Familism and Familism Subdimensions across White, Black/African American, and Hispanic Twin Samples

Model	$\chi 2$	df	$\Delta \chi 2$ (Δ df)	p -value	CFI	TLI	RMSEA	SRMR
Familism Composite								
Configural	2449.5	312	---	---	0.73	0.69	0.12	0.08
Metric (weak)	2606.8	342	157.3 (30)	< .001	0.72	0.70	0.12	0.10
Scalar (strong)	3037.0	372	430.2 (30)	< .001	0.67	0.68	0.12	0.12
Strict	3280.8	404	243.8 (32)	< .001	0.64	0.68	0.12	0.16
Familism Support								
Configural	221.8	27	---	---	0.92	0.86	0.13	0.05
Metric (weak)	297.9	37	76.1 (10)	< .001	0.89	0.87	0.12	0.12
Scalar (strong)	405.2	47	107.3 (10)	< .001	0.85	0.86	0.13	0.15
Strict	465.7	59	60.5 (12)	< .001	0.83	0.87	0.12	0.21
Familism Obligation								
Configural	178.4	15	---	---	0.85	0.71	0.15	0.06
Metric (weak)	202.4	23	24 (8)	.002	0.84	0.79	0.13	0.09
Scalar (strong)	462.8	31	260.4 (8)	< .001	0.61	0.62	0.17	0.18
Strict	617.7	41	154.9 (10)	< .001	0.48	0.62	0.17	0.27
Familism Referent								
Configural	114.5	15	---	---	0.95	0.89	0.12	0.04
Metric (weak)	165.1	23	50.6 (8)	< .001	0.92	0.90	0.12	0.08
Scalar (strong)	187.7	31	22.6 (8)	.004	0.92	0.92	0.10	0.08
Strict	282.3	41	94.6 (10)	< .001	0.87	0.90	0.11	0.14

Table 8

Testing for Measurement Invariance on Parenting and Family Conflict across White, Black/African American, and Hispanic Twin Samples

Model	$\chi 2$	df	$\Delta \chi 2$ (Δ df)	p -value	CFI	TLI	RMSEA	SRMR
Parental Warmth (Primary Caregiver)								
Configural	48.96	15	---	---	0.97	0.94	0.07	0.03
Metric (weak)	55.68	23	6.72 (8)	.57	0.97	0.96	0.06	0.07
Scalar (strong)	**63.44**	**31**	**7.76 (8)**	**.46**	**0.97**	**0.97**	**0.05**	**0.08**
Strict	94.77	41	31.33 (10)	< .001	0.95	0.97	0.05	0.27
Parental Monitoring								
Configural	27.05	15	---	---	0.97	0.93	0.04	0.03
Metric (weak)	**31.25**	**23**	**4.20 (8)**	**.84**	**0.98**	**0.97**	**0.03**	**0.03**
Scalar (strong)	67.34	31	36.09 (8)	< .001	0.90	0.90	0.05	0.05
Strict	209.05	41	141.71 (10)	< .001	0.54	0.66	0.09	0.21
Family Conflict								
Configural	**145.34**	**81**	---	---	**0.95**	**0.93**	0.04	0.04
Metric (weak)	175.32	97	29.98 (16)	.02	0.93	0.93	0.04	0.04
Scalar (strong)	194.18	113	18.86 (16)	.28	0.93	0.93	0.04	0.05
Strict	246.69	131	52.51 (18)	< .001	0.90	0.92	0.04	0.05

Table 9

Predicting Externalizing Behaviors from Parental Warmth

	White Sample (n = 1023)				Hispanic Sample (n = 152)				Black/African American Sample (n = 220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.01	0.04	[-.09,.06]	0.72	-0.13	0.09	[-.32,.06]	0.18	0.06	0.08	[-.09,.21]	0.53
Sex	-0.12	0.04	[-.19,-.05]	0.00	-0.05	0.09	[-23,.13]	0.60	-0.16	0.09	[-.35,.02]	0.07
Par Edu	0.07	0.04	[-.01,.15]	0.08	0.13	0.10	[-.07,.34]	0.22	-0.08	0.12	[-.32,.17]	0.52
Fam income	-0.27	0.06	[-.38,-.16]	<.001	-0.32	0.14	[-.60,-.05]	0.03	-0.18	0.10	[-.37,.02]	0.11
Par Warmth	-0.08	0.04	[-.17,.00]	0.06	**-0.16**	**0.07**	**[-.31,-.02]**	**0.03**	0.08	0.07	[-.06,.22]	0.29

Note. β: standardized coefficient; CI: 95% Confidence Intervals for standardized coefficients: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for. Bolded values are significant at p <.05.

Table 10

Predicting Externalizing Behaviors from Parental Monitoring

	White Sample (n=1023)				Hispanic Sample (n=152)				Black/African American Sample (n=220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.01	0.04	[-09,.06]	0.71	-0.15	0.10	[-.34,.04]	0.12	0.06	0.08	[-.10,.21]	0.49
Sex	-0.12	0.04	[-.19,-.05]	0.00	-0.03	0.10	[-.22,.16]	0.77	-0.16	0.10	[-.35,03]	0.09
Par Edu	0.07	0.04	[-.01,.15]	0.10	0.13	0.11	[-.08,.35]	0.24	-0.09	0.13	[-.33,.16]	0.48
Fam income	-0.27	0.06	[-.38,-.16]	<.001	-0.33	0.15	[-.62,-.03]	0.03	-0.17	0.10	[-.37,.03]	0.13
Par Monitoring	-0.03	0.04	[-.11,.05]	0.41	-0.10	0.06	[-.22,.03]	0.12	0.02	0.06	[-.10,.15]	0.73

Note. β: standardized coefficient; CI: 95% Confidence Intervals for standardized coefficients: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for. Bolded values are significant at p <.05.

Table 11

Predicting Externalizing Behaviors from Family Conflict

	White Sample (n= 1023)				Hispanic Sample (n=152)				Black/African American Sample (n=220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.01	0.04	[-.08,.06]	.81	-0.14	0.10	[-.33,.05]	0.16	0.06	0.08	[-.10,.22]	0.48
Sex	-0.12	0.04	[-.19,-.05]	.00	-0.04	0.10	[-.23,.15]	0.67	-0.16	0.10	[-.35,.03]	0.08
Par Edu	0.07	0.04	[-02,.15]	.11	0.14	0.11	[-.08,.36]	0.23	-0.08	0.12	[-.32,.16]	0.48
Fam income	-0.24	0.06	[-.36,-.13]	<.001	-0.31	0.15	[-.60,-.01]	0.05	-0.18	0.10	[-.38,.02]	0.12
Fam Conflict	**0.18**	**0.04**	**[.10,.26]**	**<.001**	0.09	0.07	[-.04,.23]	0.16	-0.02	0.07	[-.16,.13]	0.84

Note. β: standardized coefficient; CI: 95% Confidence Intervals for standardized coefficients: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for. Bolded values are significant at p <.05.

Table 12

Predicting Externalizing Behaviors from Parental Attitudinal Familism Composite

	White Sample (n = 1023)				Hispanic Sample (n = 152)				Black/African American Sample (n=220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.02	0.04	[-.09,.06]	0.61	-0.18	0.09	[-.35,.00]	0.06	0.07	0.07	[-.07,.22]	0.32
Sex	-0.13	0.04	[-.20,-.06]	<.001	-0.04	0.10	[-.22,.15]	0.72	-0.13	0.09	[-.31,.05]	0.13
Par Edu	0.07	0.04	[-.02,.15]	0.11	0.16	0.12	[-.06,.39]	0.17	-0.09	0.12	[-.33,.15]	0.43
Fam income	-0.28	0.06	[-.39,-.17]	<.001	-0.33	0.15	[-.62,-.04]	0.03	-0.19	0.10	[-.38,-01]	0.08
Familism Comp	-0.03	0.04	[-.10,.04]	0.43	**0.18**	**0.08**	**[.03,.34]**	**0.04**	**-0.19**	**0.09**	**[-.36,-.03]**	**0.03**

Note. β: standardized coefficient; CI: 95% Confidence Intervals for standardized coefficients: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for.

Bolded values are significant at p <.05.

Table 13

Predicting Externalizing Behaviors from Parental Attitudinal Familism Support

	White Sample (n = 1023)				Hispanic Sample (n = 152)				Black/African American Sample (n = 220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.02	0.04	[-.09,.06]	0.62	-0.17	0.09	[-.35,.01]	0.07	0.09	0.07	[-.05,.23]	0.24
Sex	-0.13	0.04	[-.20,-.06]	<.001	-0.04	0.09	[-.22,.15]	0.69	-0.14	0.09	[-.32,.05]	0.12
Par Edu	0.07	0.04	[-.02,.15]	0.11	0.15	0.11	[-.08,.37]	0.21	-0.11	0.12	[-.34,.12]	0.31
Fam income	-0.28	0.06	[-.39,-.16]	<.001	-0.33	0.15	[-.63,-.04]	0.03	-0.18	0.10	[-.37,.01]	0.11
Familism Support	-0.03	0.04	[-.10,.05]	0.47	**0.17**	**0.07**	**[.02,.31]**	**0.03**	**-0.25**	**0.09**	**[-.41,-.08]**	**0.02**

Note. β: standardized coefficient; CI: 95% Confidence Intervals for standardized coefficients: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for. Bolded values are significant at p <.05.

Table 14

Predicting Externalizing Behaviors from Parental Attitudinal Familism Obligations

	White Sample (n = 1023)				Hispanic Sample (n = 152)				Black/African American Sample (n = 220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.02	0.04	[-.09,06]	0.62	-0.16	0.09	[-.34,.02	0.08	0.07	0.07	[-.08,.22]	0.36
Sex	-0.13	0.04	[-.20,-.06]	<.001	-0.04	0.10	[-.23,.15]	0.68	-0.14	0.09	[-.32,.03]	0.09
Par Edu	0.07	0.04	[-.01,.15]	0.10	0.16	0.12	[-.07,.39]	0.18	-0.08	0.12	[-.32,.16]	0.48
Fam income	-0.28	0.06	[-.39,-.16]	<.001	-0.31	0.14	[-.59,-.03]	0.04	-0.20	0.10	[-.39,-.02]	0.07
Familism Obli	-0.03	0.04	[-.11,.06]	0.54	0.16	0.10	[-03,.35]	0.14	-0.17	0.09	[-.35,.01]	0.06

Note. β: standardized coefficient; CI: 95% Confidence Intervals for standardized coefficients: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for. Bolded values are significant at p <.05.

Table 15

Predicting Externalizing Behaviors from Parental Attitudinal Familism Referent

	White Sample (n = 1023)				Hispanic Sample (n = 152)				Black/African American Sample (n=220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.02	0.04	[-.10,.06]	0.61	-0.18	0.09	[-.36,00]	0.06	0.06	0.08	[-.09,.21]	0.42
Sex	-0.13	0.04	[-20,-.06]	<.001	-0.03	0.10	[-.21,.16]	0.78	-0.14	0.09	[-.32,05]	0.12
Par Edu	0.07	0.04	[-.01,.15]	0.10	0.17	0.11	[-.06,.39]	0.16	-0.08	0.12	[-.32,.16]	0.49
Fam income	-0.28	0.06	[-.39,-.16]	<.001	-0.35	0.15	[-.64,-.07]	0.02	-0.19	0.10	[-.37,.00]	0.09
Familism Referent	-0.02	0.04	[-10,.05]	0.51	0.15	0.08	[.01,.30]	0.06	-0.11	0.08	[-.27,.05]	0.19

Note. β: standardized coefficient; CI: 95% Confidence Intervals for standardized coefficients: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for.

Bolded values are significant at p <.05.

Table 16

Predicting Externalizing Behaviors from Parental Warmth, Parental Monitoring, Family Conflict, and Parental Familism Composite

	White Sample (n = 1023)				Hispanic Sample (n = 152)				Black/African American Sample (n = 220)			
	β	SE	CI	*p*	β	SE	CI	*p*	β	SE	CI	*p*
Age	-0.01	0.04	[-.08,.06]	0.80	-0.16	0.09	[-.34,.02]	0.10	0.07	0.08	[-.08,.22]	0.34
Sex	-0.12	0.04	[-.19,-.05]	0.00	-0.05	0.10	[-.23,.14]	0.61	-0.14	0.09	[-.32,.04]	0.12
Par Edu	0.06	0.04	[-.02,.14]	0.12	0.15	0.11	[-.07,.37]	0.20	-0.09	0.12	[-.33,.15]	0.45
Fam income	-0.24	0.06	[-.36,-.13]	<.001	-0.31	0.15	[-.61,-.01]	0.05	-0.20	0.10	[-.39,-.00]	0.09
Par Warmth	-0.04	0.04	[-.12,.05]	0.41	-0.13	0.08	[-.29,.03]	0.12	0.06	0.08	[-.10,.20]	0.46
Par Monitoring	0.01	0.04	[-.07,09]	0.80	-0.06	0.07	[-.20,.09]	0.44	0.00	0.07	[-.14,.14]	0.96
Fam Conflict	**0.17**	**0.04**	**[.09,.25]**	**<.001**	0.03	0.07	[-10,.16]	0.66	-0.02	0.07	[-.16,.13]	0.84
Familism Comp	-0.03	0.04	[-.10,.04]	0.45	**0.18**	**0.08**	**[.03,33]**	**0.04**	**-0.19**	**0.09**	**[-.36,-.02]**	**0.04**

Note. β: standardized coefficient; SE: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for. Bolded values are significant at p <.05.

Table 17

Twin Intraclass Correlations for Youth Externalizing Behaviors

	MZ	**DZ**
White	0.70***	0.34***
Black/African American	0.84***	0.61***
Hispanic	0.50**	0.44**

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

Table 18

Univariate ACE models and Fit Statistics

Group	**Model**	**A**	**C**	**E**	**AIC**	**-2LL**	**Δ-2LL**	***df***	***p-value***
White	ACE	0.81	-0.10	0.28	5949.01	5937.01	NA	1009	NA
	AE	**0.71**	**--**	**0.29**	**5947.89**	**5937.89**	**0.88**	**1010**	**.35**
	CE	--	0.48	0.52	5997.35	5987.35	50.35	1010	<.001
	E	--	--	1.0	6126.65	6118.65	181.64	1011	<.001
Black	ACE	.67	.22	.11	1355.09	1343.09	NA	214	NA
	AE	**.89**	**--**	**.11**	**1354.95**	**1344.95**	**1.85**	**215**	**.17**
	CE	--	.65	.35	1373.47	1363.47	20.38	215	<.001
	E	--	--	1.0	1432.81	1424.81	81.72	216	<.001
Hispanic	ACE	.79	-.07	.29	839.36	827.36	NA	144	NA
	AE	**.70**	**--**	**.29**	**837.46**	**827.46**	**0.09**	**145**	**.76**
	CE	--	.41	.59	843.22	833.22	5.86	145	.02
	E	--	--	1.0	855.29	847.29	19.93	146	<.001

Note. -2LL = -2 log likelihood; AIC = Akaike's Information Criterion; Δ = change; A, C, and E are standardized additive genetic, shared environmental, non-shared environmental variance components respectively. The best fitting and most parsimonious model is indicated in bold. Models accounted for youth sex and age covariates.

Table 19

Model Fit Statistics for Moderation Models for White Sample

Model	**AIC**	**-2LL**	**Δ-2LL**	***df***	**p-value**
Familism Composite					
ACE Moderated with rGE	5951.99	5931.99	--	1005	--
ACE Moderated without rGE	5950.14	5932.14	0.16	1006	.69
No Moderation	**5949.89**	**5937.89**	**5.74**	**1009**	**.12**
Familism Support					
ACE Moderated with rGE	5944.69	5924.69	--	1005	--
ACE Moderated without rGE	**5942.91**	**5924.91**	**.22**	**1006**	**.64**
No Moderation	5949.89	5937.89	12.98	1009	.01
Only AC Moderation	5948.71	5932.71	7.80	1007	.01
Only CE Moderation	5941.14	5925.14	.23	1007	.63
Only AE Moderation	5942.35	5925.35	1.44	1007	.23
Only A Moderation	5949.04	5935.04	10.13	1008	.01
Only C Moderation	5949.95	5935.95	11.04	1008	.004
Only E Moderation	5940.54	5926.54	1.63	1008	.44
Familism Referent					
ACE Moderated with rGE	6199.42	6179.42	--	1005	--
ACE Moderated without rGE	6197.60	6179.60	0.18	1006	.67
No Moderation	**5949.89**	**5937.89**	**-241.71**	**1009**	**1**

Familism Obligation					
ACE Moderated with rGE	5941.82	5921.82	--	1005	--
ACE Moderated without rGE	5939.89	5921.89	0.07	1006	.78
No Moderation	5949.89	5937.89	15.99	1009	.001
Only AC Moderation	5943.96	5927.96	6.06	1007	.01
Only CE Moderation	**5939.31**	**5923.31**	**1.42**	**1007**	**.23**
Only AE Moderation	5962.18	5946.18	24.28	1007	<.001
Only A Moderation	5966.90	5952.90	31.01	1008	<.001
Only C Moderation	5941.96	5927.96	6.07	1008	.048
Only E Moderation	5946.05	5932.05	10.16	1008	.01
Family Conflict					
ACE Moderated with rGE	5945.85	5925.85	--	1006	--
ACE Moderated without rGE	5952.15	5934.15	8.30	1005	.004
No Moderation	**5924.15**	**5910.15**	**-15.70**	**1007**	**1**
Parental Warmth					
ACE Moderated with rGE	**5916.03**	**5896.03**	**---**	**1004**	**---**
ACE Moderated without rGE	5919.54	5901.54	3.95	1005	.02
No Moderation	5938.60	5924.60	5.51	1007	<.001
Only AC Moderation	5920.09	5902.09	28.57	1005	.01
Only CE Moderation	5916.04	5898.04	6.06	1005	.16
Only AE Moderation	5914.03	5896.03	2.01	1005	.99
Only A Moderation	5918.09	5902.09	<.001	1006	.05
Only C Moderation	5923.94	5907.94	6.06	1006	.003
Only E Mo deration	5915.98	5899.98	11.91	1006	.14

Parental Monitoring					
ACE Moderated with rGE	5938.62	5918.62	---	1004	---
ACE Moderated without rGE	**5938.86**	**5920.86**	**2.24**	**1005**	**.13**
No Moderation	5944.82	5932.82	11.96	1008	.01
Only AC Moderation	5937.38	5921.38	0.52	1006	.47
Only CE Moderation	5937.23	5921.23	0.36	1006	.56
Only AE Moderation	5942.27	5926.27	5.40	1006	.02
Only A Moderation	5941.69	5927.69	6.83	1007	.03
Only C Moderation	5935.41	5921.41	0.54	1007	.76
Only E Moderation	5940.41	5926.41	5.55	1007	.06

Note. -2LL = -2 log likelihood; AIC = Akaike's Information Criterion; Δ = change; A, C, and E are additive genetic, shared environmental, non-shared environmental variance components respectively. The best fitting and most parsimonious model is indicated in bold.

Table 20

Model Fit Statistics for Moderation Models for Black/African American Sample

Model	AIC	-2LL	Δ-2LL	*df*	p-value
Familism Comp					
ACE Moderated with rGE	**1334.03**	**1314.03**	--	**210**	--
ACE Moderated without rGE	1338.32	1320.32	6.28	211	.01
No Moderation	1350.88	1336.88	22.85	213	<.001
Only AC Moderation	1335.53	1317.53	3.50	211	.06
Only CE Moderation	1337.70	1319.70	5.66	211	.02
Only AE Moderation	1332.15	1314.15	.11	211	.74
Only A Moderation	1333.70	1317.70	3.66	212	.16
Only C Moderation	1346.43	1330.43	16.40	212	<.001
Only E Moderation	1338.98	1322.98	8.94	212	.01
Familism Sup					
ACE Moderated with rGE	1322.82	1302.82	--	210	--
ACE Moderated without rGE	1324.50	1306.50	3.67	211	.06
No Moderation	1355.09	1343.09	36.59	214	<.001
Only AC Moderation	**1326.25**	**1310.25**	**3.75**	**212**	**.05**
Only CE Moderation	1327.77	1311.77	5.27	212	.02
Only AE Moderation	1326.36	1310.36	3.87	212	.049
Only A Moderation	1327.29	1313.29	6.79	213	.03
Only C Moderation	1338.29	1324.29	17.79	213	<.001
Only E Moderation	1339.70	1325.70	19.21	213	<.001
Familism Ref					
ACE Moderated with rGE	1340.74	1320.74	--	210	--
ACE Moderated without rGE	1342.13	1324.13	3.39	211	.07
No Moderation	1355.09	1343.09	18.96	214	<.001
Only AC Moderation	1348.33	1332.33	8.20	212	.004
Only CE Moderation	1346.20	1330.20	6.07	212	.01

Only AE Moderation	**1342.80**	**1326.80**	**2.67**	**212**	**.10**
Only A Moderation	1347.09	1333.09	8.96	213	.01
Only C Moderation	1353.37	1339.37	15.24	213	<.001
Only E Moderation	1346.05	1332.05	7.92	213	.02
Familism Obl					
ACE Moderated with rGE	**1347.52**	**1327.52**	--	**210**	--
ACE Moderated without rGE	1349.61	1331.61	4.01	211	.04
No Moderation	1351.54	1337.54	10.02	213	.02
Only AC Moderation	1347.28	1329.28	1.76	211	.18
Only CE Moderation	1351.15	1333.15	5.64	211	.02
Only AE Moderation	1345.69	1327.69	0.17	211	.68
Only A Moderation	1345.47	1329.47	1.95	212	.38
Only C Moderation	1350.20	1334.20	6.68	212	.04
Only E Moderation	1352.71	1336.71	9.20	212	.01
Fam Conflict	NO CONVERGANCE				
P Warmth					
ACE Moderated with rGE	1360.34	1340.34	--	210	--
ACE Moderated without rGE	1358.34	1340.34	<.001	211	.99
No Moderation	**1355.09**	**1343.09**	**2.75**	**214**	**.43**
P Monitoring					
ACE Moderated with rGE	1345.87	1325.87	--	208	--
ACE Moderated without rGE	1344.12	1326.12	0.25	209	.62
No Moderation	**1344.22**	**1332.22**	**6.10**	**212**	**.11**

Note. -2LL = -2 log likelihood; AIC = Akaike's Information Criterion; Δ = change; A, C, and E are additive genetic, shared environmental, non-shared environmental variance components respectively. The best fitting and most parsimonious model is indicated in bold.

Table 21

Model Fit Statistics for Moderation Models for Hispanic Sample

Model	**AIC**	**-2LL**	**Δ-2LL**	***df***	**p-value**
Familism Comp					
ACE Moderated with rGE	833.98	813.98	--	140	--
ACE Moderated without rGE	**834.90**	**816.90**	**2.92**	**141**	**.09**
No Moderation	839.46	827.46	10.55	144	.01
Only AC Moderation	834.01	818.01	1.11	142	.29
Only CE Moderation	834.69	818.69	1.79	142	.18
Only AE Moderation	832.94	816.94	.03	142	.86
Only A Moderation	832.24	818.24	1.34	143	.51
Only C Moderation	838.74	824.74	7.84	143	.02
Only E Moderation	833.76	819.76	2.85	143	.24
Familism Sup					
ACE Moderated with rGE	**833.38**	**813.38**	--	**140**	--
ACE Moderated without rGE	837.07	819.07	5.69	141	.02
No Moderation	838.91	824.91	11.53	143	.01
Only AC Moderation	835.98	817.98	4.60	141	.03
Only CE Moderation	804.88	786.88	-26.50	141	1
Only AE Moderation	831.42	813.42	0.04	141	.84
Only A Moderation	833.98	817.98	4.60	142	.10
Only C Moderation	840.46	824.46	11.08	142	.003
Only E Moderation	803.70	787.70	-25.68	142	1
Familism Ref					
ACE Moderated with rGE	856.38	836.38	--	140	--
ACE Moderated without rGE	855.52	837.52	1.14	141	.29
No Moderation	**839.46**	**827.46**	**-10.06**	**144**	**1**

Familism Obl					
ACE Moderated with rGE	**808.19**	**788.19**	--	**140**	--
ACE Moderated without rGE	810.93	792.93	4.74	141	.03
No Moderation	837.52	823.52	34.33	143	<.001
Only AC Moderation	806.72	788.72	0.53	141	.47
Only CE Moderation	828.64	810.64	22.45	141	<.001
Only AE Moderation	807.83	789.83	1.64	141	.20
Only A Moderation	805.49	789.49	1.30	142	.52
Only C Moderation	828.69	812.69	24.50	142	<.001
Only E Moderation	804.16	788.16	-0.03	142	1
Fam Conflict					
ACE Moderated with rGE	842.57	822.57	--	140	--
ACE Moderated without rGE	842.71	824.71	2.14	141	.14
No Moderation	**839.46**	**827.44**	**2.74**	**144**	**.43**
P Warmth					
ACE Moderated with rGE	845.62	825.62	--	140	--
ACE Moderated without rGE	844.08	826.08	0.45	141	.50
No Moderation	**839.46**	**827.46**	**1.38**	**144**	**.71**
P Monitoring					
ACE Moderated with rGE	844.38	824.38	--	140	--
ACE Moderated without rGE	844.32	826.32	1.94	141	.16
No Moderation	**839.46**	**827.46**	**1.13**	**144**	**.77**

Note. -2LL = -2 log likelihood; AIC = Akaike's Information Criterion; Δ = change; A, C, and E are additive genetic, shared environmental, non-shared environmental variance components respectively. The best fitting and most parsimonious model is indicated in bold

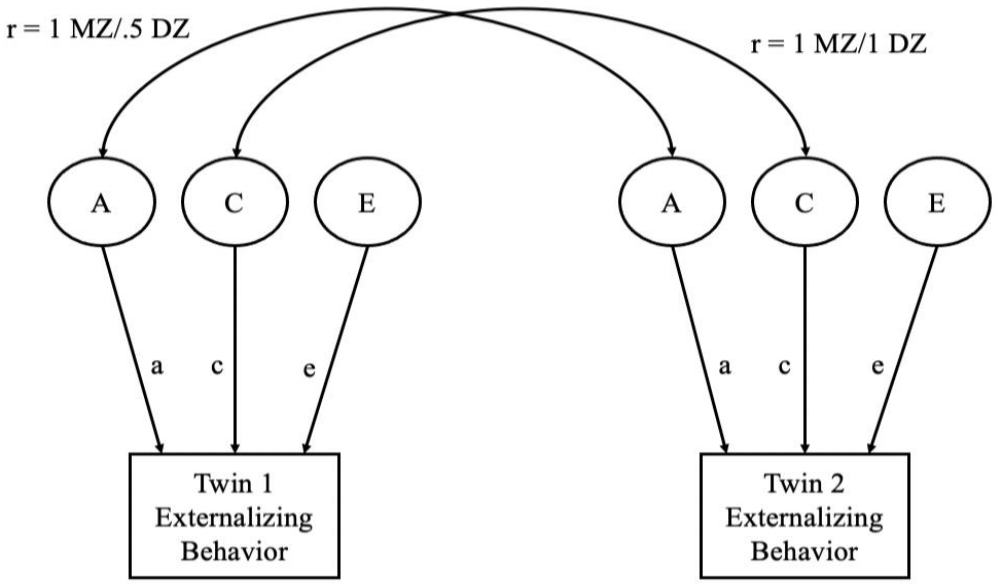

Figure 1. *Univariate ACE Model*

Note. Additive Genetic Influences are presented as A; Common/Shared Environmental Influences are presented as C; Non-Shared/Individual-Specific Environmental Influences are presented as E; a, c, and e are path coefficients of A, C, and E; Correlation coefficient for A is set to 1 for MZ twins and .5 for DZ twins, and the correlation coefficient between C is set to 1 for both MZ and DZ twins.

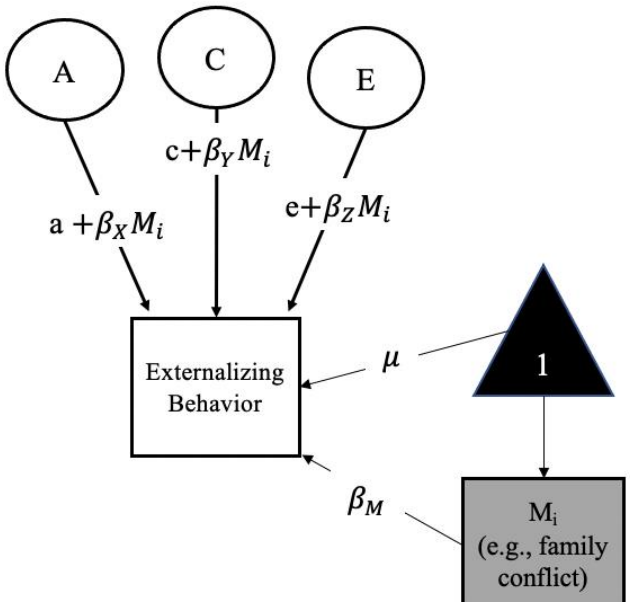

Figure 2. *Example Moderated ACE Model*

Note. Moderator (M; i.e., family behaviors and familism) has a potential effect on the path coefficients from A, C, and/or E to childhood externalizing behaviors. Only one child of a twin pair shown for simplicity. This model accounts for the main effect of the moderator (β_M) on childhood externalizing behaviors which accounts for any potential gene-environment correlation. A, C, and E represent the additive genetic, shared environmental, and non-shared environmental influences on childhood externalizing behaviors respectively; a, c, and e, are the unmoderated components of the A, C, and E paths coefficients; M_i is the moderator level for a given individual; μ is the mean of externalizing behaviors, 1 = the constant by which μ is multiplied. Interactions between the moderator and A, C, and E are indicated by significant non-zero values of β_X, β_Y, or β_Z respectively (Purcell, 2002).

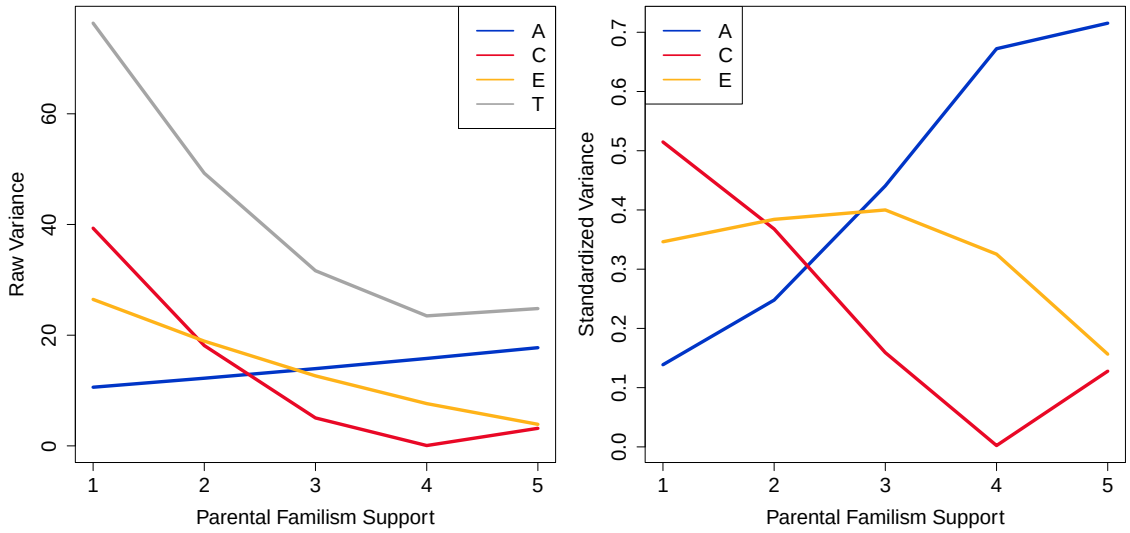

Figure 3. *White Sample: Familism Support - ACE Model - Without rGE*

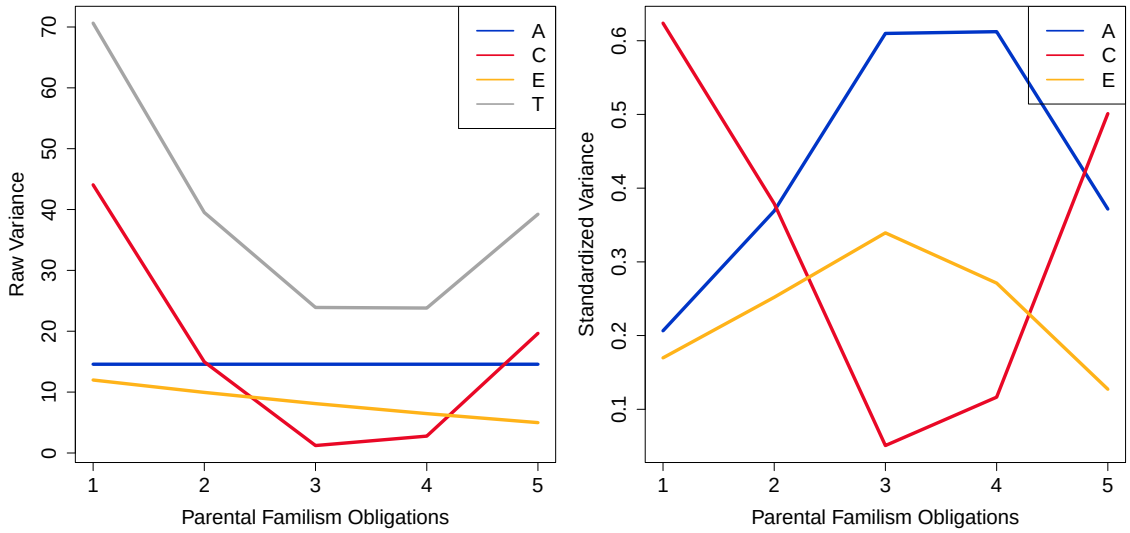

Figure 4. *White Sample: Familism Obligations – CE Model – Without rGE*

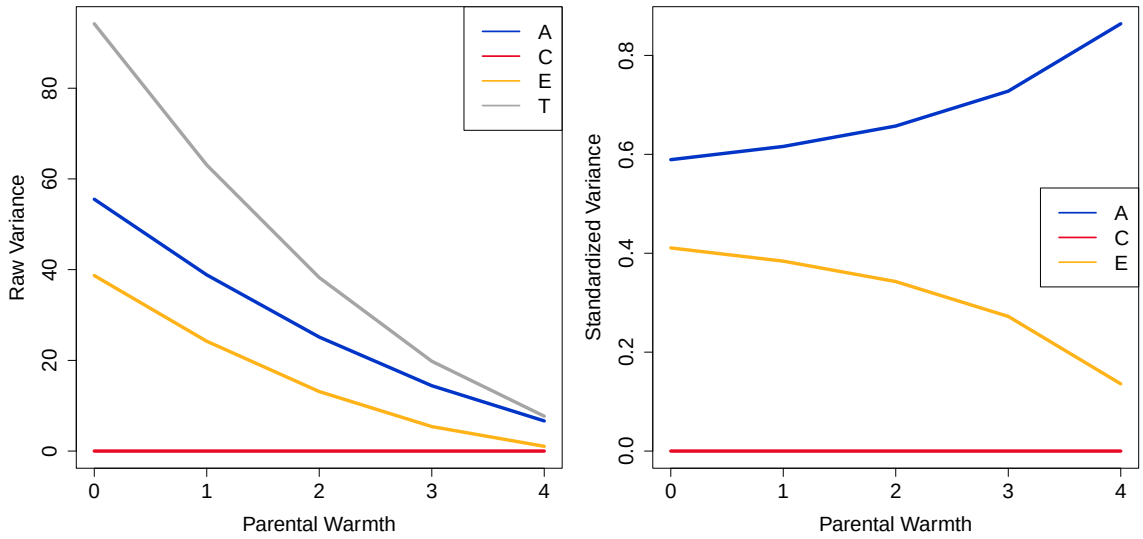

Figure 5. *White Sample: Parental Warmth – ACE Model – With rGE*

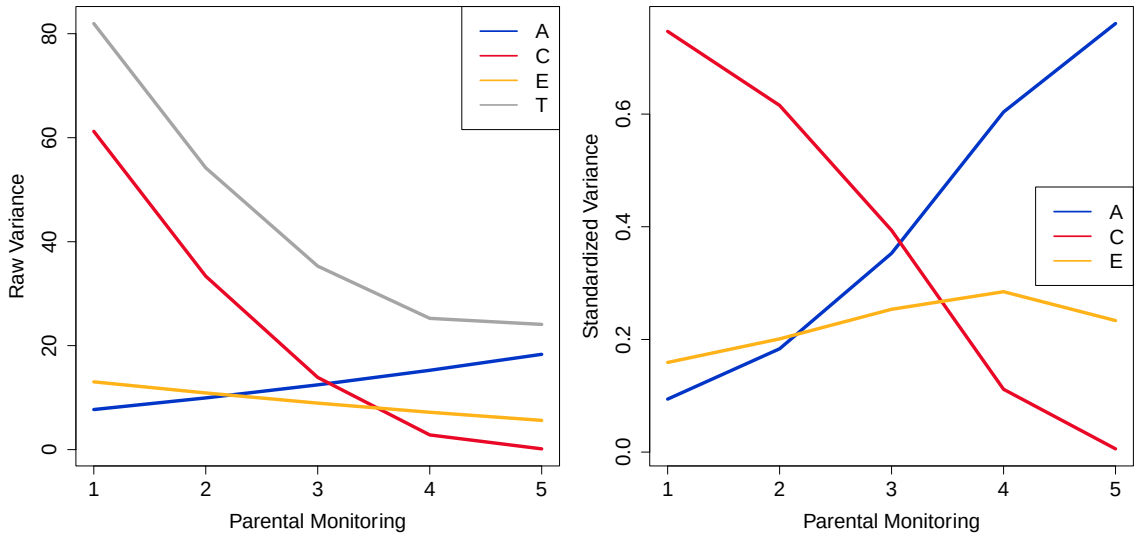

Figure 6. *White Sample: Parental Monitoring – ACE Model– Without rGE*

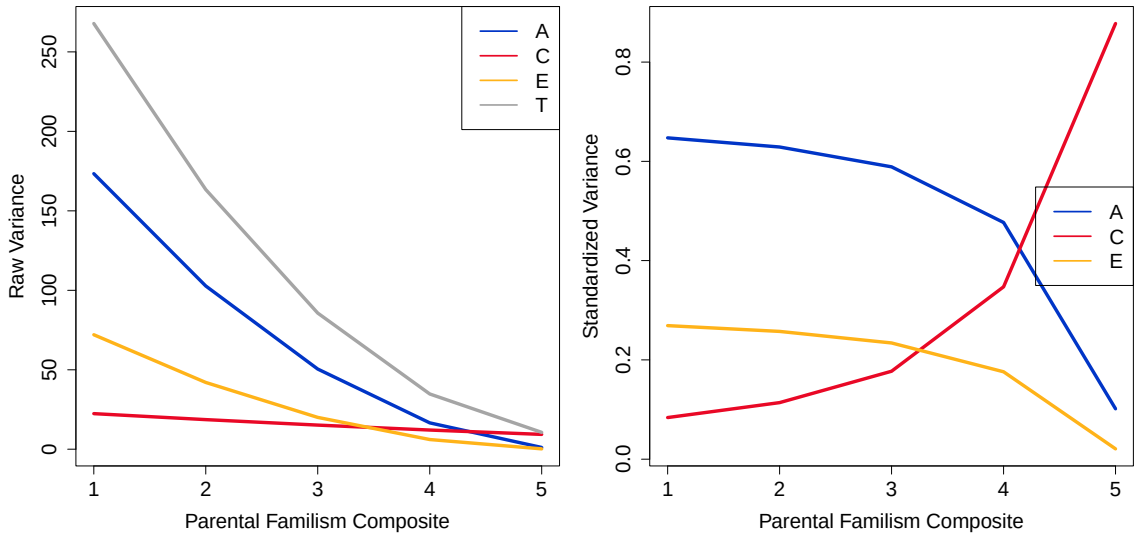

Figure 7. *Black/African American Sample: Familism Composite – ACE Model– With rGE*

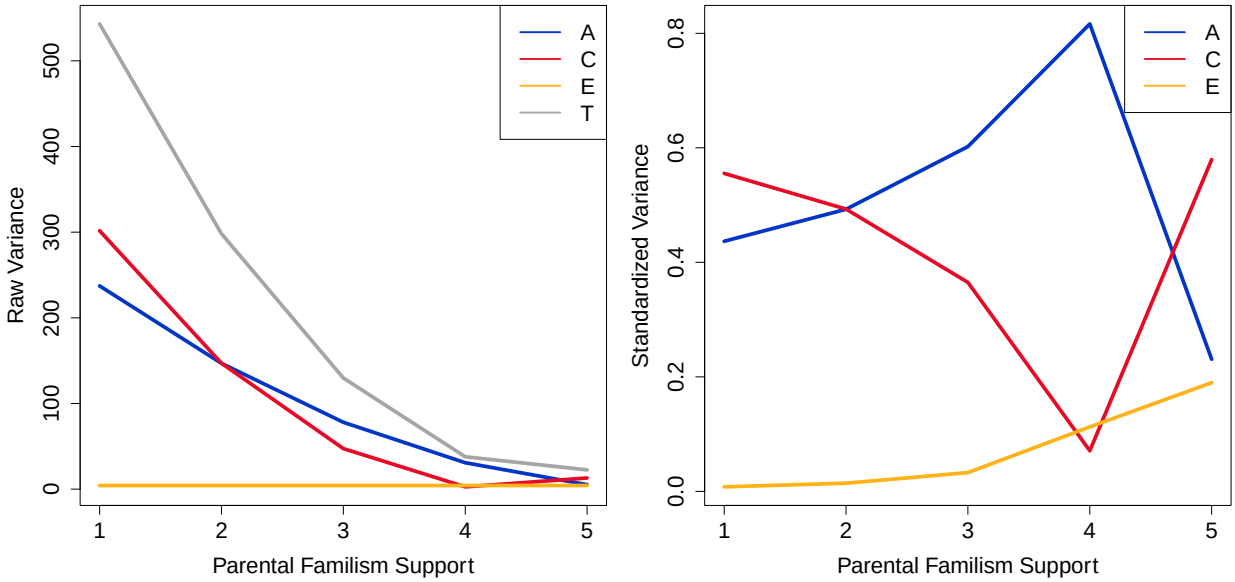

Figure 8. *Black African American Sample: Familism Support – AC Model– Without rGE*

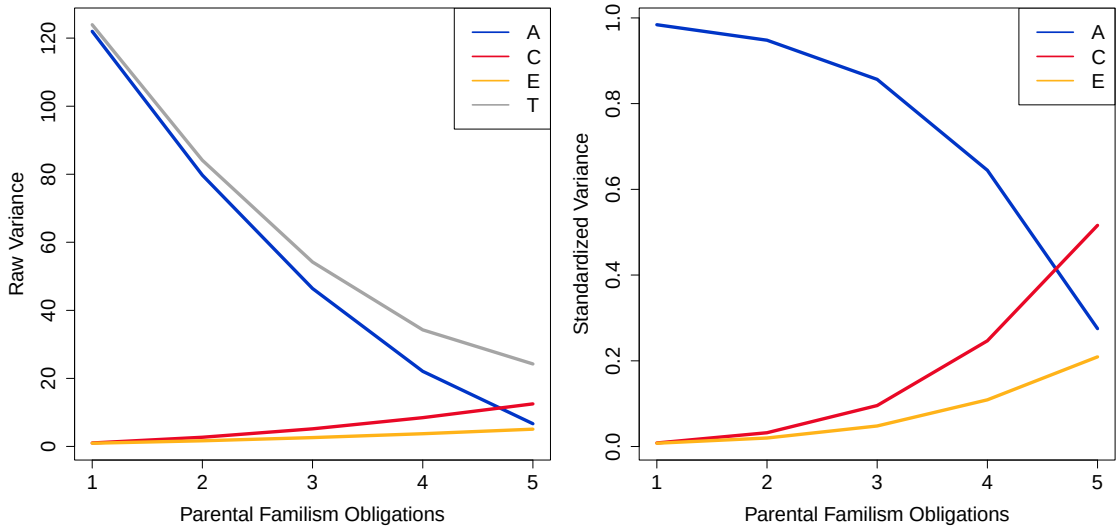

Figure 9. *Black African American Sample: Familism Obligations – ACE Model – With rGE*

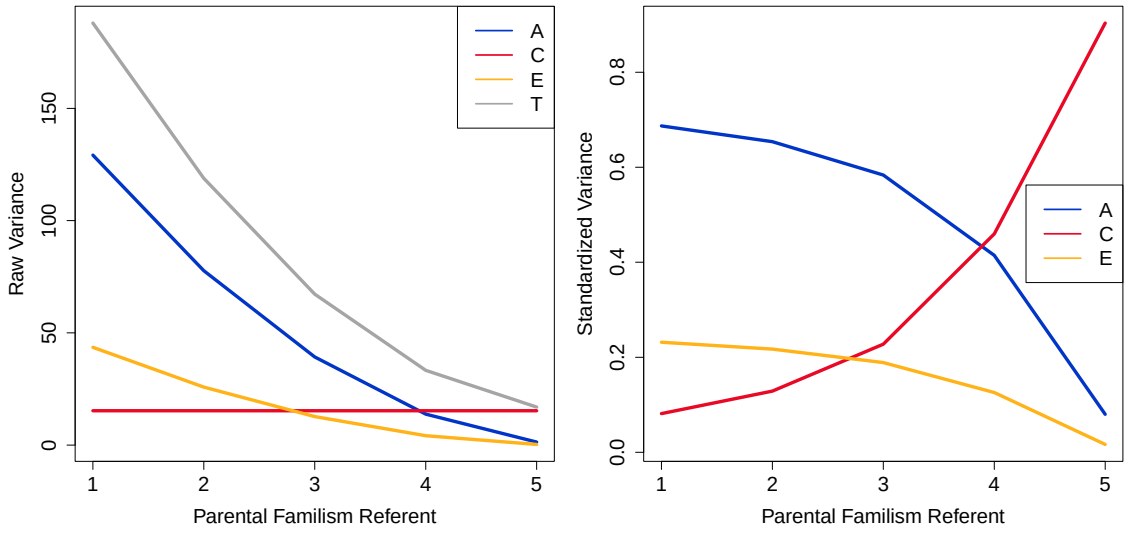

Figure 10. *Black/African American Sample: Familism Referent – AE Model – Without rGE*

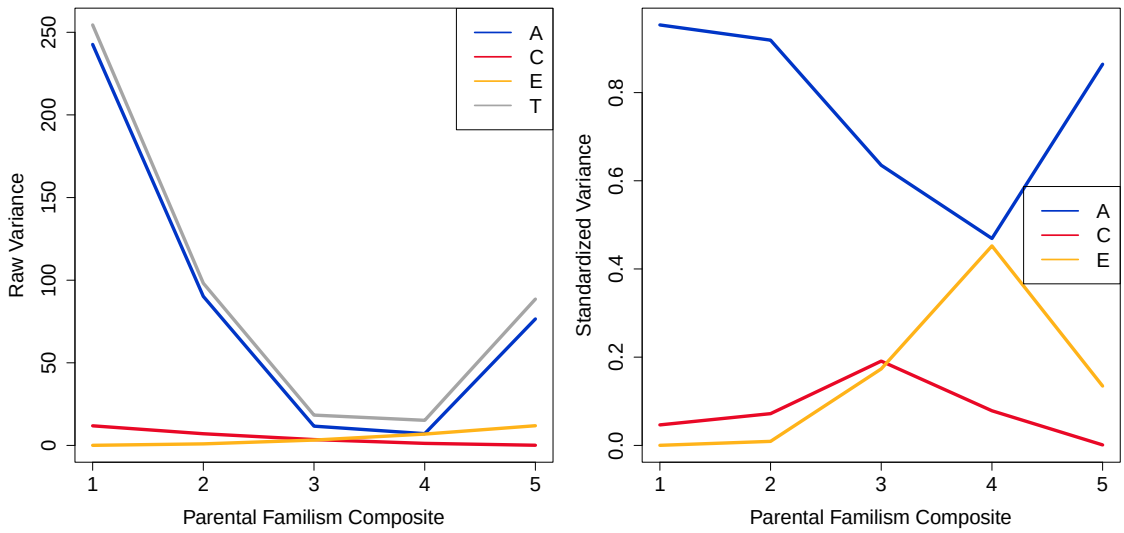

Figure 11. *Hispanic Sample: Familism Composite – ACE Model – Without rGE*

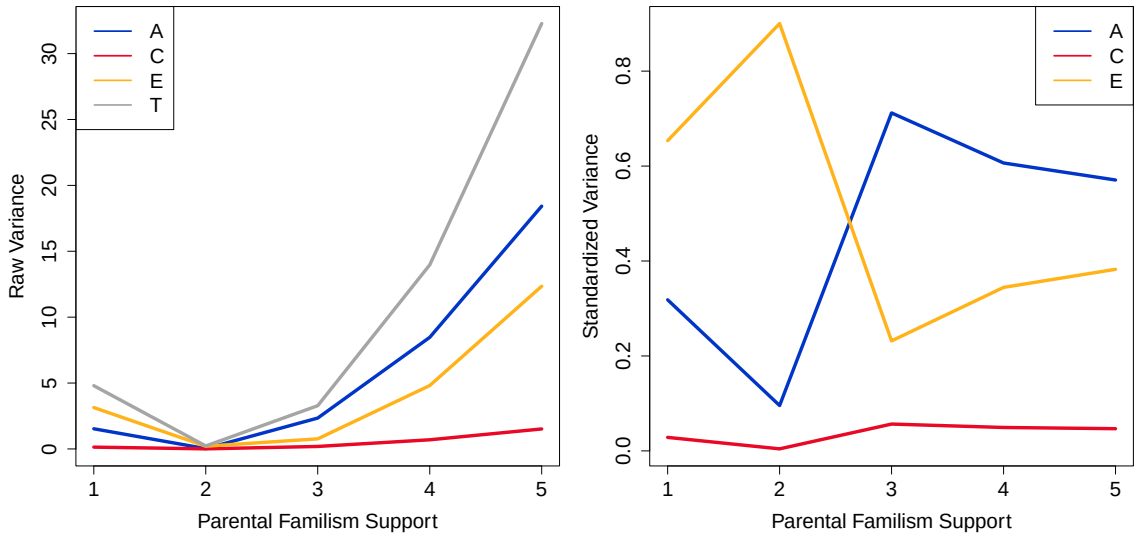

Figure 12. *Hispanic Sample: Familism Support – ACE Model – With rGE*

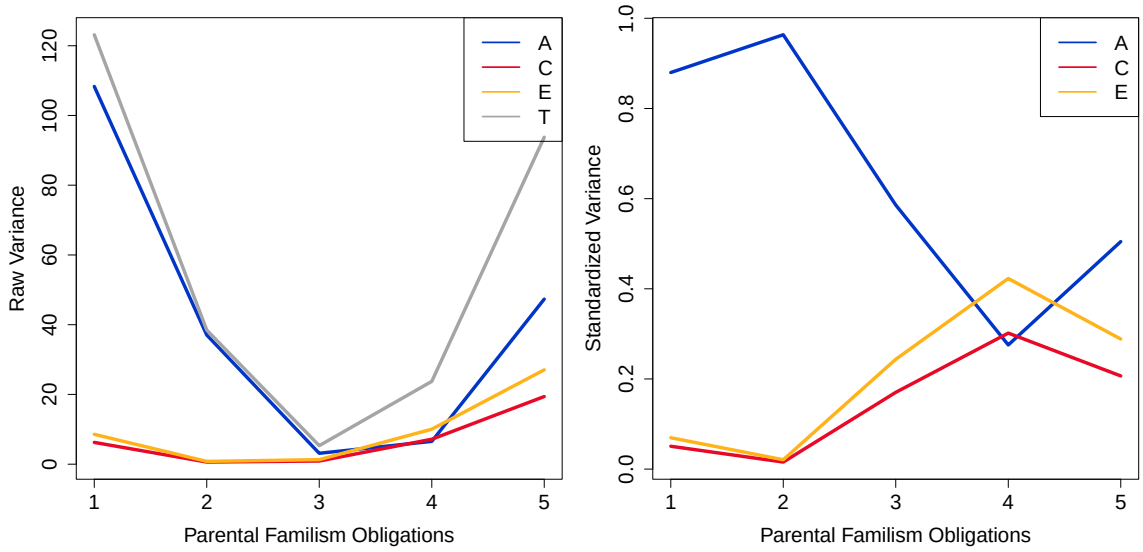

Figure 13. *Hispanic Sample: Familism Obligations - ACE Model – With rGE*

REFERENCES

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.

American Psychological Association, APA Working Group on Stress and Health Disparities. (2017). Stress and health disparities: Contexts, mechanisms, and interventions among racial/ethnic minority and low-socioeconomic status populations. Retrieved from http://www.apa.org/pi/health-disparities/resources/stress-report.aspx

Arieli, S., Grant, A. M., & Sagiv, L. (2014). Convincing Yourself to Care About Others: An Intervention for Enhancing Benevolence Values: Increasing Benevolence Values. *Journal of Personality*, *82*(1), 15–24. https://doi.org/10.1111/jopy.12029

Barr, P. B., & Dick, D. M. (2020). The Genetics of Externalizing Problems. *Current Topics in Behavioral Neurosciences*, *47*, 93–112. https://doi.org/10.1007/7854_2019_120

Baumann, A. A., Kuhlberg, J. A., & Zayas, L. H. (2010). Familism, mother-daughter mutuality, and suicide attempts of adolescent Latinas. *Journal of family psychology : JFP : journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *24*(5), 616–624. https://doi.org/10.1037/a0020584

Bentley, A. R., Callier, S., & Rotimi, C. N. (2017). Diversity and inclusion in genomic research: why the uneven progress?. *Journal of community genetics*, *8*(4), 255–266. https://doi.org/10.1007/s12687-017-0316-6

Bergen, S., Gardner, C., & Kendler, K. (2007). Age-Related Changes in Heritability of Behavioral Phenotypes Over Adolescence and Young Adulthood: A Meta-Analysis. *Twin Research and Human Genetics, 10*(3), 423-433. doi:10.1375/twin.10.3.423

Berry, J. W., Segall, M. H., & Kagitcibasi, C. (1997). *Handbook of Cross-Cultural Psychology, Volume 3: Social Behavior and Applications (2nd Edition)* (Subsequent ed., Vol. 3). Allyn & Bacon.

Betz C. L. (1995). Childhood violence: a nursing concern. *Issues in comprehensive pediatric nursing*, *18*(3), 149–161. https://doi.org/10.3109/01460869509087268

Beyers, J. M., Bates, J. E., Pettit, G. S., & Dodge, K. A. (2003). Neighborhood structure, parenting processes, and the development of youths' externalizing behaviors: A

multilevel analysis. *American Journal of Community Psychology*,*31*(1–2), 35–53. https://doi.org/http://dx.doi.org/10.1023/A:1023018502759

Boker, S., Neale, M., Maes, H., Wilde, M., Spiegel, M., Brick, T., Spies, J., Estabrook, R., Kenny, S., Bates, T., Mehta, P., & Fox, J. (2011). OpenMx: An Open Source Extended Structural Equation Modeling Framework. *Psychometrika*, *76*(2), 306–317. https://doi.org/10.1007/s11336-010-9200-6

Boker, S., Neale, M., Maes, H., Wilde, M., Spiegel, M., Brick, T. R., & Fox, J. (2014). OpenMx: Multipurpose software for statistical modeling. *R package version*, *2*(1).

Booker, J. A., Capriola-Hall, N. N., Greene, R. W., & Ollendick, T. H. (2020). The parent–child relationship and posttreatment child outcomes across two treatments for oppositional defiant disorder. *Journal of Clinical Child and Adolescent Psychology*, *49*(3), 405–419. https://doi.org/http://dx.doi.org/10.1080/15374416.2018.1555761

Boutwell, B. B., Beaver, K. M., Barnes, J. C., & Vaske, J. (2012). The developmental origins of externalizing behavioral problems: parental disengagement and the role of gene-environment interplay. *Psychiatry research*, *197*(3), 337–344. https://doi.org/10.1016/j.psychres.2011.12.032

Broman, C. L., Reckase, M. D., & Freedman-Doan, C. R. (2006). The role of parenting in drug use among black, latino and white adolescents. *Journal of Ethnicity in Substance Abuse*, *5*(1), 39–50. https://doi.org/10.1300/J233v05n01_03

Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard University Press.

Bronfenbrenner, U. (1994). Ecological models of human development. In International Encyclopedia of Education (Vol. 3, 2nd ed.). Oxford: Elsevier.

Buehler, C., Krishnakumar, A., Stone, G., Anthony, C., Pemberton, S., Gerard, J., & Barber, B. K. (1998). Interparental Conflict Styles and Youth Problem Behaviors: A Two-Sample Replication Study. *Journal of Marriage and the Family*, *60*(1), 119. https://doi.org/10.2307/353446

Burgess, E. W., & Locke, H. S. (1945). *The family: From institution to companionship*. New York, NY: American.

Burt, S. A. (2009). Rethinking environmental contributions to child and adolescent psychopathology: A meta-analysis of shared environmental influences. *Psychological Bulletin, 135*(4), 608–637. https://doi.org/10.1037/a0015702

Burt, S. A., & Klump, K. L. (2014). Parent-child conflict as an etiological moderator of childhood conduct problems: an example of a 'bioecological' gene-environment interaction. *Psychological medicine*, *44*(5), 1065–1076. https://doi.org/10.1017/S0033291713001190

Button TM, Lau JY, Maughan B, Eley TC. Parental punitive discipline, negative life events and gene-environment interplay in the development of externalizing behavior. *Psychol Med.* 2008;38(1):29–39.

Cahill, K. M., Updegraff, K. A., Causadias, J. M., & Korous, K. M. (2021). Familism values and adjustment among Hispanic/Latino individuals: A systematic review and meta-analysis. *Psychological Bulletin*, *147*(9), 947.

Carey, G. (1986). Sibling imitation and contrast effects. *Behavior Genetics*, *16*(3), 319–341. https://doi.org/10.1007/BF01071314

Causadias, J. M. (2013). A roadmap for the integration of culture into developmental psychopathology. *Development and Psychopathology*, *25*(4pt2), 1375–1398. https://doi.org/10.1017/S0954579413000679

Causadias, J. M., & Korous, K. M. (2017). How Are Genes Related to Culture? An Introduction to the Field of Cultural Genomics. In J. M. Causadias, E. H. Telzer, & N. A. Gonzales (Eds.), *The Handbook of Culture and Biology* (pp. 151–177). John Wiley & Sons, Inc. https://doi.org/10.1002/9781119181361.ch7

Cheung, A. K., Harden, K. P., & Tucker-Drob, E. M. (2014). Gene×Environment interactions in early externalizing behaviors: parental emotional support and socioeconomic context as moderators of genetic influences? *Behavior Genetics*, *44*(5), 468–486. https://doi.org/10.1007/s10519-014-9664-8

Christophe, N. K., & Stein, G. L. (2022). Facilitating the Study of Familism Across Racial/Ethnic Groups: Creation of the Short Attitudinal Familism Scale. *Journal of Family Psychology*, *36*(4), 534–544. https://doi.org/10.1037/fam0000954

Coll, C. G., Lamberty, G., Jenkins, R., McAdoo, H. P., Crnic, K., Wasik, B. H., & Garcia, H. V. (1996). An Integrative Model for the Study of Developmental Competencies in Minority Children. *Child Development*, *67*(5), 1891. https://doi.org/10.2307/1131600

Connor, D. F., Ford, J. D., Albert, D. B., & Doerfler, L. A. (2007). Conduct disorder subtype and comorbidity. *Annals of Clinical Psychiatry : Official Journal of the American Academy of Clinical Psychiatrists*, *19*(3), 161–168. https://doi.org/10.1080/10401230701465269

Davies, P. T., & Cummings, E. M. (1994). Marital conflict and child adjustment: An emotional security hypothesis. *Psychological Bulletin, 116*(3), 387–411. https://doi.org/10.1037/0033-2909.116.3.387

de Domanico, Y. B., Crawford, I., & De Wolfe, A. S. (1994). Ethnic identity and self-concept in Mexican-American adolescents: Is bicultural identity related to stress or better adjustment? *Child and Youth Care Forum*, *23*(3), 197–206. https://doi.org/10.1007/BF02209228

Dick, D. M. (2011). Gene-environment interaction in psychological traits and disorders. *Annual Review of Clinical Psychology*, *7*, 383–409. https://doi.org/10.1146/annurev-clinpsy-032210-104518

Dick, D. M., Barr, P., Guy, M., Nasim, A., & Scott, D. (2017). Review: Genetic research on alcohol use outcomes in African American populations: A review of the literature, associated challenges, and implications: Alcohol Use Outcomes in African Americans. *The American Journal on Addictions*, *26*(5), 486–493. https://doi.org/10.1111/ajad.12495

Dick, D. M., Viken, R. J., Kaprio, J., Pulkkinen, L., & Rose, R. J. (2005). Understanding the covariation among childhood externalizing symptoms: genetic and environmental influences on conduct disorder, attention deficit hyperactivity disorder, and oppositional defiant disorder symptoms. *Journal of Abnormal Child Psychology*, *33*(2), 219–229. https://doi.org/10.1007/S10802-005-1829-8

Donenberg, G., & Baker, B. L. (1993). The Impact of Young Children with Externalizing Behaviors on Their Families Families and Residential Placement View project Phat Life View project SEE PROFILE. *Article in Journal of Abnormal Child Psychology*. https://doi.org/10.1007/BF00911315

El-Sheikh, M., & Elmore-Staton, L. (2004). The link between marital conflict and child adjustment: Parent-child conflict and perceived attachments as mediators, potentiators, and mitigators of risk. *Development and Psychopathology*, *16*(3), 631–648. https://doi.org/http://dx.doi.org/10.1017/S0954579404004705

Farrington D. P. (1989). Early predictors of adolescent aggression and adult violence. *Violence and victims*, *4*(2), 79–100.

Feinberg, M. E., Button, T. M. M., Neiderhiser, J. M., Reiss, D., & Hetherington, E. M. (2007). Parenting and Adolescent Antisocial Behavior and Depression. *Archives of General Psychiatry*, *64*(4), 457. https://doi.org/10.1001/archpsyc.64.4.457

Flores, S. M., Salum, G. A., & Manfro, G. G. (2014). Dysfunctional family environments and childhood psychopathology: The role of psychiatric comorbidity. *Trends in Psychiatry and Psychotherapy*, *36*(3), 147–151. https://doi.org/http://dx.doi.org/10.1590/2237-6089-2014-0003

Fomby, P., & Bosick, S. J. (2013). Family Instability and the Transition to Adulthood: Family Instability and the Transition to Adulthood. *Journal of Marriage and Family*, *75*(5), 1266–1287. https://doi.org/10.1111/jomf.12063

Formoso, D., Gonzales, N. A., & Aiken, L. S. (2000). Family Conflict and Children's Internalizing and Externalizing Behavior: Protective Factors. *American Journal of Community Psychology*, *28*(2), 175–199. https://doi.org/10.1023/A:1005135217449

Garavan, H., Bartsch, H., Conway, K., Decastro, A., Goldstein, R. Z., Heeringa, S., Jernigan, T., Potter, A., Thompson, W., & Zahs, D. (2018). Recruiting the ABCD sample: Design considerations and procedures. *Developmental Cognitive Neuroscience*, *32*, 16–22. https://doi.org/10.1016/j.dcn.2018.04.004

Germán, M., Gonzales, N. A., & Dumka, L. (2009). Familism Values as a Protective Factor for Mexican-origin Adolescents Exposed to Deviant Peers. *The Journal of early adolescence*, *29*(1), 16–42. https://doi.org/10.1177/0272431608324475

Goagoses, N., & Schipper, N. (2021). Concurrent associations between parenting dimensions, callous-unemotional traits, and externalizing behaviour problems during adolescence. *Emotional & Behavioural Difficulties*, *26*(3), 293–305. https://doi.org/http://dx.doi.org/10.1080/13632752.2021.1979316

Goldner, J. S., Quimby, D., Richards, M. H., Zakaryan, A., Miller, S., Dickson, D., & Chilson, J. (2016). Relations of parenting to adolescent externalizing and internalizing distress moderated by perception of neighborhood danger. *Journal of Clinical Child and Adolescent Psychology*, *45*(2), 141–154. https://doi.org/http://dx.doi.org/10.1080/15374416.2014.958838

Gonzalez, R., Thompson, E. L., Sanchez, M., Morris, A., Gonzalez, M. R., Feldstein Ewing, S. W., Mason, M. J., Arroyo, J., Howlett, K., Tapert, S. F., & Zucker, R. A. (2021). An update on the assessment of culture and environment in the ABCD Study®: Emerging literature and protocol updates over three measurement waves. *Developmental Cognitive Neuroscience*, *52*, 101021. https://doi.org/10.1016/j.dcn.2021.101021

Gottlieb G. (2007). Probabilistic epigenesis. *Developmental science*, *10*(1), 1–11. https://doi.org/10.1111/j.1467-7687.2007.00556.x

Greszta, E., & Siemińska, M. J. (2011). Patient-Perceived Changes in the System of Values After Cancer Diagnosis. *Journal of Clinical Psychology in Medical Settings*, *18*(1), 55–64. https://doi.org/10.1007/s10880-011-9221-z

Helland, M. S., Kjeldsen, A., von Soest, T., Røysamb, E., Gustavson, K., & Nilsen, W. (2017). Parental child-rearing conflicts through adolescence: Trajectories and associations with child characteristics and externalizing patterns. *Journal of Research on Adolescence*, *27*(2), 379–391. https://doi.org/http://dx.doi.org/10.1111/jora.12302

Heller, P. L. (1970). Familism scale: A measure of family solidarity. *Journal of Marriage and the Family*, 73-80.

Heller, P. L. (1976). Familism Scale: Revalidation and Revision. *Journal of Marriage and the Family*, *38*(3), 423. https://doi.org/10.2307/350410

Hernández, M. M., & Bámaca-Colbert, M. Y. (2016). A Behavioral Process Model of Familism. *Journal of family theory & review*, *8*(4), 463–483. https://doi.org/10.1111/jftr.12166

Hinshaw S. P. (1987). On the distinction between attentional deficits/hyperactivity and conduct problems/aggression in child psychopathology. *Psychological bulletin*, *101*(3), 443–463.

IBM Corp. (2020). IBM SPSS Statistics for Windows (Version 27.0) [Computer software]. IBM Corp.

Kang, S., Gair, S. L., Paton, M. J., & Harvey, E. A. (2022). Racial and Ethnic Differences in the Relation Between Parenting and Preschoolers' Externalizing Behaviors. *Early Education and Development*, *00*(00), 1–19. https://doi.org/10.1080/10409289.2022.2074202

Kendler, K. S., Prescott, C. A., Myers, J., & Neale, M. C. (2003). The Structure of Genetic and Environmental Risk Factors for Common Psychiatric and Substance Use Disorders in Men and Women. *Archives of General Psychiatry*, *60*(9), 929–937. https://doi.org/10.1001/ARCHPSYC.60.9.929

Kerr, B., & Erb, C. (1991). Career counseling with academically talented students: Effects of a value-based intervention. *Journal of Counseling Psychology, 38*(3), 309–314. https://doi.org/10.1037/0022-0167.38.3.309

King, S. M., Iacono, W. G., & McGue, M. (2004). Childhood externalizing and internalizing psychopathology in the prediction of early substance use. *Addiction*, *99*(12), 1548–1559. https://doi.org/10.1111/J.1360-0443.2004.00893.X

Knight, G. P., Gonzales, N. A., Saenz, D. S., Bonds, D. D., Germán, M., Deardorff, J., Roosav, M. W., & Updegraff, K. A. (2010). The Mexican American Cultural Values Scale for Adolescents and Adults. *The Journal of Early Adolescence, 30*(3), 444–481. https://doi.org/10.1177/0272431609338178

Kochanova, K., Pittman, L. D., & Pabis, J. M. (2021). Parenting stress, parenting, and adolescent externalizing problems. *Journal of Child and Family Studies, 30*(9), 2141–2154. https://doi.org/http://dx.doi.org/10.1007/s10826-021-01996-2

Krueger, R. F., Hicks, B. M., Patrick, C. J., Carlson, S. R., Iacono, W. G., & McGue, M. (2002). Etiologic connections among substance dependence, antisocial behavior and personality: Modeling the externalizing spectrum. *Journal of Abnormal Psychology, 111*(3), 411–424. https://doi.org/10.1037/0021-843X.111.3.411

Lansford, J.E. (2022), Annual Research Review: Cross-cultural similarities and differences in parenting. J Child Psychol Psychiatr, 63: 466-479. https://doi.org/10.1111/jcpp.13539

Laursen, B., & Collins, W. (2009). Parent—Child Relationships During Adolescence. In *Handbook of adolescent psychology* (Vol. 2). https://doi.org/10.1002/9780470479193.adlpsy002002

Li, M., Johnson, S. B., Musci, R. J., & Riley, A. W. (2017). Perceived neighborhood quality, family processes, and trajectories of child and adolescent externalizing behaviors in the United States. *Social Science & Medicine*, *192*, 152-161.

Lindahl, K. M., & Malik, N. M. (1999). Marital conflict, family processes, and boys' externalizing behavior in Hispanic American and European American families. *Journal of clinical child psychology, 28*(1), 12–24. https://doi.org/10.1207/s15374424jccp2801_2

Liu J. (2004). Childhood externalizing behavior: theory and implications. Journal of child and adolescent psychiatric nursing : official publication of the Association of Child and Adolescent Psychiatric Nurses, Inc, 17(3), 93–103. https://doi.org/10.1111/j.1744-6171.2004.tb00003.x

Lopez-Tamayo, R., Robinson, W. L., Lambert, S. F., Jason, L. A., & Ialongo, N. S. (2016). Parental monitoring, association with externalized behavior, and academic outcomes in urban African-American youth: A moderated mediation analysis. *American Journal of Community Psychology, 57*(3–4), 366–379. https://doi.org/http://dx.doi.org/10.1002/ajcp.12056

Lorenzo-Blanco, E.I., Unger, J.B., Baezconde-Garbanati, L., Ritt-Olson, A., & Soto, D.W. (2012). Acculturation, Enculturation, and Symptoms of Depression in Hispanic Youth: The Roles of Gender, Hispanic Cultural Values, and Family Functioning. *Journal of Youth and Adolescence, 41*, 1350-1365.

Lynch, S. J., Sunderland, M., Newton, N. C., & Chapman, C. (2021). A systematic review of transdiagnostic risk and protective factors for general and specific psychopathology in young people. *Clinical Psychology Review*, *87*, 102036. https://doi.org/10.1016/j.cpr.2021.102036

Maes, H. H. M., Lapato, D. M., Schmitt, J. E., Luciana, M., Banich, M. T., Bjork, J. M., Hewitt, J. K., Madden, P. A., Heath, A. C., Barch, D. M., Thompson, W. K., Iacono, W. G., & Neale, M. C. (2022). Genetic and Environmental Variation in Continuous Phenotypes in the ABCD Study®. *Behavior Genetics*, *0123456789*. https://doi.org/10.1007/s10519-022-10123-w

Marceau, K., Rolan, E., Leve, L. D., Ganiban, J. M., Reiss, D., Shaw, D. S., Natsuaki, M. N., Egger, H. L., & Neiderhiser, J. M. (2019). Parenting and prenatal risk as moderators of genetic influences on conduct problems during middle childhood. *Developmental Psychology*, *55*(6), 1164–1181. https://doi.org/http://dx.doi.org/10.1037/dev0000701

McLoyd, V. C., Cauce, A. M., Takeuchi, D., & Wayne, L. W. (2000). Marital processes and parental socialization in families of color: A decade review of research. *Journal of Marriage and Family*, *62*(4), 1070–1093. https://doi.org/10.1111/j.1741-3737.2000.01070.x

McNeilly, E. A., Peverill, M., Jung, J., & McLaughlin, K. A. (2021). Executive function as a mechanism linking socioeconomic status to internalizing and externalizing psychopathology in children and adolescents. *Journal of Adolescence*, *89*(1), 149–160. https://doi.org/10.1016/j.adolescence.2021.04.010

Meltzer, H., Ford, T., Goodman, R., & Vostanis, P. (2011). The Burden of Caring for Children with Emotional or Conduct Disorders. *International Journal of Family Medicine, 2011*. https://doi.org/10.1155/2011/801203

Mendle, J. (2014). Why Puberty Matters for Psychopathology. *Child Development Perspectives*, *8*(4), 218–222. https://doi.org/10.1111/cdep.12092

Meysamie, A., Ghalehtaki, R., Ghazanfari, A., Daneshvar-Fard, M., & Mohammadi, M. R. (2013). Prevalence and Associated Factors of Physical, Verbal and Relational Aggression among Iranian Preschoolers. *Iranian journal of psychiatry*, *8*(3), 138–144.

Moffitt T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: a developmental taxonomy. *Psychological review*, *100*(4), 674–701.

Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Development and Psychopathology*, *13*(2), 355–372. https://doi.org/10.1017/S0954579401002097

Moffitt, T. E., Caspi, A., Harrington, H., & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited antisocial pathways: follow-up at age 26 years. *Development and Psychopathology*, *14*(1), 179–207. https://doi.org/10.1017/S0954579402001104

Mohammadi, M. R., Salmanian, M., & Keshavarzi, Z. (2021). The Global Prevalence of Conduct Disorder: A Systematic Review and Meta-Analysis. *Iranian journal of psychiatry*, *16*(2), 205–225. https://doi.org/10.18502/ijps.v16i2.5822

Monroe, S. M., & Simons, A. D. (1991). Diathesis-stress theories in the context of life stress research: Implications for the depressive disorders. *Psychological Bulletin, 110*(3), 406–425. https://doi.org/10.1037/0033-2909.110.3.406

Moos, R. H., & Moos, B. S. (1976). A Typology of Family Social Environments. *Family Process*, *15*(4), 357–371. https://doi.org/10.1111/j.1545-5300.1976.00357.x

Murphy, Jr., E. F., Gordon, J. D., & Mullen, A. (2004). A Preliminary Study Exploring the Value Changes Taking Place in the United States since the September 11, 2001 Terrorist Attack on the World Trade Center in New York. *Journal of Business Ethics*, *50*(1), 81–96. https://doi.org/10.1023/B:BUSI.0000020879.93654.86

Neale M. C., Maes H. M. Methodology for Genetic Studies of Twins and Families. 2004 Retrieved March 2, 2004, http://www.vipbg.vcu.edu/~vipbg/ mx/book2004a.pdf.

Niv, S., Tuvblad, C., Raine, A., & Baker, L. A. (2013). Aggression and Rule-breaking: Heritability and stability of antisocial behavior problems in childhood and adolescence. *Journal of Criminal Justice*, *41*(5), 285–291. https://doi.org/10.1016/J.JCRIMJUS.2013.06.014

Owens, E. B., & Shaw, D. S. (2003). Predicting growth curves of externalizing behavior across the preschool years. *Journal of Abnormal Child Psychology*, *31*(6), 575–590. https://doi.org/http://dx.doi.org/10.1023/A:1026254005632

Pachter, L. M., Auinger, P., Palmer, R., & Weitzman, M. (2006). Do parenting and the home environment, maternal depression, neighborhood, and chronic poverty

affect child behavioral problems differently in different racial-ethnic groups? *Pediatrics*, *117*(4), 1329–1338. https://doi.org/10.1542/peds.2005-1784

Patterson, G. R., Reid, J. B., & Dishion, T. J. (1998). Antisocial boys. In J. M. Jenkins, K. Oatley, & N. L. Stein (Eds.), *Human emotions: A reader* (pp. 330–336). Blackwell Publishing. (Reprinted from G. R. Patterson et al, "Antisocial Boys," Eugene, OR: Castalia, 1992, pp. 10–14)

Pennington, B. F., McGrath, L. M., Rosenberg, J., Barnard, H., Smith, S. D., Willcutt, E. G., Friend, A., Defries, J. C., & Olson, R. K. (2009). Gene X environment interactions in reading disability and attention-deficit/hyperactivity disorder. *Developmental psychology*, *45*(1), 77–89. https://doi.org/10.1037/a0014549

Pereyra, S. B., & Bean, R. A. (2017). Latino adolescent substance use: A mediating model of inter-parental conflict, deviant peer associations, and parenting. *Children and Youth Services Review*, *76*, 154–162. https://doi.org/http://dx.doi.org/10.1016/j.childyouth.2017.03.001

Pettit, G. S., Bates, J. E., Dodge, K. A., & Meece, D. W. (1999). The impact of after-school peer contact on early adolescent externalizing problems is moderated by parental monitoring, perceived neighborhood safety, and prior adjustment. *Child Development*, *70*(3), 768–778. https://doi.org/http://dx.doi.org/10.1111/1467-8624.00055

Pettit, G.S., Arsiwalla, D.D. Commentary on Special Section on "Bidirectional Parent–Child Relationships": The Continuing Evolution of Dynamic, Transactional Models of Parenting and Youth Behavior Problems. *J Abnorm Child Psychol* **36**, 711–718 (2008). https://doi.org/10.1007/s10802-008-9242-8

Pinquart, M. (2017). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental Psychology*, *53*(5), 873–932. https://doi.org/10.1037/dev0000295

Popejoy, A. B., & Fullerton, S. M. (2016). Genomics is failing on diversity. *Nature*, *538*(7624), 161–164. https://doi.org/10.1038/538161a

Purcell, S. (2002). *Variance Components Models for Gene–Environment Interaction in Twin Analysis*.

Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review*, *41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Putnick, D. L., Bornstein, M. H., Lansford, J. E., Malone, P. S., Pastorelli, C., Skinner, A. T., Sorbring, E., Tapanya, S., Tirado, L. M. U., Zelli, A., Alampay, L. P., Al-Hassan, S. M., Bacchini, D., Bombi, A. S., Chang, L., Deater-Deckard, K., Di Giunta, L., Dodge, K. A., & Oburu, P. (2015). Perceived mother and father acceptance-rejection predict four unique aspects of child adjustment across nine countries. *Journal of Child Psychology and Psychiatry*, *56*(8), 923–932. https://doi.org/http://dx.doi.org/10.1111/jcpp.12366

Rabinowitz, J. A., Drabick, D. A. G., & Reynolds, M. D. (2016). Family conflict moderates the relation between negative mood and youth internalizing and externalizing symptoms. *Journal of Child and Family Studies*, *25*(12), 3574–3583. https://doi.org/http://dx.doi.org/10.1007/s10826-016-0501-y

Raine A. (2002). Biosocial studies of antisocial and violent behavior in children and adults: a review. *Journal of abnormal child psychology*, *30*(4), 311–326. https://doi.org/10.1023/a:1015754122318

Ramphal, B., Whalen, D. J., Kenley, J. K., Yu, Q., Smyser, C. D., Rogers, C. E., & Sylvester, C. M. (2020). Brain connectivity and socioeconomic status at birth and externalizing symptoms at age 2 years. *Developmental Cognitive Neuroscience*, *45*, 100811. https://doi.org/10.1016/j.dcn.2020.100811

Rea-Sandin, G. (2022). *Novel Measures of Culture and Their Relation to Self-Regulation in Middle Childhood: A Genetically Informed Twin Study* (Order No. 29064484). Available from Dissertations & Theses @ Arizona State University; ProQuest Dissertations & Theses Global. (2665563475). http://login.ezproxy1.lib.asu.edu/login?url=https://www.proquest.com/dissertations-theses/novel-measures-culture-their-relation-self/docview/2665563475/se-2

Reid, J. B., & Patterson, G. R. (1989). The development of antisocial behaviour patterns in childhood and adolescence. *European Journal of Personality*, *3*(2), 107–119. https://doi.org/10.1002/per.2410030205

Rohner, R. P., & Rohner, E. C. (1981). University of Pittsburgh-Of the Commonwealth System of Higher Education Parental Acceptance-Rejection and Parental Control: Cross-Cultural Codes. *Source: Ethnology*, *20*(3), 245–260.

Rothenberg, W. A., Lansford, J. E., Bornstein, M. H., Chang, L., Deater-Deckard, K., Di Giunta, L., Dodge, K. A., Malone, P. S., Oburu, P., Pastorelli, C., Skinner, A. T., Sorbring, E., Steinberg, L., Tapanya, S., Uribe Tirado, L. M., Yotanyamaneewong, S., Alampay, L. P., Al-Hassan, S. M., & Bacchini, D. (2020). Effects of Parental Warmth and Behavioral Control on Adolescent Externalizing and Internalizing Trajectories Across Cultures. *Journal of Research on Adolescence*, *30*(4), 835–855. https://doi.org/10.1111/jora.12566

Ruiz-Hernández, J. A., Moral-Zafra, E., Llor-Esteban, B., & Jiménez-Barbero, J. A. (2019). Influence of parental styles and other psychosocial variables on the development of externalizing behaviors in adolescents: A sytematic review. *European Journal of Psychology Applied to Legal Context*, *11*(1), 9–21. https://doi.org/10.5093/EJPALC2018A11

Sabogal, F., Marín, G., Otero-Sabogal, R., VanOss Marín, B., & Perez-Stable, E. (1987). Hispanic familism and acculturation: What changes and what doesn't? *Hispanic Journal of Behavioral Sci- ences, 9,* 397–412.

Samek, D. R., Hicks, B. M., Keyes, M. A., Bailey, J., McGue, M., & Iacono, W. G. (2015). Gene-environment interplay between parent-child relationship problems and externalizing disorders in adolescence and young adulthood. *Psychological medicine*, *45*(2), 333–344. https://doi.org/10.1017/S0033291714001445

Schaefer, E. S. (1965). Children's reports of parental behavior: An inventory. *Child Development, 36*(2), 413–424. https://doi.org/10.2307/1126465

Schermerhorn, A. C., D'Onofrio, B. M., Turkheimer, E., Ganiban, J. M., Spotts, E. L., Lichtenstein, P., Reiss, D., & Neiderhiser, J. M. (2011). A genetically informed study of associations between family functioning and child psychosocial adjustment. *Developmental Psychology*, *47*(3), 707–725. https://doi.org/http://dx.doi.org/10.1037/a0021362

Schludermann, S., & Schludermann, E. (1988). Questionnaire for children and youth (CRPBI-30). *Unpublished manuscript, University of Manitoba, Winnipeg*.

Schwartz, S. J. (2007). The applicability of familism to diverse ethnic groups: A preliminary study. *Journal of Social Psychology*, *147*(2), 101–118. https://doi.org/10.3200/SOCP.147.2.101-118

Shanahan, M. J., & Hofer, S. M. (2005). Social context in gene-environment interactions: retrospect and prospect. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *60 Spec No*(SPEC. ISS.), 65–76. https://doi.org/10.1093/GERONB/60.SPECIAL_ISSUE_1.65

Skeer, M., McCormick, M. C., Normand, S.-L. T., Buka, S. L., & Gilman, S. E. (2009). A prospective study of familial conflict, psychological stress, and the development of substance use disorders in adolescence. *Drug and Alcohol Dependence*, *104*(1–2), 65–72. https://doi.org/http://dx.doi.org/10.1016/j.drugalcdep.2009.03.017

Smart, J. F., & Smart, D. W. (1995). Acculturative Stress: The Experience of the Hispanic Immigrant. *The Counseling Psychologist*, *23*(1), 25–42. https://doi.org/10.1177/0011000095231003

Smith, E. P., Witherspoon, D. P., Bhargava, S., & Bermudez, J. M. (2019). Cultural Values and Behavior among African American and European American Children. *Journal of Child and Family Studies*, *28*(5), 1236–1249. https://doi.org/10.1007/s10826-019-01367-y

Soli, A. R., McHale, S. M., & Feinberg, M. E. (2009). Risk and protective effects of sibling relationships among African American adolescents. *Family Relations*, *58*(5), 578–592. https://doi.org/10.1111/j.1741-3729.2009.00576.x

Stattin, H., & Kerr, M. (2000). Parental monitoring: a reinterpretation. *Child development*, *71*(4), 1072–1085. https://doi.org/10.1111/1467-8624.00210

Stormont, M. (2016). Family Factors Associated with Externalizing Disorders in Preschoolers:*Http://Dx.Doi.Org/10.1177/105381519802100305*, *21*(3), 232–251. https://doi.org/10.1177/105381519802100305

Thompson, R., Kim, J., Litrownik, A. J., Briggs, E. C., Hussey, J. M., English, D. J., & Dubowitz, H. (2011). Early Adolescent Risk Behavior Outcomes of Childhood Externalizing Behavioral Trajectories. The Journal of Early Adolescence, 31(2), 234–257. https://doi.org/10.1177/0272431609361203

Timmermans, M., Van Lier, P. A. C., & Koot, H. M. (2008). Which forms of child/adolescent externalizing behaviors account for late adolescent risky sexual behavior and substance use? *Journal of Child Psychology and Psychiatry*, *49*(4), 386–394. https://doi.org/10.1111/J.1469-7610.2007.01842.X

Tucker-Drob, E. M., & Bates, T. C. (2016). Large Cross-National Differences in Gene × Socioeconomic Status Interaction on Intelligence. Psychological Science, 27(2), 138–149. https://doi.org/10.1177/0956797615612727

Tuvblad, C., Zheng, M., Raine, A., & Baker, L. A. (2009). A common genetic factor explains the covariation among ADHD ODD and CD symptoms in 9–10 year old boys and girls. *Journal of Abnormal Child Psychology*, *37*(2), 153. https://doi.org/10.1007/S10802-008-9278-9

Ucus, S., Garcia, A., Esteraich, J., & Raikes, H. (2019). Predictors and behavioural outcomes of parental involvement among low-income families in elementary schools, United States. *Early Child Development and Care*, *189*(9), 1425–1443. https://doi.org/http://dx.doi.org/10.1080/03004430.2017.1385609

Van Loon, L. M. A., Van de Ven, M. O. M., Van Doesum, K. T. M., Witteman, C. L. M., & Hosman, C. M. H. (2014). The relation between parental mental illness and adolescent mental health: The role of family factors. *Journal of Child and Family Studies*, *23*(7), 1201–1214. https://doi.org/http://dx.doi.org/10.1007/s10826-013-9781-7

Williams, D. R., Mohammed, S. A., Leavell, J., & Collins, C. (2010). Race, socioeconomic status, and health: Complexities, ongoing challenges, and research opportunities: Race, SES, and health. *Annals of the New York Academy of Sciences*, *1186*(1), 69–101. https://doi.org/10.1111/j.1749-6632.2009.05339.x

Yamada, S., Pepler, D., Jiang, D., Cappadocia, M. C., Craig, W., & Connolly, J. (2016). Developmental trajectories of adolescent substance use. *Journal of Child & Adolescent Substance Abuse*, *25*(1), 33–48. https://doi.org/http://dx.doi.org/10.1080/1067828X.2014.884482

Yildirim, E. D., & Roopnarine, J. L. (2015). The mediating role of maternal warmth in the associations between harsh parental practices and externalizing and internalizing behaviors in Hispanic American, African American, and European American families. *Cultural Diversity and Ethnic Minority Psychology*, *21*(3), 430–439. https://doi.org/10.1037/a0038210

Zeiders, K. H., Updegraff, K. A., Umaña-Taylor, A. J., McHale, S. M., & Padilla, J. (2016). Familism Values, Family Time, and Mexican-Origin Young Adults' Depressive Symptoms. *Journal of marriage and the family*, *78*(1), 91–106. https://doi.org/10.1111/jomf.12248

APPENDIX A

SUPPLEMENTAL TABLES

Supplemental Table 1

Parental Nativity Status

		% born in US
Hispanic Sample	All ABCD	36%
	Twins	62%
Black Sample	All ABCD	50%
	Twins	44%
White Sample	All ABCD	62%
	Twins	75%

Supplemental Table 2

Predicting Externalizing Behaviors from Familism Composite with the Full ABCD Hispanic Sample

Predictor	β	SE	*p*
Age	-.05	.02	.02
Sex	-.12	.02	<.001
Par Edu	.04	.03	.13
Fam income	-.12	.03	<.001
Comp Familism	-.01	.02	.60

Note. Full ABCD Hispanic Sample (n = 2410); β: standardized coefficient; SE: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for.

Supplemental Table 3

Predicting Externalizing Behaviors from Familism Support with the Full ABCD Hispanic Sample

Predictors	β	SE	*p*
Age	-.05	.02	.01
Sex	-.12	.02	<.001
Par Edu	.04	.04	.14
Fam income	-.11	.03	<.001
Familism Support	-.03	.02	.22

Note. Full ABCD Hispanic Sample (n = 2410); β: standardized coefficient; SE: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for.

Supplemental Table 4

Parental Report of the Child's Hispanic/Latin American Group

Group	n	%
Puerto Rican	10	6.6%
Dominican Republic	2	1.3%
Mexican	30	19.9%
Mexican American	61	40.4%
Chicano	1	.7%
Central or South American	20	13.2%
Other Latin American	2	1.3%
Other Hispanic	21	13.9%
Don't Know	4	2.6%
No Answer	1	.7%

Supplemental Table 5

Predicting Externalizing Behaviors from Composite Familism Squared

	White Sample (n= 1023)			Hispanic Sample (n=152)			Black/African American Sample (n=220)		
	β	SE	*p*	β	SE	*p*	β	SE	*p*
Age	-.02	.04	.60	-.18	.09	.06	.08	.07	.25
Sex	-.13	.04	<.001	-.01	.10	.92	-.13	.09	.13
Par Edu	.07	.04	.10	.17	.11	.17	-.10	.12	.42
Fam income	-.28	.06	<.001	-.33	.15	.03	-.19	.10	.09
Comp Fam	.22	.32	.47	.88	.83	.27	-1.04	1.53	.50
Comp Fam Squared	-.26	.32	.42	-.70	.87	.40	.85	1.48	.57

Note. β: standardized coefficient; SE: standard error; *p*: p-value; If p-values found were between .001 and .004, they are reported here as .00. Site and family clustering were accounted for.