Trajectories of Family Instability and Disruptive Behaviors Across Early Childhood: A Prospective Study of At-Risk Families

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Abstract

Economically marginalized families are at a particularly high risk to experience instability in the form of residential mobility, family structure instability, and incarceration of parenting figures. Previous research has linked instability in early childhood to later behavior problems, but little is known about the longitudinal relationship between instability and behavior problems. The present study uses data from 731 families recruited to be at high risk for child behavior problems on the basis of socioeconomic disadvantage, family problems, and child behaviors. Parents reported on residential mobility, family structure instability, incarceration of adults in the home, and child behavior problems at child age 2, 3, 4, 5, and 7.5. A bivariate growth curve model was fit to model the growth of instability and externalizing behaviors. Both instability and externalizing behaviors were found to decline over time. However, instability between birth and 2 predicted higher levels of externalizing behaviors at age 2 and the change in instability over time positively predicted the change in externalizing behaviors over time. The findings from the present study have implications for mental health professionals seeking to intervene on behavior problems at the family level as well as policy makers who are making decisions at the community level.

John Watson famously declared, “Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I’ll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors” (Watson, 1924). While research over the past century has demonstrated that individual factors (i.e., genetic predispositions) play a large role in the development of human behavior (Caspi et al., 2002; Devlin, Daniels, & Roeder, 1997; Eaves et al., 2000), researchers continue to recognize the important contributions from the environment (Jaffee, Hanscombe, Haworth, Davis, & Plomin, 2012; Turkheimer, Haley, Waldron, D’Onofrio, & Gottesman, 2003) on behavior development.

Environmental features, such as predictability and a sense of order, have been found to promote positive child development, and are inherently lacking in highly chaotic homes (Bradley et al., 1989; Evans & Waches, 2010). For example, Rosenblum and Paully (1984) subjected macaque mother-infant dyads to either stable or varying feeding locations within their environments. Macaque mothers in the variable environment showed poorer parenting behaviors toward their infants and infants in the variable environments were more insecurely attached to their mothers, relative to mother-infant dyads raised in stable environments (Rosenblum & Paully, 1984). Researchers have also demonstrated deleterious effects of environmental instability in human development. In the cognitive development literature, for example, household chaos has been linked to deficits in cognitive development including low academic achievement (Bradley & Caldwell, 1976) and poor inhibitory control (Brown, Ackerman, & Moore, 2013). Poor academic achievement and deficits in inhibitory control have been associated with the development of externalizing behaviors (Hardaway, Wilson, Shaw, &

Dishion, 2011). Similarly, unpredictability in household routines and rules was found to mediate the association between a family's income-to-needs ratio and children's psychological distress four years later, indicating that high levels of environmental instability may explain associations between poverty and maladaptive psychological outcomes in children (Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005).

Children commonly experience events such as residential mobility or family structure instability, which may contribute to the disruption of routines within a house. While isolated instances of instability in the context of an otherwise stable environment are thought to have minimal impact on child development (Tiesler et al., 2013), chronic, high levels of instability have consistently been associated with maladaptive behavioral (D'Onofrio et al., 2005; Fomby & Cherlin, 2007), emotional (Rumbold et al., 2012), and cognitive (Bradley & Caldwell, 1976; Jaffee et al., 2012) outcomes. Census data and other research suggests that low-socioeconomic status (SES) families experience more frequent residential (U.S. Census Bureau, 2017) and family structure instability (Cooper, McLanahan, Meadows, & Brooks-Gunn, 2009), suggesting that socioeconomic disadvantage may elevate the risk for instability as a way of life. Moreover, the effects of instability may be especially pronounced in low-SES families, who have fewer resources to buffer the stressors associated with chronic instability.

In addition to residential mobility and family structure instability, some families experience more severe forms of disruption, such as the incarceration of a primary caregiver (PC). Such events may occur unexpectedly and cause serious disruption within the family system (Dallaire, 2007; Hagan & Dinovitzer, 1999). Similar to residential mobility and family structure instability, low-SES families and minority parents are at an elevated likelihood to be incarcerated (Mauer & King, 2007) increasing the likelihood that a child born into a low-SES, minority home

will experience instability in their environment. The purpose of this study is to explore longitudinal associations between environmental instability and disruptive behaviors across the first seven years of life among a large sample of racially diverse, low-SES parent-child dyads.

Residential Mobility and Child Development

Estimates from the US Census Bureau suggest that approximately 17.4% of families living below the poverty line moved between 2016 and 2017 compared to only 9.8% of families living above 150% of the poverty line (U.S. Census Bureau, 2017), indicating that while residential mobility is common for all American youth, families living in poverty are particularly mobile. In addition to mobility being more common for low-SES families, the nature of moves tends to be different for poor versus wealthy families (Fitchen, 1994). Specifically, wealthier families tend to move 'upward' to safer neighborhoods, larger houses, better school districts, or for new career opportunities. Such moves are more likely to be planned so disruption within the household is minimized. Moreover, upward mobility coincides with factors that benefit positive child development (i.e., a better school district, more family income due to a new career opportunity) that may offset temporary disorganization within the household due to the move. However, for economically disadvantaged families, moves tend to be lateral (i.e. to neighborhoods of comparable advantage or disadvantage) or downward (i.e. to more disadvantaged neighborhoods) (Fitchen, 1994), which may exacerbate the disorganization within a household following a move. In addition, relative to wealthier families, poor families are more likely to move for negative reasons (e.g., eviction, neighborhood danger) and tend to move more sporadically (Fitchen, 1994).

A number of researchers have linked higher levels of residential mobility in childhood to poor behavior outcomes (Adam & Chase-Lansdale, 2002; Boynton-Jarrett, Hair, & Zuckerman,

2013; Fowler, Henry, Schoeny, Taylor, & Chavira, 2014; Jellyman & Spencer, 2008). For example, Fowler and colleagues (2014) found residential mobility to positively predict externalizing behaviors in preschoolers (ages 4-6) and adolescents (ages 11-14), but not among school-age youth (ages 7-10), suggesting that residential mobility at developmentally sensitive periods is especially harmful. Similarly, residential mobility in the first five years of life has been linked to higher levels of externalizing behaviors at age 10, accounting for the number of residential transitions experienced between ages 5 and 10 and behavior problems at age 5, suggesting that the effects of early residential mobility persist into late childhood (Womack et al., in press).

In addition to moving more frequently, low-SES families are likely to move between neighborhoods of comparable disadvantage, a factor that has been found to exacerbate the effects of mobility (Parente & Mahoney, 2009; Sharkey & Sampson, 2010). For example, among a predominantly low-SES sample, male youth living in a high-crime neighborhood or moving between neighborhoods of comparable disadvantage was associated with higher levels of aggressive behaviors in male youth (Parente & Mahoney, 2009). Additionally, males who moved from average crime neighborhoods to high-crime neighborhoods displayed the highest levels of aggressive behaviors (Parente & Mahoney, 2009). Together, the studies on mobility suggest that 'parallel' mobility between neighborhoods of comparable disadvantage is a moderate risk factor for maladaptive behaviors, while 'downward' mobility amplifies the risk. Considering that low-SES families tend to make parallel or downward moves while high-SES families are more likely to move upward, the negative effective effects of higher rates of residential mobility among economically disadvantaged families may be even more pronounced.

Researchers have proposed several mechanisms by which residential mobility impacts child behavior, which may vary across child development. In early childhood, for example, frequent residential mobility may disrupt the structure of the environment leading to poor cognitive development and deficits in inhibitory control (Schmitt, Finders, & McClelland, 2015) upon school entry and set children on a trajectory of poor academic achievement (Fowler et al., 2015; Voight, Shilnn, & Nation, 2012), which are risk factors for later behavior problems (Eisenberg et al., 2009; Masten et al., 2005). Alternatively, mobility during the school-age years may disrupt peer networks as youth are displaced to new school districts (South & Haynie, 2004). Children who move to new school districts may be prone to affiliate with deviant peers who tend to be more accepting of new individuals into their groups (Haynie & South, 2006). Finally, chronic mobility may disrupt the parent-child relationship as the parent is forced to allocate time and energy to the logistics of moving (Riina, Lippert, & Brooks-Gunn, 2016).

Family Structure Instability and Child Development

While residential mobility can be thought of as disruption of the household as a family moves to different geographic locations, family structure instability represents disruption *within* a household. To date, the literature on family structure instability has predominantly focused on the divorce of two biological parents (see Amato, 2010 for a review). However, estimates suggest that about 40% of children are born into non-marital relationships (Martin et al., 2018), with that number being higher for low-SES families (Kennedy & Bumpass, 2008). Moreover, approximately 50% of children born into non-marital cohabitating relationships experience the dissolution of their parent's relationship by age 9 compared to 20% of children born to married parents (Kennedy & Bumpass, 2008). Given that the youth whose parents separate are at an elevated risk for emotional and behavioral problems (D'Onofrio et al., 2005; Shaw, Winslow, &

Flanagan, 1999), research should include non-marital cohabiting separations along with divorce when assessing family instability. Finally, research on divorce or separation doesn't account for the disruption that a new (marital or non-marital) cohabiting relationship can bring to the home. Children whose parents bring a new cohabiting partner into the household may have to adapt to a new parenting hierarchy, new rules and discipline practices, and new siblings who may come with a cohabiting partner. Therefore, in this manuscript family structure instability accounts for divorce and remarriage as well as separation and initiation of new non-marital cohabiting relationships.

Research generally supports a frequency-based approach toward studying family structure transitions, which emphasized the *number* of transitions the child has experienced rather than conceptualizing family transitions as a binary yes/no variable (Amato, 2010; Capaldi & Patterson, 1991). Such an approach recognizes that any transition in family structure has the potential to lead to more transitions (i.e., a separation can be followed by new cohabitating relationships), which may incrementally lead to poorer child development. Consistent with this perspective, numerous researchers have linked the number of family structure transitions in childhood to maladaptive social development (Cavanagh & Huston, 2008) and behavior problems (Capaldi & Patterson, 1991; Goodnight et al., 2013; Osborne & McLanahan, 2007). Specifically, Capaldi and Patterson (1991) demonstrated a linear relationship between the number of marital transitions and deviant behaviors among a sample of 206 4th grade boys. Similarly, Goodnight and colleagues (2013) found that the number of maternal relationship transitions in the first 5 years of life to have a stronger effect on adolescent antisocial behavior than transitions experienced after the first 5 years of life, accounting for numerous covariates including family income, maternal antisocial behavior, and genetic influences. It should be noted

that transitions after age 5 also contributed independent variance to adolescent antisocial behavior. These results suggest that transitions during multiple developmental periods may be detrimental to child development, and that transitions in early childhood may be particularly impactful.

Parental Incarceration and Child Development

The United States has the largest prison population (2.2 million; Kaeble & Glaze, 2016) and second highest rate of incarceration (698 per 100,000; Walmsley, 2016) in the world. Conservative estimates suggest that approximately 1.7 million American children (2.3% of all American children) had a parent incarcerated in 2007 (Glaze and Maruschak, 2008). Minority children are disproportionately likely to experience the incarceration of a parent with one in 25 White children experiencing the incarceration of a parent by their 14th birthday compared to a staggering one in four Black children (Wildeman, 2009).

Unsurprisingly, a number of researchers have linked parental incarceration to elevated levels of behavior problems in children (Murray, Farrington, & Sekol, 2012). For example, a meta-analysis of 40 studies found that parental incarceration was associated with a large effect on children's antisocial behaviors (Murray et al., 2012). While not addressed in the overwhelming majority of studies, genetic factors likely play a role in the relationship between parental incarceration and later child behavior problems (Crowe, 1974; Ferguson, 2010). Adding to the difficulty understanding the effects of parental incarceration on child development is the fact that the pre-incarceration environment may carry several risk factors (e.g., parental substance use, few economic resources), which are known to contribute to maladaptive child development (Johnson & Easterling, 2012; Miller, 2006).

Despite the difficulty disentangling the effects of genetics and other potentially confounding variables, several rigorous studies have indicated that disruption within the home at least partially explains the association between parental incarceration and later behavior problems (Geller, Cooper, Garfinkel, Schwartz-Soicher, & Mincy, 2012; Murray & Farrington, 2005). For example, Murray and Farrington (2005) found that separation due to incarceration predicted antisocial behaviors in boys only if the incarceration occurred after the child was born. Similarly, using data from the Fragile Families and Wellbeing study, paternal incarceration at age 3 was found to predict behavior problems at age 5, but paternal incarceration at age 5 did not predict behavior problems at age 3 (Geller et al., 2012). The temporal ordering of the effects of incarceration on child behavior development indicates that the effects of incarceration on child development aren't entirely dependent on genetic influences. Interestingly, separation from a caregiver does not explain all of the effects of incarceration on child maladaptive behavior development. Geller and colleagues (2012) found paternal incarceration was found to be a stronger predictor of boy's behavior problems compared to other forms of father absenteeism (e.g., divorce, father report that he 'spends no time' with the child). Thus, some component to parental incarceration appears to influence the development of child behavior problems beyond the effects of separation from caregivers and genetic influences on antisocial behavior. One possibility is that the incarceration of a parent creates an unexpected period of instability over which the child has little control (Murray et al., 2012). Starting from the arrest of the parent, children may be shocked at the unexpected removal of a parenting figure from the home and the trial of their parent may be a period of great uncertainty (Fishman, 1983). Additionally, the incarceration of a parent necessarily involves a change in household structure and the child may be placed in another household altogether.

Instability as a Common Factor

In considering the impact of residential mobility, family structure instability, and parenting figure incarceration on child development outcomes, each event can be seen as contributing to the instability of a child's environment. Moreover, residential mobility, family structure instability, and parental incarceration co-occur at a level greater than chance (Tasca, Rodriguez, & Zatz, 2011; Womack et al., in press). For example, family structure instability is often coupled with a change in residence. Alternatively, multiple residential transitions may contribute to conflict and separation cohabiting caregivers. As previously discussed, the incarceration of a parenting figure results in a change in household composition and may also be accompanied by residential transitions.

In line with cumulative risk theory (Rutter, 1974), children who experience multiple types of transition tend to be at a higher risk for behavior problems compared to children who experience only one type of instability (Simmons, Burgeson, Carlton-Ford, & Blyth, 1987; Tasca et al., 2011). Given that residential instability, family structure instability, and parental incarceration frequently co-occur and have similar impacts on child behavior problems, it would be useful to create a single instability risk factor, which would allow researchers to measure the overall amount of instability in a child's environment and differentiate children who are experiencing high levels of instability in one domain of life from higher-risk children who are experiencing instability across several domains of life. While a single variable approach limits the ability to detect patterns of instability and observe interactions between different instability factors, a single variable approach will decrease measurement error and increases validity over examining individual factors (Ghiselli, Campbell, & Zedeck, 1981). One approach to creating a single construct is a cumulative risk approach, which involves computing a composite score of

several related risk-factors (Evans, Li, & Whipple; Rutter, 1979). In the present study, this is done by conducting a confirmatory factor analysis (CFA) which yields a latent instability variable at each age that represents the shared variance between the indicator variables (i.e., residential mobility, family structure instability, and parental incarceration).

The Present Study

The present study seeks to fill several gaps in the literature. First, previous research on childhood instability has predominantly focused on single episodes of instability (i.e., a divorce; Shaw et al., 1999) or examined the impact of the number of transitions over a particular developmental period (Fowler et al., 2014). However, little is known about how family instability changes over time. Census data suggests that families with older children tend to move less frequently that families with younger children (U.S. Census Bureau, 2017), which suggests that as the family system ages it becomes more stable. Similarly, one study examining instability longitudinally found family instability to decrease between child age 6 and 12, adding evidence that most families tend to become more stable over time (Milan, Pinderhughes, & Conduct Problems Research Group, 2006). However, residential mobility and family structure instability in early childhood is highly correlated with residential mobility and family structure instability, respectively, in late-childhood (Womack et al., in press), indicating that some families remain relatively unstable across the entirety of childhood. Using latent growth curve models, the present study aims to explore the mean shape and variability in trajectories of instability across the first seven years of childhood in a large sample of racially diverse, economically marginalized families.

Second, the present study aims to prospectively examine the relationship between instability and disruptive behaviors across childhood. To date there has been little research on

how behavior problems fluctuate based on trajectories of instability across childhood. Milan and colleagues (2006) found that family instability was related to higher levels of behavior problems concurrently, but there was no association between the slope of family instability and the slope of externalizing behaviors. However, Ge and colleagues (1994) found the change in stressful life events across adolescence to predict the change in depressive symptoms across the same time period. While previous research has identified early childhood to be a time of particular sensitivity to residential mobility (Tiesler et al., 2013), family structure instability (Goodnight et al., 2013), and parental incarceration (Murray and Farrington, 2005), no studies have prospectively examined family instability and behavior problems across this time period. Utilizing growth curve modeling, the present study fills this gap by examining associations between instability growth factors (e.g., intercept and slope) and externalizing behavior growth factors from birth to age 7.

Based on census data that suggests families may become more stable across time (U.S. Census Bureau, 2017), I hypothesize that the mean slope of instability will be negative indicating a trend toward stability. Given previous research suggesting that instability at developmentally sensitive time periods predicts higher levels of behavior problems (Murray & Farrington, 2005; Tiesler et al., 2013), it is expected that the intercept and slope of instability will predict both the intercept and slope of externalizing behaviors.

Methods

Participants

Participants were 731 families with children between the ages of 2 years 0 months and 2 years 11 months, recruited from Women, Infant, and Children Nutritional Supplement (WIC) centers in and around the metropolitan areas of Pittsburgh, PA (urban), Eugene, OR (suburban),

and Charlottesville, VA (rural). These data were part of the Early Steps Multisite Project, a trial of the Family Check-Up intervention (Dishion et al., 2008). Families were screened for eligibility based on child behavior (e.g., early conduct problems or high-conflict relationships with adults), family problems (maternal depression or daily parenting challenges), and sociodemographic (low education achievement and low family income) risk factors. To be eligible, families had to score one standard deviation above the mean on two out of these three risk domains. Of the 1,666 families that were screened, 879 met the eligibility requirements (52% in Pittsburgh, 57% in Eugene, and 49% in Charlottesville), and 731 (83.2%) agreed to participate (88% in Pittsburgh, 84% in Eugene, and 76% in Charlottesville).

Of the 731 families recruited, 272 (37%) were recruited in Pittsburgh, 271 (37%) in Eugene, and 188 (26%) in Charlottesville. Target children (TC, 49% female) were on average 29.9 months (*SD = 3.2*) at the age 2 assessment. Across sites, children belonged to the following racial groups: 27.9% African American, 50.1% European American, 13.0% biracial, and 8.9% other races (e.g. American Indian). Thirteen percent of participants identified as Hispanic. During the 2002 – 2003 screening period, more than two thirds of those families enrolled in the project had an annual income of less than $20,000, and the average number of family members per household was 4.5 (*SD* 1.63). Forty-one percent of the sample had a high school diploma or general education diploma (GED), and an additional 32% had 1 – 2 years of post-high school training at the time of the screening. Following the baseline assessment at age 2, half of the families were randomly assigned to receive the Family Check-Up (see Dishion et al., 2008).

Procedure

Data used were collected during in-home assessments at child ages 2, 3, 4, 5, and 7.5 with PCs, TC, and alternate caregivers (AC)s, when available. Assessments involved a variety of

tasks including questionnaires, interviews, videotaped observations, and examiner impressions. All participants were financially compensated following each assessment. Custodial parent's written consent was obtained prior to administration of any measures at each assessment. A Certificate of Confidentiality was obtained from the National Institute of Health to offer protection of participants' confidentiality and encourage honest reporting. Institutional review board approval was obtained for all screening and assessment procedures.

Measures

All measures were selected on the basis on capturing instability within the home assessment to assessment. Previous research has used such variables to assess instability in early childhood (Ackerman, Izard, Schoff, Youngstrom, & Kogos, 1999).

Residential Mobility. At each assessment PCs were asked to list all of the addresses the TC had lived at since the family's last assessment (usually within the past year) and how old the child was at each address. Asking retrospectively about moves going back to the last assessment allowed us to fill in gaps if a family had missed a wave of data collection. The number of moves at each age were then summed to create a mobility score for that age.

Family Structure Instability. Parenting figure transitions were coded using responses from the demographic interview administered at each wave. First, we established whether or not the PC had a full-time live-in partner at each assessment wave using a question on the demographics interview. Next, we captured inter-wave partner transitions by asking PCs to list how many times they separated from their current partner and how many partners they lived with since the last assessment. In addition to changes in the PC's live-in romantic partner, changes in PC were counted as family structure changes. We integrated the changes in live-in partner status from wave to wave with the inter-wave partner instability and PC changes to create a total family

structure instability score at each wave. Similar to the residential mobility variable, family structure instability was assessed going back to the last assessment.

Contact with the Law. PCs also reported on any individuals living in the home that had trouble with the law within the past 2 months. For the purposes of the current study, we counted only adults living in the home who had been incarcerated as having contact with the law. Because incarceration of primary parenting figures is likely to be more impactful on child development (Tasca et al., 2011), PC incarcerations were weighted as a 2, while incarceration of any other adult living in the home was weighted as a 1. An incarceration score was generated at each wave by summing the number of PC incarcerations and incarcerations of other adults in the home.

Externalizing Behaviors. PCs and AC's completed the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001), which is a parent report of emotional and behavioral problems over the past 6 months at the each of the age 2-7.5 assessments. Responses are on a 3-point Likert scale ranging from *Not True* (0), *Somewhat or Sometimes True* (1), or *Very True or Often True* (2). The CBCL yields and externalizing factor, which is comprised of the Rule-Breaking, Aggressive Behavior, and Attention Problem subscales. Cronbach alphas for the externalizing factor ranged from .86 to .95 for the ages 2 through 7.5 assessments, indicating good internal reliability for both factors across time and informant. To minimize reporter bias, PC and AC scores were averaged at each age, with PC reports used alone when AC reports were not available.

Data Analysis

Descriptive statistics and intercorrelations between study variables were calculated using the base package in R (R Core Team, 2018). In examining the data descriptively, it because

apparent that on some of the instability indicators there were extreme outliers (for example, one PC reported 60 family structure changes between the child's birth and the age 2 assessment). I wanted to avoid biasing the data by removing every large report of any instability indicator as some families were unusually unstable and the goal of the present study was to capture this unusual instability. However, I also did not want such extreme outliers to skew my results. To identify and remove outliers, I used a modification of Tukey's "fences" rule (Tukey, 1977), which suggests that data points that are 3 times the interquartile range are outliers. In the present study, data points that were 10 times larger than the interquartile range were removed. See Table 1 for a list of data points that were removed from each variable.

A confirmatory factor analysis was conducted to determine if the data supported examining instability as a single latent variable from PC reports of residential mobility, family structure instability, and contact with the law (see Figure 1 for an example factor). Descriptive analyses indicate that the instability indicator variables were all non-normally distributed (i.e., magnitude of skew > 1, magnitude of kurtosis > 3). The non-normal indicator variables of instability were transformed using natural log transformations prior to estimation per recommendations by Tabachnick and Fidell (2007) to more closely approximate normal distribution.

Separate univariate growth curve models were fit to examine the mean trajectory shape and variability in trajectory shape for instability and externalizing behaviors across the first seven years of life. To test for potential nonlinear growth of instability and externalizing behaviors, linear and quadratic growth curve models were fit for each construct. The linear and nonlinear growth models were then compared using a log-likelihood ratio test (Santorra & Bentler, 2001). Once the best fitting univariate growth curve models were identified, a bivariate

growth curve model was fit that included a growth curve for instability and externalizing behaviors as well as estimates of the associations between the growth factors (i.e., intercepts, and slopes; see Figure 2). Because instability was assessed as a latent variable, the instability growth curve was modeled as a second-order growth curve, which allows for a more precise measurement of the regression coefficients between the instability growth factors and externalizing growth factors (for a discussion on second-order growth curves, see Ferrer, Balluerka, & Widaman, 2008; McArdle, 1988). TC Gender, annual household income at age 2, and intervention status were all controlled for in the bivariate growth curve model. Additionally, TC's race, with African American as the comparison group, and site location, with Eugene as the comparison group, were included as covariates the bivariate growth curve model.

Confirmatory factor analysis and growth curve modeling were conducted using robust maximum likelihood estimation (RML) in the 'lavaan' package in R (Rosseel, 2012). Despite transforming the instability indicator variables using log transformations, some of the variables remained non-normally distributed. RML can be used to account for non-normality in indicator variables (Huber, 1967). Model fit was assessed for the model using the following fit indices: Model Chi-Square, Root Mean Square Error of Approximation (RMSEA, <.10 indicates acceptable fit), Standardized Root Mean Square Residual (SRMR, <.08 indicates acceptable fit), and Comparative Fit Index (CFI, >.90 indicates acceptable fit; Hooper, Coughlan, & Mullen, 2008). Full information maximum likelihood estimation was used to account for missing data.

Results

Descriptive Analyses, Developing the Instability Factor, and Intercorrelations

Descriptive analyses of all continuous study variables are presented in Table 2 and descriptive statistics for all categorical variables are presented in Table 3. Instability was very

common in this sample. Between ages birth and 7, 628 (85.6%) families moved at least once, 466 (63.7%) experienced at least one family structure transitions, and 388 (53.1%) had at least one adult member of the household incarcerated. Of the 731 families in the study, 464 (63.5%) experienced at least one residential transition and one family structure transition, while 273 (37.3%) experienced a move, a family structure transition, and the incarceration of an adult household member. Only 43 (5.9%) of the families did not experience any of the instability indicators between birth and 7.

Results from a CFA support the decision to examine instability as a single latent construct. See Table 4 for the factor loadings from a measurement model of the childhood instability evaluated in lavaan. Factor scores from the CFA were then correlated with all other study variables. Instability factors at each age were modestly intercorrelated (*r's* = .157 to .392, $p < .01$), indicating that instability was relatively stable across waves. Externalizing behaviors were highly intercorrelated (*r's* = .405 to .656, $p < .01$), indicating stability in the externalizing construct over time. Within time point, instability scores were significantly positively correlated with externalizing behaviors (*r's* = .093 to .166, $p < .05$) indicating that higher levels of instability were concurrently associated with higher levels of behavior problems. See Table 5 for intercorrelations between all continuous study variables.

Univariate Latent Growth Modeling

Linear and nonlinear growth curve models were fit for early childhood instability and compared using a log-likelihood ratio test. Both linear and quadratic components were included in the nonlinear model. The log-likelihood ratio test found the nonlinear model to fit the data better ($X^2_{df=4} = 125.11$, $p < .001$). There was a significant linear decline in instability over the years (b = -0.18, SE = 0.02, $p < .001$), indicating that families tend to become more stable over

time. The quadratic effect was also significant (b = 0.03, SE = 0.003, $p < .001$), suggesting that the linear trend towards stability tends to decelerate over time. The intercept significantly negatively covaried with the slope and significantly positively covaried with the quadratic term, suggesting that families who are more unstable at baseline trend towards stability more rapidly, but the rate of declining also tends to decelerate more rapidly. Finally, the intercept, linear slope, and quadratic slope all significantly varied across participants indicating that families started at different levels of instability and changed over time at different rates.

Linear and nonlinear growth curve models were also fit for early childhood externalizing behaviors. Both linear and quadratic components were included in the nonlinear model. A log-likelihood ratio test found the nonlinear model to fit the data better ($X^2_{df=4} = 117.16$, $p < .001$). As with trajectories of instability, there was a significant linear decline in externalizing behaviors over time (b = -3.70, SE = 0.18, $p < .001$), and also a significant quadratic effect (b = 0.42, SE = 0.03, $p < .001$), indicating that parents observe fewer externalizing behaviors across early childhood, and the decline in behavior problems tends to gradually become decelerated as children get older. See Table 6 for the full results from the univariate growth curve models.

Bivariate Growth Curve Modeling

The bivariate growth curve model (see Figure 2) demonstrated a good fit to the data $X^2_{df=287,\ n=731} = 904.66$, ($p = .01$), RMSEA = .05, CFI = .73, SRMR = .07. The externalizing behavior intercept, linear slope, and quadratic slope were all regressed onto the instability intercept, linear slope, and quadratic slope as well as TC gender, TC race, site location, intervention status, and age 2 income. The instability intercept was found to significantly predict the externalizing behavior intercept (b = 4.59, SE = 2.17, $p < .05$), suggesting that children who experienced higher levels of instability between birth and 2 had higher levels of externalizing

behaviors at age 2. Additionally, the slope of instability positively predicted the slope of externalizing behaviors (b = 12.17, SE = 6.16, $p < .05$), suggesting that externalizing behaviors across early childhood tend to decline more rapidly as instability declines more rapidly. Put differently, children exhibit fewer externalizing behaviors as families become more stable. See Table 7 for all of the regression coefficients from the bivariate growth curve model.

Discussion

The present study sought to add to the existing body of literature on childhood instability by prospectively modeling the growth of instability across early childhood. Additionally, the present study expands on previous literature (Milan et al., 2006) by examining longitudinal associations between instability and behavior problems from birth through age 7. Consistent with previous literature, the findings from the present study suggest that instability in early childhood is extremely common among low-SES families (Cooper et al., 2009; U.S. Census Bureau, 2017), but the within subject patterns of instability across early childhood varied considerably between participants. Additionally, the present study found concurrent and longitudinal associations between instability and externalizing behaviors, which is in line with previous research (Milan et al., 2006).

Congruent with study hypotheses and trends observed in census data (U.S. Census Bureau, 2017) and other research (Milan et al., 2006), families tended to become increasingly stable over time and the level of instability at baseline was negatively proportional to the change in instability over time. That is, families who began the study with the highest levels of instability had the most negative slopes over time. Interestingly, the shape of the growth curve was quadratic in nature such that, on average, the rate of declining instability decelerated over time. Considering the criteria to enroll in the Early Steps study (i.e., child behavior problems,

problems within the family, and sociodemographic factors), the trajectories toward stability observed in the present study may due to regression to the mean (Trochim & Donnelly, 2001). Specifically, families were recruited based on a number of risk factors (e.g. parental substance use, low family income) that made experiencing instability in the near future very likely but over time the family systems stabilized and levels of instability declined toward an equilibrium (Boker, 2013).

While not a direct aim of the present study, we also explored the growth in externalizing behaviors between ages 2 and 7. Similar to instability, externalizing behaviors were found to decline over time in a quadratic manner with children declining less rapidly over time. The observed decline in externalizing behaviors between ages 2 and 7 is in line with findings from other prospective studies of behavior problems across early childhood (Miner & Clarke-Stewart, 2008; Spieker, Larson, Lewis, Keller, & Gilchrist, 1999). Surprisingly, the externalizing intercept was not significantly associated with either the linear or quadratic slope, which suggests that a child's rate of change in externalizing behaviors over time was not related to their initial level of behavior problems. Additionally, there was significant variability in the intercept of externalizing behaviors, but not in the linear or quadratic slopes, indicating that children significantly varied in their externalizing scores at age 2, but did not differ in their rate of change across early childhood. The finding that the intercept did not covary with the linear or quadratic slopes and that the linear and quadratic slopes did not vary significantly runs contrary to some previous research (Miner & Clarke-Stewart, 2008; Spieker et al., 1999). However, in a study looking at trajectories of disruptive behaviors across early childhood in at-risk boys, four latent classes emerged with the majority of youth (94%) falling into one of three classes that had differing intercepts but similar declining slopes across the course of the study (Shaw, Gilliom,

Ingoldsby, & Nagin, 2003). Therefore, the majority of children who are at an early sociodemographic risk for developing behavior problems may have similar developmental patterns over time, despite having within time point differences in behavior problems.

Also consistent with study hypotheses, instability was found to predict externalizing behaviors both concurrently and longitudinally. Specifically, the amount of instability a child experienced from birth to two was found to predict higher levels of externalizing behaviors at age two, suggesting that instability in the first few months of life is a risk factor for behavior problems within an already high-risk sample. While instability in the first two years did not predict growth in behavior problems over time, early instability may set a child up for future maladaptive behaviors as they enter the 'terrible twos' with poorer behavior regulation, a factor associated with later deficits in social (Calkins, Gill, Johnson, & Smith, 1999) and academic functioning (McClelland et al., 2007). Exacerbating the situation, a parent who is managing a household though several transitions may not have the time or energy to engage in positive interactions with their child and may be susceptible to coercive patterns of discipline, a risk factor for later behavior problems (Campbell, Shaw, & Gilliom, 2000; Patterson et al., 1986).

In additional to the concurrent association between instability and behavior problems at age 2, the slope of instability was positively related to the slope of externalizing behaviors. Therefore, decreasing family instability predicts decreases in behavior problems above and beyond typical patterns of development where behavior problems become less frequent over time (Spieker et al., 1999). Conversely, the positive relationship between the change in instability and change in behavior problems suggests that among families that become more unstable over time, children would be expected to exhibit more externalizing behaviors over time. Thus, instability

in early childhood appears to be a risk factor appears to be a risk factor for current behavior problems, while sustained instability appears to be a risk factor for future behavior problems.

Implications for Practice and Policy

Considering the impact of instability in early childhood on the development of behavior problems, the present study offers several implications for clinical practice and social policy. In terms of mental health support services, which seek to intervene at the individual level, the findings from the present study suggest a need to develop an intervention to be employed to deter the escalation of behavior problems in chronically unstable families. Presently, scant information exists regarding mechanisms by which family structure instability influences child behavior and more research is needed to elucidate potential points of intervention among chronically unstable families. In terms of delivering an intervention, community resource agencies serving families at a high risk for instability (e.g., WIC, Head Start, TANF, homeless shelters) may be one avenue to connect parents and children to mental health services.

Stepping back from the immediate family system and viewing the issue at the community level, the findings from the present study suggest a need to reform social policies that make instability likely among economically marginalized families. For example, the gentrification of neighborhoods often leads to an increase in cost of living, which forces poorer families to move to other locations (Hwang & Sampson, 2014; Guerrieri, Hartley, & Hurst, 2013; Lees, 2008). With regards to incarceration, 25% of all adult females incarcerated at state facilities at the end of 2015 had a drug crime as their most serious offense (Carson, 2018), which suggests that many of the families disrupted by the incarceration of a parenting figure are disrupted due to nonviolent crimes. Thus, social policies may influence child development through promoting or deterring family instability.

Limitations and Directions for Future Research

While this study has a number of strengths, a few limitations should be noted. First, the present study utilized data from a predominantly low-SES sample, which limits generalizability to more affluent samples. However, given the relative risk of poor families to experience residential mobility (U.S. Census Bureau, 2017), family structure instability (Cooper et al., 2009), and parental incarceration (Mauer & King, 2007), it seems pertinent to study how these life stressors can impact child development in families most vulnerable to instability. Another potential limitation of the present study is the possibility of reporter bias as PCs and ACs were the only reporters of child behavior problems. Because PCs (and in many cases ACs) were living in the home with the target child, they also experienced the same transitions as the TC. It is possible that the parent-child relationship quality is compromised in highly unstable households as parents may perceive their children as having more behavior problems due to fewer positive parent-child interactions (Peterson & Zill, 1986).

Finally, the present study used parental incarceration as a component of the instability factor, which was then used to predict child behavior problems. Because incarceration is highly related to antisocial behaviors (Patterson, DeBaryshe, & Ramsey, 1989), there is the potential for a genetic confound as antisocial behaviors are found to be heritable (Crowe, 1974). Our approach to examine instability as a latent variable partially circumvents the issue of possible genetic influences as CFA creates a factor based on the shared variance between a number of indicators (Maruyama, 1997). In the case of the present study, the instability factor is the shared variance between residential mobility, family structure instability, and parental incarceration and thus the only influence of parental incarceration on child behavior problems is that which is shared with residential mobility and family structure instability. Still, it is possible that parents with higher

levels of externalizing behaviors are also more likely to move or have multiple live-in partners. Therefore, there is a great need for genetically informed research on the influences of childhood instability on behavior problems.

In addition to the need for genetically informed research on childhood instability, there is a need for research examining the mechanisms by which instability impacts child behavior development. Researchers have posited several mechanisms of action including reductions in parent-child relationship quality, deficits in executive functioning, and poor academic skills upon school entry. Future research should examine these and other variables as potential mediators between instability and later behavior problems. Finally, while the present study used a predominantly high-risk, low-SES sample, future research should try and replicate the current findings in more affluent populations to see if associations between instability and behavior problems are unique to a population that experiences particularly high levels of instability of if the findings from the present study generalize to other populations.

Conclusion

The present study examined longitudinal associations of family instability in terms of residential mobility, family structure instability, and parental incarceration, and child behavior problems. Findings from the present study suggest that, on average, families become more stable across early childhood. Similarly, child externalizing behaviors tend to decrease across early childhood. However, higher levels of instability across the first two years of life predicted higher levels of behavior problems at age 2, and a steeper slope of instability predicted a steeper slope of behavior problems, suggesting both concurrent and longitudinal associations of instability on externalizing behaviors. The findings from the present study have implications for mental health

professionals who seek to intervene on the family as well as policy workers who seek to intervene on the community level.

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Table 1
Removed data points from indicator variables

Variable Name	Values Removed
Residential Mobility (2)	None
Residential Mobility (3)	None
Residential Mobility (4)	None
Residential Mobility (5)	None
Residential Mobility (7)	None
Family Structure Instability (2)	12, 12, 14, 20, 38, 60
Family Structure Instability (3)	None
Family Structure Instability (4)	None
Family Structure Instability (5)	None
Family Structure Instability (7)	12, 12, 16
Incarceration Score (2)	None
Incarceration Score (2)	None
Incarceration Score (2)	None
Incarceration Score (2)	None
Incarceration Score (2)	None

Table 2
Descriptive Statistics of Continuous Variables

	x̄	*SD*	Min	Max	Number Missing (%)
Annual Household Income 2	3.78	*1.92*	2	8	0 (0%)
Moves 0-2	0.96	*1.06*	0	8	0 (0%)
Moves2-3	0.52	*0.73*	0	5	47 (6.4%)
Moves 3-4	0.44	*0.71*	0	6	69 (9.4%)
Moves 4-5	0.46	*0.71*	0	5	87 (11.9%)
Moves 5-7	0.64	*0.89*	0	6	129 (17.6%)
Family Transitions 0-2	0.60	*1.21*	0	8	6 (0.8%)
Family Transitions 2-3	0.41	*0.72*	0	6	71 (9.7%)
Family Transitions 3-4	0.39	*0.87*	0	9	102 (14.0%)
Family Transitions 4-5	0.47	*0.98*	0	10	110 (15.0%)
Family Transitions 5-7	0.67	*1.21*	0	10	169 (23.1%)
Incarceration 0-2	0.71	*1.08*	0	4	0 (0%)
Incarceration 2-3	0.60	*1.03*	0	6	0 (0%)
Incarceration 3-4	0.30	*0.72*	0	4	72 (9.8%)
Incarceration 4-5	0.23	*0.59*	0	5	110 (15.0%)
Incarceration 5-7	0.22	*0.56*	0	4	164 (22.4%)
Externalizing Behaviors 2	19.21	*6.75*	0.5	43	1 (0.1%)
Externalizing Behaviors 3	16.47	*7.23*	1	40	74 (10.1%)
Externalizing Behaviors 4	14.78	*7.58*	0	40	103 (14.1%)
Externalizing Behaviors 5	10.89	*7.57*	0	43	117 (16.0%)
Externalizing Behaviors 7	11.72	*8.46*	0	44	163 (22.3%)

Note. Annual income was coded such that 1 = "$4,999 or less", 2 = "$5,000 to $9,999", 3 = "$10,000 to $14,999", 4 = "$15,000 to $19,999", 5 = "$20,000 to $24,999", 6 = "$25,000 to $29,999", 7 = "$30,000 to $39,999", 8 = "$40,000 to $49,999"

Table 3
Descriptive Statistics of Categorical Variables

	Full Sample *N*, %	Treatment *N*, %	Control *N*, %
Caucasian	341 (46.6%)	170 (46.7%)	171 (46.6%)
African American	292 (39.9%)	146 (40.1%)	146 (39.8%)
Hispanic	98 (13.4%)	48 (13.2%)	50 (13.6%)
Pittsburgh, PA	272 (37.2%)	136 (37.4%)	136 (37.1%)
Charlottesville, VA	188 (25.7%)	93 (25.5%)	95 (25.9%)
Eugene, OR	271 (37.1%)	135 (37.1%)	136 (37.1%)

Table 4
Factor Loadings for Instability Indicators by Age

	Age 2	Age 3	Age 4	Age 5	Age 7
Residential Mobility	.224***	.267***	.177*	.500**	.356**
Family Instability	.543*	.331*	.222**	.385***	.423*
Parental Incarceration	.280**	.400***	.143*	.405***	.177*

Note. Loadings presented are standardized loadings.
* indicates $p < .05$, ** indicates $p < .01$, *** indicates $p < .001$

Table 5

Intercorrelations Between Instability Factors and Externalizing Behaviors

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Income (2)	1										
2. Instability (2)	-.185***	1									
3. Instability (3)	-.218***	.392***	1								
4. Instability (4)	-.210***	.196***	.375***	1							
5. Instability (5)	-.189***	.206***	.310***	.341***	1						
6. Instability (7)	-.169***	.157***	.231***	.248***	.370***	1					
7. Externalizing (2)	-.087*	.159***	.078*	.058	.079*	.048	1				
8. Externalizing (3)	-.129***	.103**	.104**	.171***	.107**	.109**	.560***	1			
9. Externalizing (4)	-.070†	.077†	.065	.093*	.084*	.075†	.480***	.648***	1		
10. Externalizing (5)	-.054	.077†	.125**	.120**	.166***	.088*	.477	.554***	.608***	1	
11. Externalizing (7)	-.122**	.140***	.096*	.125**	.171***	.126**	.405***	.500***	.557***	.656***	1

Note. The internalizing variables are the factor scores generated from the CFA. † indicates $p < .1$, * indicates $p < .05$, ** indicates $p < .01$, *** indicates $p < .001$

Table 6
Results of Univariate Growth Curve Models

	Intercept		**Slope**		**Quadratic**				
	Mean level at 2 years	Variance	Change per 1-year interval	Variance	Change per 1-year interval	Variance	**Intercept-Slope Covariance**	**Intercept-Quadratic Covariance**	**Slope-Quadratic Covariance**
Instability	**0.49** (0.02)	**0.64** (0.01)	**-0.18** (0.02)	**0.02** (0.006)	**0.03** (0.003)	**.001** (0.000)	**-0.02** (.01)	**0.003** (0.001)	**-.003** (0.001)
Externalizing Behaviors	**19.51** (0.25)	**26.17** (2.86)	**-3.70** (0.19)	3.07 (1.88)	**0.42** (0.03)	0.16 (0.08)	1.11 (1.95)	-0.35 (0.32)	-0.51 (0.34)

Note. Values are un-standardized parameter estimates with standard errors in parentheses. Estimates that are significant at the $p < .05$ are denoted in bold font.

Table 7
Results of the Bivariate Growth Curve Model

	Externalizing Intercept		Externalizing Slope		Externalizing Quadratic	
	B	*SE*	B	*SE*	B	*SE*
Instability Intercept	4.55*	2.17	1.44	1.73	-0.18	0.33
Instability Slope	-5.46	7.77	12.17*	6.16	-1.72	1.18
Instability Quadratic	-8.49	30.37	21.72	23.05	-1.65	4.47
TC Gender	-0.88†	0.48	-0.10	0.34	-0.01	0.06
Hispanic	-0.40	0.83	-0.63	0.58	0.10	0.11
Caucasian	0.77	0.58	-0.14	0.41	0.01	0.08
Pittsburgh	1.27*	0.61	0.42	0.42	-0.03	0.08
Virginia	0.27	0.64	0.25	0.45	-0.11	0.08
Annual Income (2)	-0.25†	-0.13	0.10	0.10	-0.20	0.02
Intervention Status	-0.18	0.48	-0.39	0.34	-.09	0.06

Note. Values are un-standardized regression coefficients. † indicates $p < .1$, * indicates $p < .05$, ** indicates $p < .01$, *** indicates $p < .001$

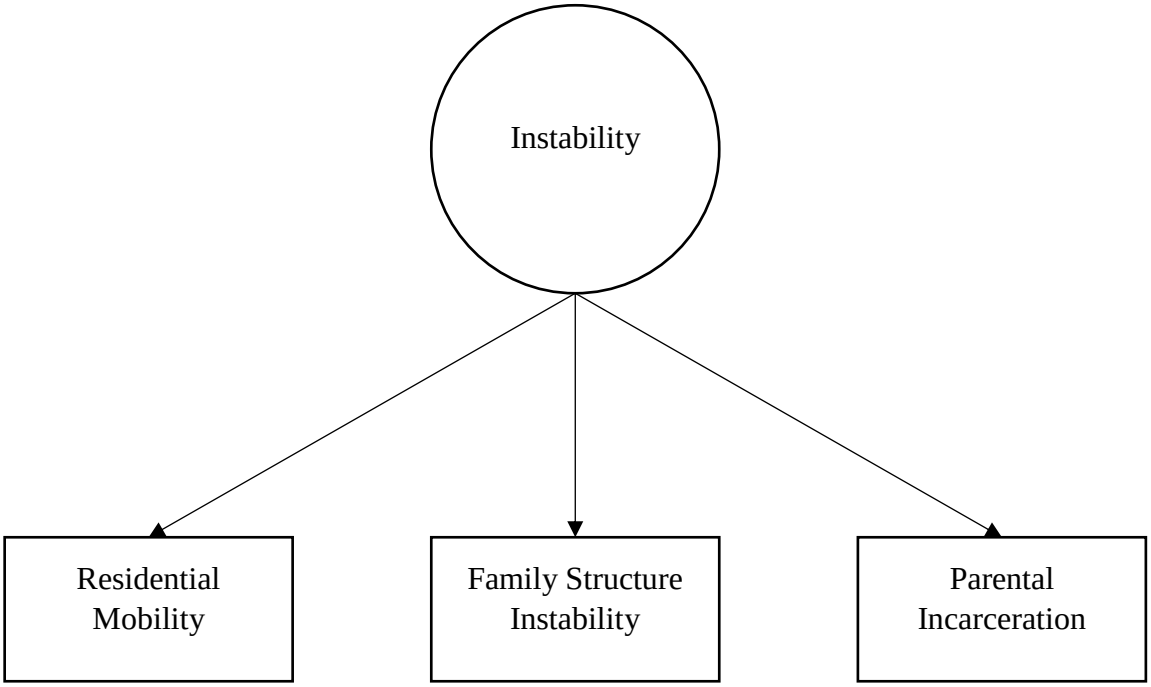

Figure 1. Sample factor model for the latent instability construct. A separate instability factor was fit at each age (2, 3, 4, 5, and 7).

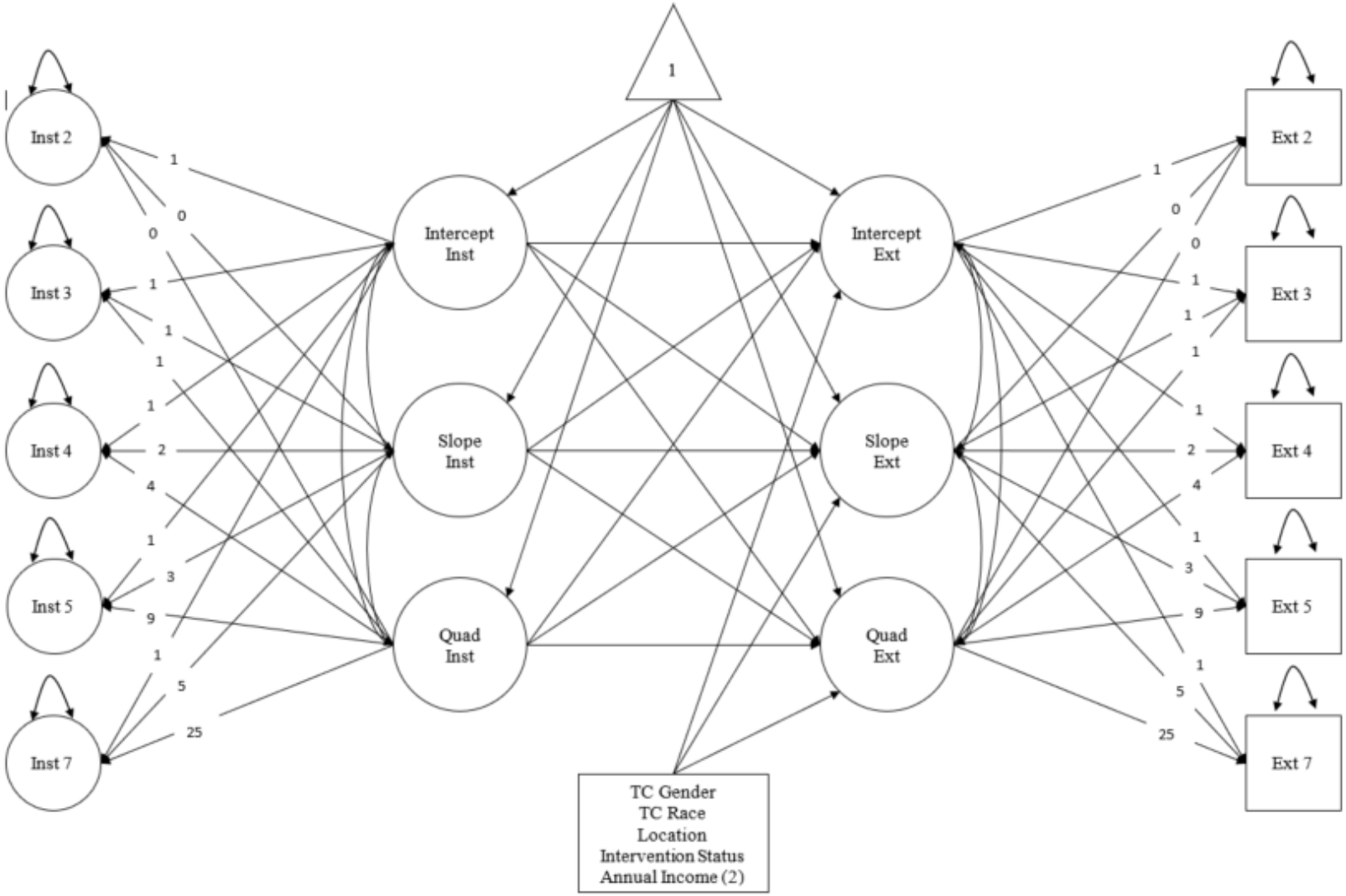

Figure 2. The proposed bivariate latent growth curve model.