Evaluation of a Longitudinal Family Stress Model in a Population-Based Cohort

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Abstract

The Family Stress Model (FSM) is an influential family process model that posits that socioeconomic disadvantage impacts child outcomes via its effects on parents. Existing evaluations of the FSM are constrained by limited measures of socioeconomic disadvantage, cross-sectional research designs, and reliance on non-population-based samples. The current study tested the FSM in a subsample of the Fragile Families and Child Wellbeing Study (N = 2,918), a large population-based study of children followed from birth through age 9. We employed a longitudinal framework and used measures of socioeconomic disadvantage beyond economic resources. Although the hypothesized FSM pathways were identified in the longitudinal model (e.g., economic pressure at age 1 was associated with maternal distress at age 3, maternal distress at age 3 was associated with parenting behaviors at age 5), the effects of socioeconomic disadvantage at childbirth on youth socioemotional outcomes at age 9 did not operate through all of the hypothesized mediators. In longitudinal change models that accounted for the stability in constructs, multiple indicators of socioeconomic disadvantage at childbirth were indirectly associated with youth externalizing behaviors at age 9 via either economic pressure at age 1 or changes in maternal warmth from ages 3 to 5. Greater economic pressure at age 1, increases in maternal distress from ages 1 to 3, and decreases/increases in maternal warmth/harshness from ages 3 to 5 were also directly associated with increases in externalizing behaviors from ages 5 to 9. Results provide partial support for the FSM across the first decade of life.

Keywords: Family process, longitudinal, socioeconomic status, parenting, family stress model

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Socioeconomic disadvantage is a potent predictor of mental and physical health problems across childhood (Bradley & Corwyn, 2002; McLoyd, 1998) and across the life course (Duncan et al., 2010). Much of the research on socioeconomic status (SES) and youth outcomes has been guided by the Family Stress Model (FSM) (Conger & Conger, 2002), which posits that

socioeconomic disadvantage affects children by affecting parents. In the FSM, economic hardships (e.g., low family income-to-needs ratio, parental job loss) predict greater economic pressure on parents (e.g., material hardship, inability to pay bills or make ends meet). Economic pressure, in turn, gives rise to greater emotional distress in parents (e.g., parental depression, anxiety). Greater parental distress leads to family conflict, including parenting that is high in harshness and low in warmth, which can lead to youth internalizing (e.g., depression, anxiety) and externalizing (e.g., aggression, rule-breaking) behaviors (Masarik & Conger, 2017). Thus, a key feature of the FSM is the recognition that socioeconomic disadvantage taxes family processes, including parent-child relationships, that lead to the emergence of youth psychopathology (Conger et al., 2010; Edin & Kissane, 2010).

The Importance of the Family Stress Model in the First Decade of Life

The FSM is particularly relevant for understanding how family processes lead to youth internalizing and externalizing problems during the first decade of life. Theories of emotional development (Eisenberg et al., 1998; Grusec, 2011) highlight the importance of parents' emotion-related socialization behaviors from infancy through middle childhood, when children spend most of their time in the home (Shaw & Bell, 1993). Parents shape the development of youth socioemotional competence through their own emotional expressions (e.g., anxiety, personal distress) and their responses to child behaviors (e.g., harshness, emotional responsivity, warmth) (Eisenberg et al., 1998). As children age into early adolescence, peer and neighborhood influences become more salient and dampen the relative impact of family processes on youth outcomes (Smetana et al., 2006). For example, meta-analyses show stronger associations between maternal depression, parenting behaviors, and multiple dimensions of youth psychopathology among younger children than adolescents (Goodman et al., 2011; Hoeve et al., 2009a). Additionally, exposure to poverty and poverty-related sequelae (e.g., economic pressure) during early childhood is particularly predictive of child outcomes (Walker et al., 2011), in part due to early sensitivity of the developing brain (Shonkoff et al., 2012; Tottenham, 2009). Thus, the FSM can be used to understand how socioeconomic disadvantage in early childhood leads to emergent youth psychopathology in middle childhood via family processes that shape emotion socialization.

Generalizability of the Family Stress Model

Empirical support for the FSM has been established across a wide range of contexts including diverse cultural backgrounds (i.e., African-American, European-American, and Mexican-American families), family structures (i.e., two-parent and single-parent families), urbanicity (i.e., urban and rural samples), and in populations within and outside of the U.S. (Conger et al., 2002; Jocson & McLoyd, 2015; Kinnunen & Feldt, 2004; Linver, Brooks-Gunn, & Kohen, 2002; Gutman, McLoyd, & Tokoyawa, 2005; Parke et al., 2004; Solantaus, Leinonen, & Punamäki, 2004). This research highlights the important role that parents play in mediating the effects of socioeconomic disadvantage on children's development and the validity of the FSM as a family process model. However, there are several quantitative and theoretical limitations of this work that warrant consideration (Conger et al., 2010).

Measurement of Socioeconomic Disadvantage

First, most tests of the FSM overwhelmingly rely on economic aspects of SES (i.e., family income) to indicate hardship (Conger et al., 2010), which may mask the complexities of the effects of socioeconomic disadvantage on family processes. Traditional components of SES include income, parental education, and occupational status (Bradley & Corwyn, 2002). Each component is differentially stable across time, captures different social and economic aspects of hardship, and has varying effects on child outcomes (Bradley & Corwyn, 2002; Conger et al., 2010; Duncan & Magnuson, 2003). For example, whereas income is sensitive to exogenous changes in the environment (e.g., job loss, macroeconomic conditions), education status is comparatively more stable in adulthood (Krieger et al., 1997). Few studies have examined parental age or marital status, which capture social capital or resources inherent to SES and may be important to the family processes proposed by the FSM (Bradley & Corwyn, 2002). Adolescent mothers may have fewer social resources than older parents (e.g., social support, relevant peer networks), and children of adolescent mothers are rated as being more aggressive and impulsive and score lower on cognitive tests than their peers with older mothers (Baldwin & Cain, 1980; Furstenberg Jr. et al., 1989). However, Bornstein and colleagues (2006) found that the positive association between age at childbirth and social support remained stable until mothers reached ~30 years (Bornstein et al., 2006), suggesting that "young mothers" may also include women well into their 20s. Family structure also predicts parent and child outcomes (McLanahan & Sandefur, 1994): married compared to single-parent households report lower levels of parent psychological distress and more parental warmth (Brown, 2004; McLanahan &

Sandefur, 1994). Previous tests of the FSM have either not included parental education, maternal age, or marital status in their models (Gutman et al., 2005; Neppl, Senia, & Donnellan, 2016; Simons et al., 2016), or have specified these variables as model covariates (Newland et al., 2013) or as predictors of family income (Gershoff et al., 2007). Although several examinations of the FSM have found consistency in the model across family structures (e.g., Conger et al., 2002; Gutman et al., 2005), family structure itself (i.e., two-parent versus single-parent households) may proxy SES (McLanahan & Sandefur, 1994). The present study addresses these limitations by examining the unique contributions of multiple indicators of SES as a broad construct (e.g., maternal age, marital status, education, income) to family processes as hypothesized by the FSM.

Longitudinal Evidence

Second, most empirical tests of the FSM are cross-sectional, with constructs (e.g., parental distress, parenting behaviors, and child behavioral problems) measured at the same time point. This design limits our understanding of the direction of effects and the scale by which they cascade across development. By contrast, longitudinal designs provide greater confidence in directional associations, particularly when these models account for the same constructs measured at previous time points (MacCallum & Austin, 2000; Maxwell & Cole, 2007). For example, White, Liu, Nair, and Tein (2015) tested an adapted FSM in a longitudinal sample of 749 Mexican-origin adolescents, and included lagged FSM constructs at previous time points so that path estimates between two constructs reflected the effect of change in the predictor variable on the outcome variable. Results showed that mother's perception of economic pressure predicted increases in harsh parenting and subsequent increases in child externalizing behaviors across middle childhood to adolescence (White et al., 2015). Few other longitudinal tests of the FSM employ this "longitudinal change" design across all constructs in the FSM (e.g., Simons et al., 2016 accounted for the lagged measures of youth conduct problems, but not earlier nurturant parenting; see Kavanaugh, Neppl, & Melby, 2018; Landers-Potts et al., 2015; Neppl, Senia, & Donnellan, 2016, for similar examples). As mediation effects are less biased in longitudinal auto-regressive models than cross-sectional mediation models (Maxwell & Cole, 2007), more research is needed to evaluate the mediation pathways hypothesized by the FSM using longitudinal data.

Population-Based Samples

A third limitation of FSM research is the lack of replication in large, population-based surveys that include large numbers of families living in disadvantaged contexts. Population-based studies that implement data collection and sampling strategies to recruit participants across diverse sociodemographic groups and geographies ensure sample diversity that reflects the population of interest (Groves et al., 2009). The issue of generalizability, stemming from the lack of representative samples (i.e., the demographic composition of the sample does not match the target population), plagues developmental science more broadly than tests of the FSM specifically (Davis-Kean & Jager, 2017; Henrich et al., 2010). Although studying family dynamics within subpopulations is critical to our understanding of diverse developmental trajectories (García Coll et al., 1996), large population-based samples can be used to validate psychological theories and broaden the impact of findings from community-based research (Davis-Kean & Jager, 2017).

Current Study

The current study tested the FSM longitudinally using the Fragile Families and Child Wellbeing Study (FFCWS), a large population-based sample of families in large U.S. cities followed from childbirth through age 9 and oversampled for nonmarital births. The FFCWS was appropriate for an examination of the FSM for several reasons. First, the study measured economic hardship and economic pressure at childbirth and age 1, which is a developmental period during which infants are particularly sensitive to the neurobehavioral effects of environmental adversity (Tottenham, 2009). Second, maternal psychological distress and parenting behaviors, which are key features of emotion socialization theory (Eisenberg et al., 1998), were collected at sequential time points during early childhood when these constructs have been shown to exert the largest effects on youth psychopathology (Goodman et al., 2011; Hoeve et al., 2009b). Lastly, the FFCWS collected youth internalizing and externalizing behaviors at age 9, when children are still largely under the influence of family processes. Moreover, psychopathology that emerges in middle childhood is often predictive of more serious socioemotional impairments that emerge in adolescence and continue into adulthood (Rutter, Kim-Cohen, & Maughan, 2006).

We tested both a longitudinal FSM (in which constructs were measured at sequential time points) and a longitudinal change FSM (in which lagged constructs at preceding time points were included to reflect change in each construct) to assess how estimates change after accounting for

construct stability. We included multiple indicators of social and economic aspects SES (i.e., family income to needs ratio, family structure, maternal education, and maternal age) to measure economic hardship at childbirth (Bradley & Corwyn, 2002; Furstenberg Jr. et al., 1989; McLanahan & Sandefur, 1994). We hypothesized that low family income-to-needs ratio, low maternal education, young mothers' age, and mothers' unmarried status at childbirth would independently predict greater youth internalizing and externalizing behaviors at age 9 via greater economic pressure at age 1, greater maternal distress at age 3, and greater maternal harshness and less maternal warmth at age 5. In models that accounted for the lagged constructs at preceding time points, we hypothesized that these associations would be attenuated, but that high harsh parenting and low maternal warmth at age 5 would continue to be significant mediators of the effect of socioeconomic disadvantage at childbirth on youth internalizing and externalizing behaviors at age 9.

Method

Sample

Participants were part of the Fragile Families and Child Wellbeing Study (FFCWS), a longitudinal cohort of 4,898 (52.4% boys) children born in 20 large U.S. cities between 1998 and 2000 (Reichman et al., 2001). The study oversampled non-marital births (~ 3:1) and when weighted, the sample is representative of families living in U.S. cities with populations of 200,000 or more between 1998 and 2000 (for detailed information about cohort retention across waves, see https://fragilefamilies.princeton.edu). At childbirth, mothers identified as White Non-Hispanic (N = 1,030, 21.1%), Black Non-Hispanic (N = 2,326, 47.5%), Hispanic (N = 1,336, 27.3%), or other (N = 194, 4.0%). Nearly 40% of the mothers reported less than a high school education at the childbirth interview, 25.3% with a high school degree or equivalent, 24.3% some college or technical training, and 10.7% who earned a college degree or higher. At childbirth, 1,088 (23.9%) biological mothers were married, 1,668 (36.7%) were cohabitating with a partner, and 1,791 (39.4%) were neither married nor cohabitating (which we denote as "single"). Thus, the FFCWS contains substantial racial, ethnic, and socioeconomic diversity, ensuring variation in the FSM constructs.

Biological mothers were interviewed at the time of the child's birth and again at 1, 3, 5, and 9 years. Telephone surveys were administered at each wave, with a subsample participating in-home visits with trained interviewers at ages three and five. The current study included 2,918

families. We excluded 1,980 families who did not have in-home observational data either at age three or five. Moreover, we marked data as missing at the ages 3, 5, or 9 interviews where the biological mother was not the respondent to prevent artifacts introduced by changing informants across time. Note that we did not exclude these families from our analyses because in the majority of these cases, the target child still lived with the biological mother most or all of the time. Mothers included in present analyses identified as Non-Hispanic Black (n = 1544, 53.1%), White Non-Hispanic (n = 541, 18.6%), Hispanic (n = 738, 25.4%), or other (n = 87, 3.0%). Most mothers did not earn a high school degree (n = 1173, 40.3%), with roughly a quarter of the sample earning a high school degree or equivalent (n = 753, 25.8%) or some college or a technical degree (n = 725, 24.9%), and 9% (n = 263) with a college diploma or higher. Consistent with the original sampling frame of the study, 78.2% (n = 2269) of the mothers were unmarried at the birth of the target child. Compared to the full FFCWS cohort, the sample used in the present analyses were more likely to be unmarried ($\chi^2[1] = 25.37$, $p < .001$) and have less education ($\chi^2[1] = 21.54$, $p < .001$), and included a larger proportion of Black Non-Hispanic mothers and less White Non-Hispanic and Hispanic mothers ($\chi^2[1] = 93.88$, $p < .001$). All data from the current study are publicly available (Fragile Families and Child Wellbeing Study, 2019)

Measures

Socioeconomic Disadvantage. Four indicators of socioeconomic disadvantage were measured at childbirth: (a) family income to needs ratio was a ratio of total household income (total income before taxes) to official U.S. Census Bureau poverty thresholds based on family composition, where higher values indicate less poverty (M = 2.10, SD = 2.31, Min – Max = 0 – 14); (b) maternal education status, coded ordinally as 1=less than a high school degree (40.3%), 2=high school or equivalent (25.8%), 3=some college or technical degree (24.9%), or 4=college degree or more (9.0%); (c) maternal age in years (M = 24.92, SD = 5.89, Min – Max = 14 – 47; 9% < 19 years; 21% < 30 years old); and (d) maternal marital status dichotomized as cohabitating or single (78.2%) versus married (21.8%). We collapsed cohabitating and single mothers into one group based on literature showing that children of cohabitating and single mothers differ more from children of married mothers than from each other with regards to socioemotional outcomes (Brown, 2004).

Economic Pressure. Economic pressure was measured at age 1 (but not at childbirth) using 12 mother-reported dichotomous (Yes/No) items about experiences in the past 12 months

(e.g., evicted, received free food/meals, telephone service disconnected, borrowed money to pay pills) taken from the Survey of Income and Program Participation (Bauman, 1998) and the Social Indicators Survey (Social Indicators Survey Center, Columbia University School of Social Work, 1999). Total scores ranged from 0 to 11 (M = 1.21, SD = 1.67, α = .70). Note that this construct has also been termed 'material hardship', but we use the term 'economic pressure' to be consistent with original conceptions of the FSM.

Maternal Distress. We created a latent factor of maternal distress at ages 1 and 3, using diagnoses of current Major Depressive Episode (MDD), Generalized Anxiety Disorder (GAD), and four items that measured self-reported stress from parenting from an abbreviated version of the Parenting Stress Inventory (PSI) (Abidin, 1995). Diagnoses of MDD (Age 1: 12.9% or 358 cases; α = .95; Age 3: 15.2% or 428 cases; α = .96) and GAD (age 1: 3.3% or 92 cases; α = .87; age 3: 5.2% or 146 cases; α = .83) were determined using criteria from the Composite International Diagnostic Interview – Short Form (CIDI-SF) (Kessler et al., 1998). A sum score of the four reverse-coded items from the PSI (e.g., "Taking care of children is more work than pleasure"), which were rated by mothers on a 4-point Likert scale (1 = strongly agree to 4 = strongly disagree), was created at ages 1 (M = 8.74, SD = 2.68, Min – Max = 4 – 16, α = .61) and 3 (M = 9.06, SD = 2.66, Min – Max = 4 – 16, α = .64). By creating a latent factor of maternal distress, we combined information from multiple overlapping but unique measures of maternal psychological functioning, and addressed low reliability of the abbreviated scales implemented in the FFCWS. Moreover, in several structural models of psychopathology, anxiety and depression load onto a single internalizing factor where the shared phenotype underlying both disorders is negative affect (Krueger & Markon, 2006). The FSM predicts that when economic pressure is high, parents are at increased risk for emotional distress, which Conger and colleagues (2010) broadly define to include anxiety and depression as well as alienation. Consistent with prior cross-sectional tests of the FSM (Gershoff et al., 2007), we included parenting stress as an additional indicator of negative affect (Arditti et al., 2010; Deater–Deckard, 2008). Results from the confirmatory factor analysis of latent maternal distress are presented in Supplemental Figure 1. To decrease overall model complexity in tests of the FSM, we extracted the resultant factor scores for each participant at each age for subsequent analyses.

Parenting. Maternal warmth and harshness were measured using interviewer-reported items from the Home Observation for Measurement of the Environment (HOME) scales and the

parent-reported Conflict Tactics Scale (CTS) during the home visits at ages 3 and 5 (Caldwell & Bradley, 1984; Straus et al., 1998). Items from the HOME were measured dichotomously (Yes/No). For each CTS item, mothers were asked to rate how many times in the past year each disciplinary practice was used ("pinched him/her", "shouted, yelled, or screamed at child"), from 0 (never happened) to 6 (more than 20 items). The CTS measures both physical and psychological forms of aggression (Straus et al., 1998). An additional response option in the CTS ("has happened but not in the past year") was recoded as "0". Factor analyses were used to create latent factors of maternal warmth and harshness at each age (Supplemental Methods). Eight items from the HOME scales were included in the latent factor of maternal warmth (Age 3 α = .79; Age 5 α = .80). A multi-informant latent factor of maternal harsh parenting (Möller et al., 2016) was created using four items from the HOME scales (Age 3 α = .73; Age 5 α = .72) and 10 items from the CTS (Age 3: α = .76; Age 5: α = .77). Measurement invariance analyses were conducted to determine the degree of invariance in both constructs across time points (see Supplemental Methods). Both maternal warmth and harshness met criteria for partial scalar invariance (i.e., equivalent factor loadings and thresholds at ages 3 and 5, for a subset of items). Factor scores were extracted for subsequent analyses.

Child Behavior. Internalizing and externalizing behaviors at ages 5 and 9 were measured using parent-reported items from an abbreviated version of the Child Behavior Checklist/6-18 (CBCL) (Achenbach & Rescorla, 2001). Seventy-two (age 5) and 111 items (age 9) were administered to parents, who were asked to rate child behavior from zero (Not true) to two (Very true). To maintain consistency across both assessment periods, we only used the items that were collected at both ages (Internalizing subscales: 17 out of 21 items from the original CBCL; Externalizing subscales: 28 out of 25 items from the original CBCL). Items that measured internalizing behaviors were drawn from the anxious/depressed, withdrawn/depressed, and somatic problems subscales (Age 5: α = .65; Age 9: α = .87). Items that measured externalizing behaviors were drawn from the aggression and rule-breaking subscales (Age 5: α = .85; Age 9: α = .87). Factor analyses were used to create latent factors of internalizing and externalizing behaviors at each age (see Supplemental Methods). Both the internalizing and externalizing constructs met criteria for partial scalar invariance (i.e., equivalent factor loadings and thresholds at ages 5 and 9, for a subset of items). Factor scores were extracted for subsequent analyses.

Analytic Strategy

We employed structural equation modeling in Mplus version 7.2 (Muthén & Muthén, 2006) to evaluate (1) a longitudinal FSM, with the constructs of interest measured at consecutive ages from childbirth through age nine, and (2) a longitudinal change FSM model, which included the lagged constructs of interest at the preceding time points from childbirth through age nine (see Figure 1 for the conceptual model). We present the results of our path models using the unweighted survey data to maintain the sociodemographic diversity of the sample that is relevant for an examination of the FSM, and because our sample restrictions (e.g., families where biological mother was the primary caregiver at all waves) would not be captured by the sampling weights. All model syntax is available in the Supplemental Material. All of the data used in the present analyses are publicly-available (Fragile Families and Child Wellbeing Study, 2019).

[INSERT FIGURE 1 HERE]

To account for a missing data (Supplemental Table 1), all statistical analyses used full information maximum likelihood (FIML) estimation. FIML uses the covariance matrix of all available data to produce unbiased estimates and standard errors in the context of missing data (McCartney et al., 2006), and has been shown to be a more powerful method of dealing with missing data than listwise deletion or imputation (Graham, 2009). Simulation studies indicate that FIML estimation provides unbiased estimates with greater power than listwise deletion even when up to 50% of data are missing (Enders & Bandalos, 2001; Schafer & Graham, 2002). Although covariance coverage was acceptable for FIML (>60% for all variables), we included auxiliary variables at ages 3 and 5 that were predictive of missingness as suggested by Graham (2009). At ages 3 and 5, families without observational data reported living in less poverty (Age 3: $t[4229] = 6.27$, $p < .001$; Age 5: $t[4137] = 5.96$, $p < .001$), living in households with less children (Age 3: $t[4209] = -6.31$, $p < .001$; Age 5: $t[4113] = -5.91$, $p < .001$) and more adults (Age 3 only: $t[4209] = 3.95$, $p < .01$), and were more likely to be married (Age 3: $\chi^2[1] = 38.91$, $p < .001$; Age 5: $\chi^2[1] = 35.47$, $p < .001$). Thus, the number of children and adults living in the household, family poverty ratio, and mother marital status (0 = unmarried, 1 = married) at ages 3 and 5 were included as auxiliary variables in all models. All models included child gender (0 = girl and 1 = boy) as a covariate. Although our intention was to test a longitudinal FSM from birth through age nine, in which constructs were measured at sequential time points, we included sensitivity analyses in which we additionally controlled for family income to needs ratio at age nine ($M = 1.89$, $SD = 2.09$, Min – Max = 0 – 30.81).

Aim 1: Longitudinal FSM. Our strategy in testing path models was to include every possible path from predictors to outcomes (e.g., for internalizing and externalizing outcomes at age 9, we included direct paths from all mediators including SES at childbirth), followed by pruning of non-significant paths to improve model fit when necessary. We also modeled the covariance between the four SES variables at childbirth so that significant paths from any of the SES variables to outcomes represented unique estimates over and above their shared covariance. We considered model fit acceptable if the Root Mean Square Error of Approximation (RMSEA) and Comparative Fit Index (CFI) met established guidelines (RMSEA < .06, and CFI > .95; Hu & Bentler, 1999). We were particularly interested in testing indirect effects from SES at childbirth to child internalizing and externalizing behaviors at age 9 via economic pressure at age 1, maternal distress at age 3, and maternal harsh parenting and low maternal warmth at age 5. We employed two complementary methods of testing indirect effects in Mplus v7.2 (Muthén & Muthén, 2006): (i) a product coefficient test (i.e., the 'Sobel method') to quantify the magnitude of the indirect effect (which can be less powerful and biased, but does provide an effect size), and (ii) unbiased confidence intervals using bootstrapping methods (i.e., 1000 draws of a Monte Carlo simulation), which do not assume normality of the indirect effects and thus represent more accurate and powerful tests of indirect, mediated pathways (Dearing & Hamilton, 2006).

Aim 2: Longitudinal change FSM. To test for longitudinal change (e.g., economic pressure at age 1 predicts increases in maternal distress from age 1 to 3), we included measures of maternal distress at age 1, parenting at age 3, and child internalizing and externalizing behaviors at age 5 as predictors of the same constructs at subsequent time periods (see Figure 1 for conceptual model). We allowed constructs that were measured at the same age (e.g., economic pressure and maternal distress at age 1) to be correlated. A fully recursive model, where we regressed youth socioemotional outcomes at age 9 on all lagged constructs (e.g., maternal distress at age 1) is not presented because model fit was worse than our hypothesized models (i.e., higher RMSEA, and lower CFI and TLI) and these paths were non-significant (results available upon request).

Results

Zero-order correlations between all variables included in the FSM are displayed in Table 1. With a large sample size, most estimates will be significant at the $p < .05$ level; thus, we focus on effect sizes. As expected, SES indicators at childbirth (i.e., family income to needs ratio, high

maternal education, maternal age, and maternal marital status [married]) were moderately correlated ($.33 < r < .51$)[1]. Lower SES at childbirth was weakly to moderately associated with greater economic pressure at age 1 and maternal distress at age 3 ($.05 < r < .18$), and weakly to moderately associated with lower maternal warmth and higher maternal harsh parenting at age 5 ($.06 < r < .21$). Lower SES at childbirth was consistently associated with externalizing behaviors ($.09 < r < .13$) but not internalizing behaviors at age 9 (Table 1). By contrast, family income-to-needs ratio at age 9 was associated with child externalizing, but not internalizing, behaviors at age 9.

Longitudinal FSM

We specified a longitudinal FSM with constructs measured from childbirth through age 9. Figure 2 displays the results of our path analyses. Consistent with our hypotheses that multiple indicators of SES would be relevant for the FSM, we found that family income to needs ratio ($\beta = -.14$, $p < .001$) and biological mother single or cohabitating ($\beta = .10$, $p < .001$) at the target child's birth each uniquely predicted greater economic pressure at age 1. Greater economic pressure at age 1 predicted greater maternal distress at age 3 ($\beta = .28$, $p < .001$) which, in turn, predicted lower observed maternal warmth ($\beta = -.06$, $p < .01$) and greater maternal harshness ($\beta = .15$, $p < .001$) at age 5. Low maternal warmth and high maternal harshness at age 5 each uniquely predicted greater child externalizing and internalizing behaviors at age 9, with the largest effect size between harsh parenting and child externalizing behaviors ($\beta = .27$, $p < .001$). There were also direct effects from economic pressure at age 1 and maternal distress at age 3 to greater child behavioral problems at age 9 ($.05 < \beta < .13$; $.001 < p < .05$); the effect sizes of these direct effects were largely similar to those linking parenting to child outcomes, suggesting that contextual factors earlier in development and parenting in later childhood may be equally important in predicting youth internalizing and externalizing behaviors at age 9 (Figure 2).

In contrast to zero-order correlations, there were no direct effects of SES at childbirth on youth externalizing behaviors at age 9; these effects operated indirectly via parenting and economic pressure (Table 2). Maternal warmth at age 5 mediated the effect of low family income-to-needs ratio and low maternal education at childbirth on youth externalizing behaviors

[1] One concern with including multiple indicators of socioeconomic disadvantage in the same model is high multicollinearity, where correlations between exogenous indicators larger than .50 increase the Type II error rate (Grewal et al., 2004). As the largest correlation among sociodemographic indicators in our sample was .51 (Table 1), we do not believe multicollinearity is a threat to our findings.

at age 9 (aβs = .01, ps < .05). Younger mother age at childbirth also predicted greater child externalizing (aβ = .04, p < .001) and internalizing (aβ = .01, p < .01) behaviors at age 9 via higher maternal harshness at age 5. In addition to parenting, economic pressure mediated SES pathways to youth externalizing and internalizing behaviors: mother marital status and low family income-to-needs ratio at childbirth each predicted greater youth externalizing and internalizing behaviors at age 9 via greater economic pressure at age 1 (Table 2). Sensitivity analyses that additionally accounted for family income-to-needs ratio at age 9 showed marginal changes to the effect sizes of some paths (see Figure 2 note), but no changes in the indirect effects from SES at birth to youth internalizing and externalizing behaviors at age 9.

[INSERT FIGURE 2 HERE]

Longitudinal Change FSM

Next, we tested a longitudinal change FSM, where the lagged constructs of maternal distress, parenting, and child behaviors were included in the path analysis. Figure 3 shows that after accounting for maternal distress at age 1, economic pressure at age 1 did not predict maternal distress at age 3. Similarly, after accounting for parenting behaviors at age 3, changes in maternal distress from ages 1 to 3 were not associated with changes in maternal warmth or harshness from ages 3 to 5. However, changes in maternal warmth (β = -.04, p < .05) and maternal harshness (β = .05, p < .01) from ages 3 to 5 predicted changes in child externalizing behaviors from ages 5 to 9 (i.e., greater increases in maternal warmth and decreases in maternal harshness led to greater decreases in externalizing behaviors) (Figure 3).

After accounting for the lagged FSM constructs, low maternal education at childbirth continued to predict greater increases in youth externalizing (but not internalizing) behaviors from ages 5 to 9 indirectly via greater decreases in maternal warmth from ages 3 to 5 (Table 2). Similarly, economic pressure at age 1 continued to mediate the effects of maternal marital status and low family income-to-needs ratio at childbirth on youth externalizing behaviors at age 9 (Table 2). All of the other indirect effects became nonsignificant after accounting for the lagged FSM constructs. Sensitivity analyses that additionally accounted for family income-to-needs ratio at age 9 yielded no changes to the path estimates or the indirect effects from SES at birth to youth internalizing and externalizing behaviors at age 9.

[INSERT FIGURE 3 HERE]

We further probed these associations in random intercepts cross-lagged panel models (Hamaker et al., 2015), which disaggregate stable between-person differences from within-person effects. Results suggested that even after accounting for stable individual differences in maternal warmth and youth externalizing behaviors from ages 3 to 9, within-person effects persisted: an individual who experienced changes in maternal warmth from ages 3 to 5 also evinced changes in externalizing behaviors from ages 5 to 9 (Supplemental Figure 2). By contrast, the associations between changes in maternal harshness from ages 3 to 5 and changes in youth externalizing behaviors from ages 5 to 9 appeared to be driven by stable between-person differences in those constructs (Supplemental Figure 3).

Post-hoc Analyses: Moderation by Race and Ethnicity

Income disparities by race and ethnicity (where Black Americans and Hispanic Americans disproportionately live below the poverty line) (Semega et al., 2017) and cultural differences (e.g., the role of extended family networks) suggest that some aspects of the FSM may vary across subpopulations (Cassells & Evans, 2017), though there have been no examinations of whether race and ethnicity moderates the FSM pathways within a longitudinal framework. Therefore, as a post-hoc analysis where we did not have any clear hypotheses, we took advantage of the racial and ethnic diversity in the FFCWS to examine whether any of the "core FSM" pathways in the longitudinal FSM were significantly different among Black Non-Hispanic families (N = 1544), White Non-Hispanic families (N = 541), and families of Hispanic origin (N = 738). Moderation was tested by comparing model fit of a freely estimated model (i.e., every path allowed to vary across groups) to a model where one of the core FSM paths was fixed across groups. As the chi-square test statistic is sensitive to large sample sizes, we evaluated ΔCFI as an alternative to $\Delta\chi^2$; $\Delta CFI \geq -.01$ indicates a significant worsening of model fit (Cheung & Rensvold, 2002). Supplemental Figure 4 shows the results of the longitudinal FSM freely estimated across White Non-Hispanics, Black Non-Hispanics, and participants of Hispanic origin. Although the magnitude of effects varied across groups, the direction of effects was generally consistent and moderation analyses suggested that none of the core FSM paths were significantly different across groups. There were no significant indirect pathways from economic hardship variables at childbirth to youth behaviors at age 9 among any of the racial and ethnic groups, though these models were likely underpowered to detect small indirect effects.

Discussion

The current paper tested a longitudinal FSM in a large, population-based sample of urban U.S. families from childbirth through age 9 and included measures of socioeconomic disadvantage that extended beyond economic aspects of SES. We found evidence for direct effects of economic pressure, maternal distress, and maternal parenting behaviors across childhood on children's socioemotional outcomes at age 9, as well as indirect effects of socioeconomic disadvantage at childbirth on youth outcomes via parenting and economic pressure (even after accounting for family income-to-needs ratio at age 9). In our most rigorous model that accounted for stability in constructs over time, low maternal education at childbirth predicted increases in child externalizing behaviors from ages 5 to 9 via decreases in maternal warmth from ages 3 to 5, highlighting the importance of non-economic indicators for the FSM (Bradley & Corwyn, 2002; Duncan & Magnuson, 2003). Our results provide support for the centrality of parenting within the FSM, while also highlighting the relevance of economic pressure and maternal distress in pathways linking socioeconomic disadvantage to youth socioemotional outcomes across childhood.

Although prior tests of the FSM have predominately relied on economic aspects of SES (i.e., family income) to probe the effects of socioeconomic disadvantage on youth outcomes, our results suggest that maternal marital status and education at childbirth are unique contributors to the FSM. Mothers who are married oftentimes have more non-economic resources than single-parent or cohabitating parents, including social support and lower psychological distress (Brown, 2004; McLanahan & Sandefur, 1994). Similarly, higher maternal education confers additional cognitive resources that can be used to strategize in times of economic distress, as well as parent more effectively (Bradley & Corwyn, 2002). Although family income-to-needs ratio at childbirth was associated with greater economic pressure at age 1 and maternal warmth at age 5, it did not predict youth outcomes via parenting, which is in contrast to most previous tests of the FSM (Conger et al., 2010). In supplemental analyses that did not include maternal education, age, or marital status at childbirth in the longitudinal FSM, the indirect effects from low family income-to-needs ratio at childbirth to greater youth externalizing behaviors at age 9 via low maternal warmth and high harsh parenting at age 5 were significant ($\alpha\beta$s = .01, ps < .01; results available upon request). This suggests that after accounting for the covariance between family income-to-needs ratio and these non-economic indicators of hardship, maternal marital status and education may be more proximal predictors of youth externalizing behaviors within the FSM in the

FFCWS. Although our theoretical model is novel in expanding the measurement of socioeconomic disadvantage to include maternal age at childbirth and marital status, these constructs could also be conceptualized as predictors of family income within the FSM. We included them as core indicators to acknowledge that marital status and maternal age at childbirth confer non-economic resources that undermine socioeconomic disadvantage. Our results suggest that future tests of this family process model should include indicators of socioeconomic disadvantage that extend beyond family income.

This study also contributed to the existing FSM literature by testing both a longitudinal model and a longitudinal change model (i.e., a cross-lagged model). When the lagged constructs of maternal distress, parenting, and child socioemotional outcomes were added to the longitudinal model, many path estimates became non-significant: economic pressure at age 1 was not associated with maternal distress at age 3, and maternal distress at age 3 did not predict maternal warmth or harshness at age 5. Changes in the indirect effects were also observed: once the lagged FSM constructs were added to the longitudinal model, maternal age at childbirth no longer predicted youth internalizing and externalizing behaviors via maternal harsh parenting. However, because all of the indirect effects were of such small magnitude (all aβs = .01), these changes may not be meaningful. Generally, across both modeling frameworks, socioeconomic disadvantage at childbirth appeared to have indirect effects on youth socioemotional outcomes at age 9 via maternal parenting behaviors at age 5 and economic pressure at age 1, though the size of these effects were modest.

Although the FSM does not strictly hypothesize differential effects of harsh and warm parenting for youth internalizing and externalizing outcomes (Masarik & Conger, 2017), our results suggest otherwise. Indeed, several previous tests of the FSM measured socioemotional competence as a latent factor that included internalizing and externalizing behaviors (e.g., Raver et al., 2007), and parenting behaviors as a latent factor that included harsh and warm parenting (Landers-Potts et al., 2015). Only one previous longitudinal test of the FSM distinguished youth socioemotional competence along internalizing and externalizing domains: White et al. (2015) found that mothers' perceptions of economic pressure predicted youth externalizing behaviors, but not internalizing behaviors, via maternal harshness. The indirect effects via parenting in our models were also largely specific to youth externalizing outcomes.

The effects of socioeconomic disadvantage at childbirth on youth socioemotional outcomes operated through parenting and economic pressure (i.e., there were no direct effects of family income-to-needs ratio, maternal education, marital status, or maternal age at childbirth to youth socioemotional behaviors at age 9). Though these findings support the mediation effects hypothesized by the FSM (i.e., via parenting), the indirect pathways via economic pressure and maternal warmth were of similar magnitude, suggesting that both constructs are important to the FSM. We also observed modest direct effects of economic pressure and maternal distress across childhood on youth socioemotional outcomes at age 9. That is, we found evidence that economic pressure and maternal distress may predict youth outcomes via mechanisms outside of parenting. This result is difficult to compare with previous tests of the FSM model as results have been mixed – some studies have not tested for these direct effects (e.g., Conger et al., 2002), some have found evidence for them (e.g., Kavanaugh et al., 2018), and others have not (e.g., Diggs & Neppl, 2018). However, there is good reason to believe that economic pressure and maternal distress may predict youth outcomes via multiple pathways. Mother-reported economic pressure in the current study included items that asked parents about material hardship, eviction, and food insecurity (Bauman, 1998; Social Indicators Survey Center, Columbia University School of Social Work, 1999). Several reviews show that low SES increases risk for child socioemotional problems through physical environmental exposures (e.g., housing quality, toxicant exposure), in addition to interpersonal processes within the parent-child relationship (Evans, 2004; Evans & Kantrowitz, 2002). Indeed, recent studies in the FFCWS have shown that adverse housing conditions (Jackson et al., 2017) and food insecurity (Hobbs & King, 2018), significantly increase risk for youth socioemotional problems. Future research should integrate physical environmental exposures with interpersonal processes to better understand pathways from economic hardship to youth socioemotional outcomes.

The indirect effects from maternal marital status and maternal education at childbirth to youth externalizing behaviors at age 9 via parenting at age 5 did not fully explain the associations between socioeconomic disadvantage and youth outcomes. In the longitudinal change FSM, the indirect effects via parenting explained roughly 50% of the total effect from SES at childbirth to youth outcomes, suggesting sizeable contributions from the direct effects (e.g., economic pressure at age 1, maternal distress at age 3, parenting at age 5). Indeed, previous longitudinal tests of the FSM that examined this model across timespans of more than a few

years report similarly small or non-significant indirect effects of parenting (Diggs & Neppl, 2018; Kavanaugh et al., 2018; Neppl et al., 2016; White et al., 2015). By contrast, Landers-Potts et al., (2015), whose longitudinal test of the FSM measured constructs only two years apart, reported much larger effect sizes (aβ = .16, 85% of the total effect) for the indirect effects of economic pressure on youth outcomes via parenting (see also Henninger & Luze, 2014). These studies thus suggest that the hypothesized indirect effects of SES on youth outcomes via parenting, as outlined in the FSM, may operate along shorter timeframes (e.g., on the order of weeks or months or a year or two). Alternatively, though our inclusion of both warm and harsh parenting behaviors was a strength of our study, other unmeasured aspects of parenting in early childhood (e.g., positive behavior support) may be important in mediating the impact of socioeconomic disadvantage on youth socioemotional outcomes (Dishion et al., 2008). More research is needed to investigate whether the small indirect effects observed in the current analyses result from a discrepancy in the time scale of such family processes, or whether there are other mechanisms (e.g., access to quality childcare, variation in material hardship, parenting behaviors beyond harshness and warmth) linking socioeconomic disadvantage to youth socioemotional outcomes.

Small indirect effects via parenting do not discount the importance of parenting behaviors in the development of youth socioemotional outcomes. In our models, both harsh and warm parenting at age 5 exerted modest direct effects on youth externalizing behaviors at age 9. Of course, one limitation of these findings is that they could reflect gene-environment correlation – that parents who are harsh also pass genetic risk for such aggression to their children, who display higher levels of externalizing behaviors (Manuck & McCaffery, 2014). However, several studies that have used adoption designs to disambiguate genetic and environmental influences on youth psychopathology, report effects of adoptive parents' behavior (e.g., warmth) on child socioemotional outcomes (e.g., Hyde et al., 2016). Parents are critical regulators of context effects on children (Conger et al., 2010; McLoyd, 1990, 1998), particularly during early childhood when children spend much of their time in the home (Shaw & Bell, 1993). Importantly, the relations between parenting behaviors and child socioemotional outcomes were continuous; greater maternal warmth and lower harsh parenting predicted fewer child internalizing and externalizing behaviors. Thus, framing our results within a resilience

framework highlights maternal warmth as promotive factor for families living in poverty (Ager, 2013; Kim-Cohen et al., 2004).

Post-hoc moderation analyses of the FSM by race and ethnicity showed that although the strength of the associations varied by group, there were no significant differences in the core FSM pathways among White Non-Hispanic, Black Non-Hispanic, and Hispanic families. These results stand in contrast to cross-sectional reports (e.g., Raver et al., 2007), suggesting that family processes may be more similar across cultural backgrounds within a longitudinal framework. Moreover, as the FFCWS is a population-based study that employed recruitment techniques to interview families representative of large U.S. cities, the results presented here may be more generalizable to the broader population. Future examinations of the FSM are needed that broaden our characterization of race and ethnicity to include fluid individual-level measures of culture (e.g., ethnic identity, acculturation; Causadias, 2013). For example, White et al. (2015) found that mother's familism values mitigated the effects of economic pressure on maternal warmth; this type of attention to culturally-relevant orientations is an important avenue for future investigations of family processes in racially-, ethnically-, and culturally diverse populations (Garcia Coll et al., 1996).

Limitations and Future Directions

Several limitations of this study are noteworthy. First, as is common in large-scale survey research, the study implemented abbreviated measures of our constructs of interest, which resulted in lower than expected scale reliabilities (e.g., internalizing subscale of the Child Behavior Checklist [Achenbach & Rescorla, 2001] at age 5, $\alpha = .65$; parenting stress from an abbreviated version of the Parenting Stress Inventory [Abidin, 1995] at age 1, $\alpha = .61$, and age 3, $\alpha = .64$). Thus, the abbreviated measurement of constructs and low scale reliability may have contributed to some of the non-significant outcomes (e.g., child internalizing behaviors) and mediators (e.g., maternal distress) in our models. Moreover, the abbreviated version of the Child Behavior Checklist also prevented us from examining whether youth psychopathology was in the clinical range. Second, as the FFCWS only collected parent-reported youth psychopathology and parents also self-reported their own psychopathology, informant bias is also a concern and may inflate the associations between constructs (Berg-Nielsen, Vika, & Dahl, 2003). Thus, future longitudinal examinations of the FSM should integrate additional measures of internalizing and externalizing behaviors, including clinical assessments and multiple-informant measures where

possible. Third, original conceptions of the FSM included interparental conflict within married dyads as an additional mediator linking socioeconomic disadvantage to youth outcomes, which we did not include in the present paper. As the FFCWS purposely oversampled non-marital births as part of the original study design (Reichman et al., 2001) and nearly 80% of the mothers in our sample were unmarried at childbirth, we did not want to introduce uncertainty into our models with changing partner dyads over time. Although we believe the strengths of the FFCWS dataset outweigh this limitation, interparental conflict is an important predictor of youth socioemotional outcomes (Spjeldnes & Choi, 2008) and should be studied further within the FSM using large, population-based datasets. Fourth, though we used both observational and self-report measures of parenting in our models, many families did not participate in the in-home interview at age 3 and/or 5. To account for this missing data, we excluded families without at least one wave of observational data and in doing so, altered the composition of the sample from the original FFCWS. That data were systematically missing may undermine the representativeness of the sample (Groves et al., 2009). Fifth, one potential weakness of cross-lagged panel models is these models include both within-person and between-person effects (Berry & Willoughby, 2017; Curran & Bauer, 2011; Hamaker et al., 2015). Thus, we estimated two random intercepts cross-lagged panel models (Hamaker et al., 2015) and found relatively similar results, though note that the association between harsh parenting and youth externalizing behaviors may be driven by stable between-person differences in those constructs.

The current test of a longitudinal FSM in a relevant population-based sample of urban U.S. births contributes to our understanding of the longitudinal relations between socioeconomic disadvantage and youth socioemotional outcomes. The study leveraged the diversity and sample size of the Fragile Families and Child Wellbeing Study dataset to examine the unique influences of multiple indicators of SES to family processes, and to construct a rigorous longitudinal change FSM model that accounted for stability in constructs. Results highlight the importance of replicating and extending existing psychological theories in large, population-based studies. In the case of the FSM, more research is needed to understand the timescale within which these family processes operate. Moreover, the current results emphasize that economic pressure, parent psychological functioning, and parenting behaviors exert durable effects on youth socioemotional outcomes across the first 9 years of life.

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Table 1. Zero-order correlations between variables included in the Family Stress Model

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Childbirth	1. Family poverty ratio	-									
	2. Maternal education	.51***	-								
	3. Maternal age (years)	.33***	.37***	-							
	4. Mother married	.40***	.35***	.37***	-						
Age 1	5. Economic pressure	-.17***	-.09***	-.05*	-.18***	-					
Age 3	6. Maternal distress	-.10***	-.09***	-.05**	-.06**	.29***	-				
Age 5	7. Maternal warmth	.19***	.21***	.14***	.16***	-.03	-.07***	-			
	8. Harsh parenting	-.10***	-.05**	-.17***	-.13***	.12**	.18***	-.08***	-		
Age 9	9. Child internalizing	.06**	-.06**	-.05	-.03	.10***	.15***	-.07***	.12***	-	
	10. Child externalizing	-.14***	-.11***	-.10***	-.09***	.15***	.21***	-.14***	.32***	.52***	-
	11. Family poverty ratio	.63***	.48***	.29***	.36***	-.17***	-.09***	.17***	-.10***	-.03	-.13***

Note. 1,433 < N < 2,918 Spearman rank correlations were used for associations with mother marital status (dichotomous).
*p<.05, **p<.01 ***p<.001

Table 2. Indirect effects linking socioeconomic disadvantage at childbirth to youth socioemotional outcomes at age 9

	Longitudinal Model	**Longitudinal Change Model**
	Estimate (SE), Bootstrapped [95% CI]	Estimate (SE), Bootstrapped [95% CI]
Outcome: Youth Externalizing Behaviors at Age 9		
Predictor: Low Family Income-to-Needs at Childbirth		
Indirect Effect via Economic Pressure at Age 1	.01 (.003)**, [.004, .016]	.01 (.003)**, [.002, .009]
Indirect Effect via Maternal Warmth at Age 5	.01 (.002)**, [.002, .011]	ns
Predictor: Mother Single or Cohabitating at Childbirth		
Indirect Effect via Economic Pressure at Age 1	.01 (.003)**, [.002, .013]	.01 (.002)*, [.001, .009]
Indirect Effect via Maternal Harsh Parenting at Age 5	.02 (.006)*, [.004, .028]	ns
Predictor: Low Maternal Education at Childbirth		
Indirect Effect via Maternal Warmth at Age 5	.01 (.003)***, [.006, 019]	.01 (.001)*, [.004, .017]
Indirect Effect via Maternal Harsh Parenting At Age 5	.02 (.006)*, [.005,.024]	ns
Predictor: Young Mother Age at Childbirth		
Indirect Effect via Maternal Harsh Parenting at Age 5	.04 (.006)***, [.030, .054]	ns
Outcome: Youth Internalizing Behaviors at Age 9		
Predictor: Low Family Income-to-Needs at Childbirth		
Indirect Effect via Economic Pressure at Age 1	.01 (.003)*, [.001, .014]	ns
Predictor: Mother Single or Cohabitating at Childbirth		

Indirect Effect via Economic Pressure at Age 1	.01 (.003)*, [.001, .011]	ns
Predictor: Young Mother Age at Childbirth		
Indirect Effect via Maternal Harsh Parenting at Age 5	.01 (.003)***, [.005, .018]	ns

Note. N = 2,918. Standardized estimates are shown. For indirect effects, we provide the unbiased bootstrapped CI of this effect ($p<.05$) as well as an estimate of the product coefficients ($\alpha\beta$) (i.e., the 'sobel test') as an index of gross effect size. Inclusion of family income-to-needs ratio at age nine in the models (see Methods) did not change the effect sizes or statistical significance of the indirect effects, either in the longitudinal model or the longitudinal change model.

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

Figure 1. Conceptual Model

Aim 1 tested of the longitudinal family stress model (FSM) across childhood (from childbirth through age nine), as indicated by the constructs in white boxes. In Aim 2, we tested a longitudinal change FSM by adding the lagged constructs of maternal distress, harsh parenting, maternal warmth, and child internalizing and externalizing behaviors, as indicated by shaded gray boxes

Figure 2. Path model testing the longitudinal family stress model

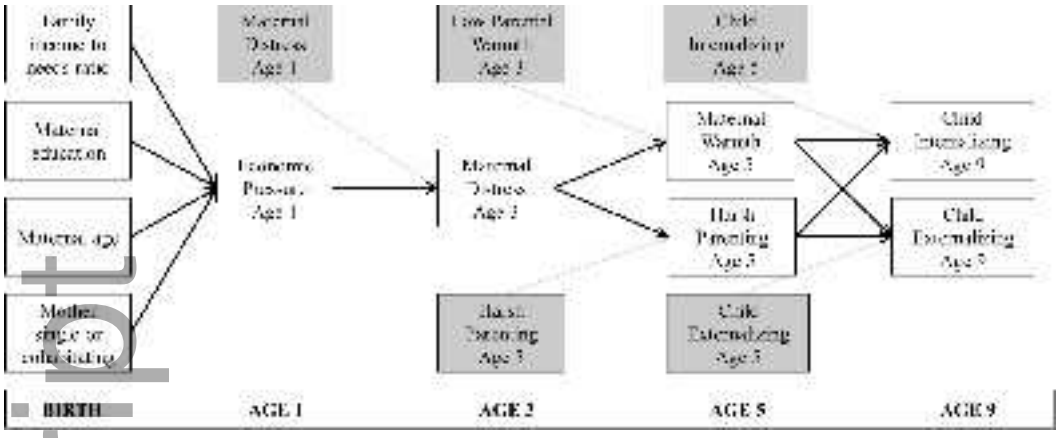
*p<.05, **p<.01, ***p<.001; Paths are marked with standardized estimates.

N=2,918. Model fit: $X^2(8) = 24.28$, $p < .001$, RMSEA=.03, 90%CI [.02, .04], CFI=.99, TLI=.96. Non-significant paths that were also modeled but not pictured: All measures of socioeconomic disadvantage at childbirth to child internalizing and externalizing at age 9. In sensitivity analyses, we additionally controlled for family income to needs ratio at age nine (see Methods). The associations between maternal warmth and child internalizing ($\beta = -.04$, $p < .05$) and externalizing ($\beta = -.08$, $p < .001$) behaviors were weaker, while the associations between harsh parenting and child internalizing ($\beta = .08$, $p < .001$) and externalizing ($\beta = .27$, $p < .001$) behaviors were stronger.

Figure 3. Path model testing the longitudinal change family stress model

*p<.05, **p<.01, ***p<.001; Paths are marked with standardized estimates.

N=2,918. Model fit: $X^2(60) = 981.43$, $p < .001$, RMSEA=.07, 90%CI [.07, .08], CFI = .94, TLI = .93. Non-significant paths that were also modeled but not pictured: All measures of socioeconomic disadvantage at childbirth to maternal distress at age 3, and child internalizing and externalizing at age 9. In sensitivity analyses, we additionally controlled for family income to needs ratio at age nine (see Methods). There were no changes in the effects sizes of any of the depicted paths.



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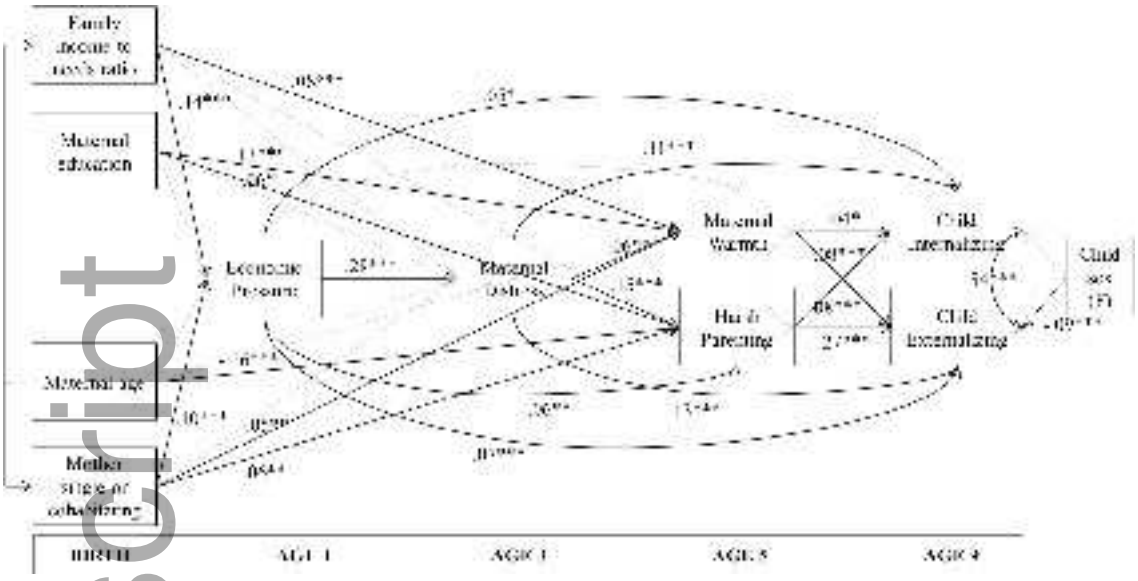

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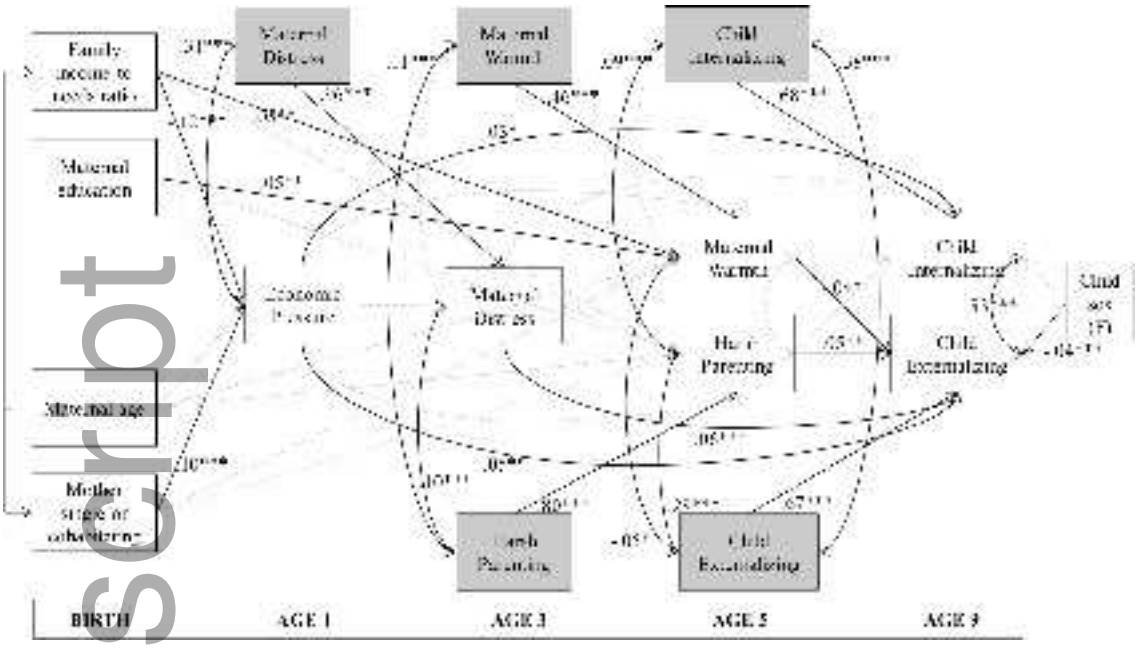

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