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RESEARCH ARTICLE

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Household instability and self-regulation in Head Start children: The mediating and moderating roles of bedtime routines

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Abstract

Children in unstable homes face frequent changes and distractions from unpredictable events, leading to lower emotional regulation and reduced attentional regulation. This study investigated the role of early bedtime routines in the relationship between household instability and self-regulation among Early Head Start children. Specifically, we investigated whether early bedtime routines function as a mediating mechanism or a moderating factor in the association between early household instability and children's self-regulation. The analytic sample included 1760 primarily low-income, ethnic minority families in the U.S. Using two separate longitudinal models, we tested the mediation effect using path analysis and found that early bedtime routine during toddlerhood (14–36 months) significantly mediated the relationship between household instability and both emotional and attentional regulation at 36 months. However, the moderation analysis did not yield significant evidence supporting the buffering role of bedtime routines. This study provides empirical evidence that parents' engagement in establishing consistent early bedtime routines plays a significant mediating role in supporting the development of children's emotional and attentional regulation in the context of household instability.

KEYWORDS

attentional regulation, early bedtime routines, emotional regulation, household instability, infant development

1 | INTRODUCTION

Children living in unstable households may experience frequent changes in their residence and/or primary caregivers and are distracted by various unpredictable events (Andrews et al., 2021; Brown & Low, 2008). Existing evidence indicates that household instability is linked with decreased emotional regulation and poor executive functioning among children (e.g., Andrews et al., 2021; McCoy & Raver, 2014; Razza et al., 2010). While these associations are recognized, the specific underlying pathways have yet to be fully investigated. In the literature on routines and child development, many studies have emphasized the benefits of family routines for children's self-regulation, encompassing both family-level activities, such as mealtime and chores, and child-level activities (see a systematic review by Selman and Dilworth-Bart, 2024). Although early bedtime routines have received comparatively less

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attention within this body of research, previous research suggests that inconsistent nighttime routines and disruptions in normal sleep patterns during early childhood make individuals more susceptible to poor emotional functioning (Hale et al., 2011), problem behaviors (Gregory et al., 2008; Pudasainee-Kapri et al., 2025), and reduced attentional and academic outcomes across school years (Brown & Low, 2008; Finegood & Blair, 2017). Guided by Mindell and Williamson (2018) conceptual model, which identifies bedtime routines as a distinctive regulatory context that supports multiple domains of early development, the present study examines how early bedtime routines function within the broader family environment as either a mediator or moderator of the association between household instability and children's emotional and attentional regulation. Drawing on longitudinal data from Early Head Start families—a population often exposed to heightened levels of household instability—this study explores early bedtime routines as a potential mechanism of developmental change or a protective factor that may promote resilience in children growing up in homes with instability.

Key findings

1. Household instability during infancy is significantly associated with lower levels of emotional and attentional regulation at age 3, highlighting the developmental risks posed by unpredictable and disruptive home environments.
2. Early bedtime routines (14–36 months) significantly mediate the relationship between household instability and children's self-regulation outcomes, indicating that consistent caregiving practices may function as a mechanism connecting to children's emotional and attentional development.
3. Early bedtime routines did not moderate the effects of household instability on emotional and attentional regulation.

Statement of relevance

This study contributes to the growing literature on early family experiences and their effects on toddlers' emotional and attentional regulation. By examining early bedtime routine as a consistent, relationship-based caregiving practice, the findings underscore how everyday interactions can serve as key mechanisms in fostering self-regulation. This is particularly relevant in the context of early household instability, which is more commonly experienced in children from low-income families, including those enrolled in Early Head Start.

1.1 | Household instability and the development of self-regulation

Self-regulation is defined as a multidimensional construct that enables individuals to control thoughts, emotions, and actions in response to environmental stimuli, which has been found to be crucial to multiple domains of development in children and their later academic competence (e.g., Finegood & Blair, 2017; Razza et al., 2012). In this study, we focus on two key dimensions of self-regulation in early childhood: emotional regulation, the ability to manage and express emotions in appropriate and adaptive ways (Eisenberg & Morris, 2002), and attentional regulation, the capacity to sustain and shift attention to meet task demands (Razza et al., 2012). Emotional regulation involves the processes and strategies used to recognize, understand, and modulate one's emotions in order to adaptively respond to and navigate through various emotional states (Eisenberg & Morris, 2002). It develops rapidly across infancy and toddlerhood years, in which children often rely on their parents or consistent caregivers to externally regulate their emotions, such as looking for parents when being sad or experiencing discomfort (Morris et al., 2007). Attentional regulation reflects children's ability to focus their attention on specific stimuli in their environmental settings and to keep them away from distraction (Derryberry & Roothbart, 1997). Attentional regulation is a crucial cognitive function that denotes children's capacity to selectively direct their attention towards particular stimuli present in their surroundings. This ability plays a fundamental role in helping children process relevant information by centering their focus on specific tasks, objects, or events (e.g., Razza et al., 2012).

Frequent disruptions in household stability—such as shifts in caregiving arrangements, moves, financial hardship, or the loss of a family member—can negatively impact the development of key aspects of self-regulation in early childhood, including emotional and attentional control (Sturge-Apple et al., 2017). Prior research has shown a direct correlation between household instability and lower levels of attentional regulation in children (see Andrews et al., 2021, for a review). The unpredictability stemming from household instability may disrupt the child's consistent proximal processes, resulting in notable challenges in regulatory processes and behaviors. For

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example, preschool children who lack routine exhibit poor performance on delayed gratification tasks (a form of self-regulation that involves the ability to resist immediate temptations or rewards in order to achieve a greater or more desirable outcome in the future) by kindergarten age (Martin et al., 2012). Children residing in unstable home situations may encounter regular disruptions and distractions from unforeseen events, making it challenging for them to establish effective family routines. However, the precise mediation mechanisms through which the absence of a bedtime routine influences the relationship between household instability and self-regulation in toddlerhood have not been empirically examined yet.

1.2 | Bedtime routines as a regulatory context

Bedtime routines involve consistent behaviors where parents participate with their children in daily activities leading up to sleep at night, such as calming activities like storytelling, book reading, bath time, or a massage (De Stasio et al., 2020; Mindell & Wlliamson, 2018). Mindell and Williamson (2018) proposed a conceptual model that emphasizes the significance of a bedtime routine as a crucial element in fostering not only healthy sleep patterns but also supporting comprehensive development and well-being during early childhood. The establishment and maintenance of bedtime routines require dynamic interactions between parents, their child, as well as other contextual factors (e.g., chaos and instability; Mindell & Williamson, 2018). For example, caregivers from socioeconomically disadvantaged households often have low educational attainment, which has been associated with less likelihood of implementing consistent bedtime routines and poor bedtime health literacy (Hale et al., 2011). In a Head Start sample, 50% of children were reported to have unhealthy bedtime practices, with more children going to bed late than early (48% vs. 14%; Bonuck et al., 2016). In the case of household instability, frequent changes in residence or caregivers can disrupt the establishment of consistent and predictable bedtime routines (Covington et al., 2019).

Bedtime routines play a crucial role in fostering self-regulation in children, as consistent routines offer a structure that helps guide a child's emotions and behaviors, ultimately contributing to positive emotional states (Mindell & Williamson, 2018; Pudasainee-Kapri et al., 2025; Spagnola & Fiese, 2007). The structured, predictable nature of bedtime routines—such as reading, hygiene, and calming rituals—may directly support children's emotional and behavioral regulation by scaffolding their ability to manage transitions and internalize self-soothing strategies (Kiel et al., 2024). However, in households marked by instability—such as frequent moves, shifting caregivers, or chronic stress—these routines may be inconsistent, interrupted, or altogether absent (Weisner, 2010), potentially compromising children's opportunities to develop foundational self-regulation skills. In this way, bedtime routines can serve as a mediating mechanism, helping to explain how early environmental risks like household instability affect children's self-regulatory capacities. Within the context of early parenting, research suggests that disruptions, or the complete absence of such routines, have been linked to compromised emotional regulation and inhibition (Anderson et al., 2017; Bocknek et al., 2018; Kitsaras et al., 2018; Turnbull et al., 2013). The establishment of bedtime routines during infancy and toddlerhood years may be vital for positive emotional development at age 3 in low-income families who are more prone to household instability. Empirical studies suggest that bedtime routines are an important contextual variable that is associated with positive social-emotional development among samples of primarily disadvantaged children (Hale et al., 2011; Lam et al., 2023; Schlieber & Han, 2018). Another research study found that children from ethnic minority families were less likely to have consistent bedtime routines or use regular bedtimes, which may contribute to later poor self-regulation (Hale et al., 2011).

At the same time, consistent bedtime routines may also operate as a moderating factor, offering a source of stability, emotional security, and caregiver attunement that buffers the child from broader environmental unpredictability (Selman & Dilworth-Bart, 2024). While household instability may disrupt children's emotional and attentional development by increasing stress and reducing opportunities for consistent caregiving, a stable bedtime routine can act as a protective factor by offering a daily moment of structure, caregiver presence, and emotional security. Although no empirical findings on self-regulation have been presented, a recent review by Selman and Dilworth-Bart (2024) highlighted the protective power of routines in early childhood, particularly in high-stress or low-resource environments. It emphasizes that routines provide children with a sense of safety, predictability, and control, all of which are crucial for healthy development. Supporting this notion, Bridley and Jordan (2012) found that child routines significantly moderated the association between children's daily hassles and internalizing behavior problems, such that children with more structured routines were less likely to show internalizing symptoms when faced with daily stressors. Similarly, Ferretti and Bub (2014) found that among children living in poverty, those who experienced more consistent routines at 14 months exhibited significantly higher cognitive functioning at 36 months, suggesting that routines can foster

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developmental resilience in adverse contexts. Therefore, for children experiencing instability, having a regular bedtime routine may attenuate its negative effects on self-regulation.

1.3 | Current study

This study aims to address the gap in existing research on the connection between household instability and the development of self-regulation, while also examining the role of early bedtime routines. We hypothesize that (1) household instability experienced 12 and 24 months will be negatively associated with emotional regulation and attentional regulation in early childhood at 36 months, and (2) early bedtime routines (from 12 to 36 months) will mediate the associations between household instability experienced in infancy and toddlerhood and emotional regulation as well as attentional regulation in early childhood at 36 months. In addition, we explore whether early bedtime routines (from 12 to 36 months) serve as moderators in the associations between household instability and emotional regulation, as well as attentional regulation at 36 months. Although variables are often conceptualized as either mediators or moderators, emerging research underscores the value of exploring both roles within a single study—especially when theoretical frameworks and prior findings offer competing explanations for the mechanisms of influence (e.g., Arslan, 2018; Karazsia & Berlin, 2018).

2 | METHOD

2.1 | Participant and procedure

Data for this study were sourced from the large-scale evaluation project of Early Head Start programs—Early Head Start Research and Evaluation Project (EHSRE). This evaluation project is a large-scale initiative launched by the (Administration for Children and Families, 2002a) to assess the effectiveness of Early Head Start programs. The original study recruited 3001 families from 17 program sites across the United States between 1995 and 2000, selected to reflect diverse family demographics, geographic regions, and program models. The goal was to examine the program's impact on low-income families, particularly those led by single parents. The dataset used in the present study is accessible via the Child and Family Data Archive. Further details on the study's methodology can also be found in this data archive (see also [BLINDED] [2025] for additional information). Because the data are de-identified and publicly available, this research meets the criteria for exemption from Institutional Review Board (IRB) review. Participant consent was completed in the EHSRE data collection procedure.

The EHSRE study gathered longitudinal data via interviews with mothers and evaluations conducted by trained child interviewers when focal children were at ages 14, 24, and 36 months. To collect data on various aspects of self-regulation, EHSRE-trained interviewers conducted home visits with enrolled families and directly assessed emotional regulation and attentional regulation in children. The subsample ($N = 1760$) of families participating in the EHSRE project included in this study primarily consisted of low-income families and families of color. Families that were not included in the third wave of data collection, when emotional regulation and attentional regulation were measured, were excluded from the analyses. The analytic sample consisted of 50.3% male children, with primary caregivers being mothers (99% of the sample; mean age, 22.46 years old; SD = 5.56) at baseline, when the children were 14 months old. Only 24.3% of the mothers had a high school degree or above. In the analytical sample, 89% of families fell below the federal poverty line, with 49.5% indicating they received welfare. This sample presented ethnic and racial diversity, comprising 32.2% Black, 38.4% White, and 23.8% Hispanic/Latino/a, as reported by the mothers (see Table 1).

2.2 | Measurement

2.2.1 | Household instability

To capture children's experiences of household instability, caregivers reported on several indicators, including the number of residential moves, whether they had ever been homeless, whether there had been any childbirth, and whether the mother remained married and cohabiting with the father since the initial assessment. To develop indicators, the number of moves over the previous year that was originally assessed on continuous scales was dichotomized to 0 = less than two moves and 1 = equal to or more than two moves. The other three items were measured on a yes/no scale: ever homeless: yes = 1 and no = 0; any childbirth: yes = 1 and no = 0; married and living with dad since baseline: yes = 0 and no = 1. The selection and the scale of these items were based on previous seminal works (e.g., Brown et al., 2013; Fomby & Cherlin, 2007; McCoy & Raver, 2014) and were designed to make optimal use of the available dataset indicators to capture multiple dimensions of instability, such as changes in residence, household composition, and significant life events influencing household structure and perceived stress. Household instability was represented by

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TABLE 1 Descriptive statistics of the analytical sample.

Variable	Analytical sample ($N = 1760$)		
	N	%	M (SD)
Child characteristics			
Child sex (male)	885	50.3	
Race/ethnicity			
Black/African American	567	32.2	
Hispanics/Latino/a	418	23.8	
White	676	38.4	
Others	68	3.9	
Low birth weight (< 2500 g)	98	8.4	
Primary language is English	1345	78.9	
Maternal characteristics			
Maternal age (at childbirth; in years)			22.46 (5.56)
Maternal education			
< 12 years of schooling	789	44.8	
About 12 years of schooling	494	28.1	
> 12 years of schooling	411	24.3	
Not married/cohabiting	1311	74.5	
Not employed/school/training	899	51.1	
Household/ neighborhood characteristics			
Household income < 33% of poverty level	418	23.8	
Household income 33%–67% of poverty level	452	25.7	
Household income 67%–99% of poverty level	387	22	
Household income > = 100% of poverty level	194	11	
Receiving welfare	871	49.5	

a composite score derived from five items assessed at the 12- and 24-month periods (range = 0–8), with higher scores indicating greater levels of household instability.

2.2.2 | Early bedtime routines

To measure the consistency of children's early bedtime routines, a bedtime routine index was created (Zajicek-Farber et al., 2014). This index combined caregiver responses to three yes/no questions: (1) whether the child had a consistent bedtime on weekdays, (2) whether there was a regular nightly pre-sleep routine, and (3) whether reading was part of the bedtime routine. Each item was scored as 1 ("yes") or 0 ("no"), and responses were collected at three developmental stages—when the child was 14, 24, and 36 months old. Scores from three time points were aggregated to create a composite measure ranging from 0 to 9, with higher scores indicating more consistent early bedtime routines between 14 and 36 months of age. These items are conceptually grounded in existing research on bedtime routine practices (e.g., Covington et al., 2019; Kitsaras et al., 2018; Pudasainee-Kapri et al., 2025). The reliability of this measurement (KR20; Kuder-Richardson-20) is 0.67. The mean score was 4.62 (SD = 2.22).

2.2.3 | Emotional regulation

Children's emotional regulation was measured at 36 months using the Emotional Regulation Subscale of the Bayley Behavior Rating Scale (BSID-II; Bayley, 1993; Wasserman & Matula, 1996). This subscale includes a series of structured, play-based tasks intended to evoke emotional and frustration responses, which trained interviewers observe and rate. The assessment captures the child's ability to transition between activities, regulate negative emotions, and tolerate frustration during the session. Children were rated on a five-level scale, with higher values denoting higher levels of emotional regulation. The seven-item scale has shown excellent internal consistency (Cronbach's $\alpha > .90$) in studies using the EHSRE dataset (ACF, 2002; $\alpha = .92$ in Noroña-Zhou & Tung, 2021), and its reliability and validity have been supported in multiple studies within and beyond the EHSRE sample (e.g., Brophy-Herb et al., 2013; Mortensen & Barnett, 2019).

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2.2.4 | Attentional regulation

The assessment of attentional regulation in children at 36 months was conducted using a method called the "3 bags" task (Brady-Smith et al., 2000). In this task, the parent and child are given three bags containing unfamiliar toys and are instructed to play with them in a designated order. Attentional regulation was captured by the levels of engagement and focus exhibited by the child while interacting with the toys provided in the three bags. It is measured by assessing indicators such as the child's ability to concentrate on a specific object, their coordination of activities involving multiple objects, and their exploration of various aspects of a toy while spending more than a minimal amount of time. The interaction between the parent and child is recorded on video. The structured nature of the task allows for the observation of children's ability to regulate attention in a mildly demanding but developmentally appropriate setting. Trained researchers analyzed children's behaviors using a 7-point scale, with a higher score reflecting a higher level of attentional regulation (Jeon et al., 2013). Based on the technical report provided by the dataset, inter-rater reliability was rigorously established and maintained throughout the study to ensure high observational reliability of the attentional regulation rating (Administration for Children and Families, 2002b). At 36 months, the percent agreement averaged 94% across coders.

2.2.5 | Covariates

To account for variables that could influence children's self-regulation, several covariates were added to the analytical model. These included child sex (coded as 1 for boys and 0 for girls), emotionality (assessed using the emotionality subscale from the Temperament: Early Developing Personality Traits scale; Buss & Plomin, 1984), and cognitive engagement/orientation as measured by the Bayley Scales of Infant Development–Second Edition (BSID-II; Bayley, 1993) at 14 months. Maternal depression (Dias & Figueiredo, 2020) was also controlled for, based on mothers' responses to the Center for Epidemiological Studies Depression Scale–Short Form (CES-D-SF; Radloff, 1977), with a binary indicator for likely depression (1 = depressed, 0 = not depressed). Additionally, the poverty ratio was included, calculated as the family income divided by the federal poverty threshold and adjusted for household size. These covariates were selected to help isolate the specific contributions of household instability and bedtime routines by adjusting for key child and family characteristics known to be associated with early self-regulation (e.g., Lengua, 2012; Matthews et al., 2009).

2.2.6 | Approach to analysis

The study's hypothetical model, as illustrated in Figure 1, outlines the associations among the variables under investigation. Household instability, assessed at 14 and 24 months, was modeled to predict bedtime routines, measured at 14, 24, and 36 months (H1). Subsequently, the bedtime routine was used to predict emotional regulation and attentional regulation, both measured at 36 months (H2). Considering the significant correlation between emotional regulation and attentional regulation, the model allowed these variables to be correlated with one another. Although both are components of self-regulation, prior research highlights their distinct developmental trajectories, behavioral manifestations, and predictive implications (e.g., Blair & Raver, 2015; Eisenberg et al., 2010). Emotional regulation refers primarily to the management of affective responses, while attentional regulation involves cognitive control processes such as focusing and shifting attention. Modeling them separately allows for a more nuanced understanding of how household instability and bedtime routines may differentially influence these domains. To test the moderating role of bedtime routine, we run separate moderation analyses in regression for emotional and attentional regulation at 36 months.

Descriptive statistics and bivariate correlations were first computed to summarize sample characteristics and explore associations among key variables (see Tables 1 and 2). The primary analyses employed path modeling in Amos 29.0 to test the hypothesized mediation model. Bootstrapping procedures were used to evaluate the indirect effects. Model fit was assessed using conventional benchmarks, including the Comparative Fit Index (CFI), where values greater than .95 reflect excellent fit, and the Root Mean Square Error of Approximation (RMSEA), with values under .05 indicating good model fit (Hu & Bentler, 1999). Although chi-square statistics were reported, their interpretation was made with caution due to sensitivity to sample size. Path coefficients were considered statistically meaningful when p-values were below .05. Full Information Maximum Likelihood (FIML) was applied for model estimation (Hox, 2013). Because bootstrapping requires a complete dataset, multiple imputation was performed prior to mediation testing. The imputation process, conducted within AMOS (Arbuckle, 2005), involved first estimating model parameters using maximum likelihood, followed by predicting missing values using a linear regression algorithm based on each case's observed variables. These predicted values replaced the missing data for the purposes of the mediation analysis.

To examine whether bedtime routines moderated the association between early household instability and children's self-regulation, hierarchical multiple regression

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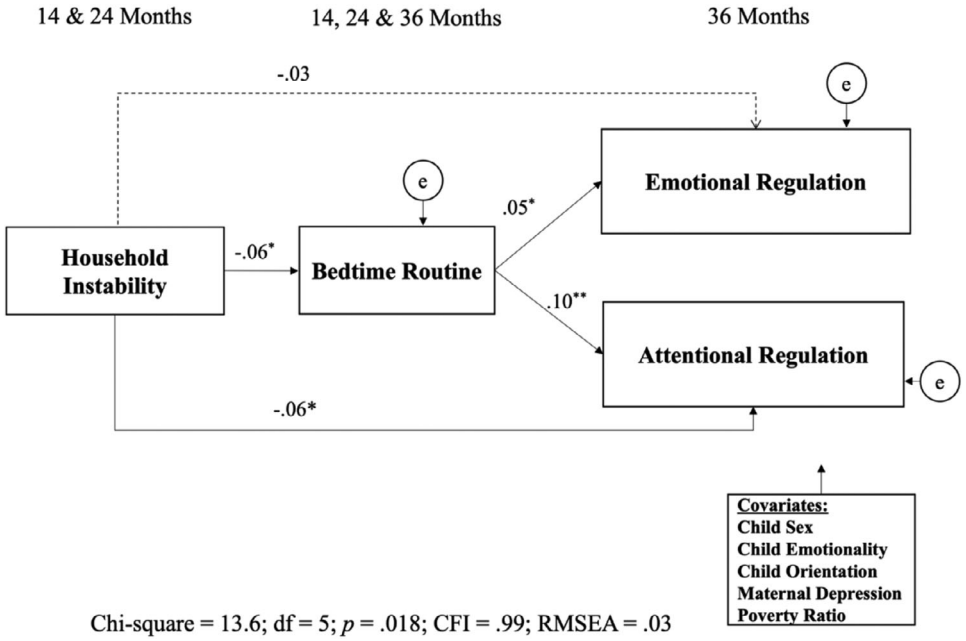

FIGURE 1 Mediation Model. *Note*: *$p < .05$; **$p < .01$; dash line = insignificant paths ($p > .05$).

analyses were conducted. Household instability (the composite score from 12 and 24 months) and bedtime routine (the composite score from 14, 24, and 36 months) were first mean-centered, and an interaction term was created by multiplying the centered predictors. The regression model followed a three-block approach: in Block 1, control variables were entered (child sex, child emotionality and orientation, maternal depression, and poverty ratio); in Block 2, household instability and bedtime routine were added; and in Block 3, the interaction term was entered to test the moderation effect. Separate models were conducted for emotional regulation and attentional regulation at 36 months. A significant interaction term in Block 3 ($p < .05$) would indicate that the effect of household instability on self-regulation varied depending on the level of bedtime routine.

3 | RESULTS

3.1 | Preliminary analyses

Table 2 presents the descriptive statistics and correlation matrix for all observed variables. The results presented several significant associations. For example, greater household instability was associated with lower levels of early bedtime routines ($r = -.08$, $p < .01$), emotional regulation ($r = -.06$, $p < .05$), and attentional regulation ($r = -.07$, $p < .05$). In contrast, stronger bedtime routines were positively linked to both emotional regulation ($r = .08$, $p < .01$) and attentional regulation ($r = .11$, $p < .01$).

3.2 | Mediation and moderation models

Figure 1 shows that the proposed mediation model exhibited a good fit: $\chi^2 = 13.6$, df = 5, $p < .01$; CFI = .99; RMSEA = .03. This analysis revealed significant direct effects of household instability on attention regulation ($\beta = -.06$, $p = .02$), while the direct effect between household instability and emotional regulation was not significant ($\beta = -.03$, $p = .08$). Early bedtime routines demonstrated associations with both facets of self-regulation at 36 months: emotional regulation ($\beta = .05$, $p = .03$) and attentional regulation ($\beta = .10$, $p < .01$).

To assess the mediation pathways, we employed bias-corrected bootstrapping with a sample size of $N = 2000$ to estimate the 95% confidence intervals, following the approach described by Preacher and Hayes (2004). The bootstrapping results for the association between household instability and emotional regulation, mediated by bedtime routines, revealed a significant mediation pathway. The mean upper bound was –.0001, the mean lower bound was –.008, and the *p*-value was .03. Similarly, the bootstrapping results for the association between household instability and attention regulation, mediated by bedtime routine, also indicated a significant mediation pathway. The mean upper bound was –.002, the mean lower bound was –.014, and the p-value was .01. These significant mediation pathways were present when all the covariates were included in the model (see Table 3 for the standardized path coefficients). The indirect effect of household instability on emotional regulation through bedtime routine was −0.003, accounting for approximately

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TABLE 2 Correlation and descriptive statistics of the variables in the path model.

		1	2	3	4	5	6	7	8	9
1	Household Instability (14 & 24 months)	1								
2	Bedtime routine (14–36 months)	−.08**	1							
3	Emotional regulation (36 month)	−.06*	.08**	1						
4	Attentional regulation (36 month)	−.07**	.11**	.22**	1					
5	Child emotionality (14 month)	.03	−.11**	−.05	−.07**	1				
6	Child orientation (14 month)	.05	.06*	.10**	.06*	−.12**	1			
7	Child sex (baseline)	<.01	−.02	−.17**	−.08**	.05	−.05	1		
8	Maternal depression (14 month)	.09*	−.11**	−.09**	−.02	.13**	−.06	−.03	1	
9	Poverty ratio (14 month)	−.08**	.08**	.07**	.07**	−.09**	.06*	0	−.01	1
	Mean (percentage)	.85	4.55	3.92	4.89	2.97	3.52	49.7% girl	N/A	60.95
	SD/%	.85	2.18	.76	.95	.95	.74	N/A	23.1% depressed	52.12

Note: *$p < 0.05$ (2-tailed).
**$p < 0.01$ (2-tailed).

9.1% of the total effect (effect ratio = 0.09). Similarly, the indirect effect on attentional regulation was −0.006, also accounting for 9.1% of the total effect. These findings suggest that while early bedtime routines play a statistically significant mediating role, they account for a small portion of the overall association between household instability and children's self-regulation.

Results from the moderation analyses indicated that early bedtime routines (i.e., composite 14-36 months) did not significantly moderate the relationship between early household instability and emotional regulation at 36 months ($\beta < .01$, $p = .85$), nor did they moderate the association with attentional regulation ($\beta = .013$, $p = .60$).

4 | DISCUSSION

To comprehensively examine the connections between early household instability and the development of emotional and attentional regulation in childhood, this study examined the longitudinal associations among household instability, early bedtime routines, self-regulation (i.e., emotion regulation and attentional regulation at 36 months) using data from the EHSRE. Employing mediation path modeling, the findings suggested that early bedtime routine acted as a mediating factor between early household instability experienced during the ages of 14 and 24 months and subsequent emotional and attentional regulation at age 36 months.

This study found a negative correlation between household instability experienced before 24 months of age and emotional regulation and attentional regulation at 36 months. These findings added empirical evidence that early exposure to household instability was linked to reduced self-regulation in children. These results align with our hypothesis and echo prior studies showing that greater household instability is related to weaker attentional and overall self-regulatory skills (Andrews et al., 2021; Weisner, 2010). Additionally, this study aimed to examine whether early bedtime routines mediated the association between household instability and the development of self-regulation in toddlerhood. The results supported our hypothesis and indicated that bedtime routines acted as a mediator between household instability and emotional regulation and attention regulation at 36 months. Bedtime routines in infancy and toddlerhood are crucial, as they promote positive emotional states (Spagnola & Fiese, 2007) and are associated with better emotional and attentional regulation. In contrast, unpredictable routines can lead to poorer outcomes in these areas. These findings support Mindell and Williamson (2018) conceptual framework, which posits that the benefits of such routines extend directly beyond other positive

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TABLE 3 Path coefficients in the mediation model.

	Emotional regulation (36 month)			Attentional regulation (36 month)		
	Estimate (Beta)	SE	95% CI	Estimate (Beta)	SE	95% CI
Household instability (14 & 24 months)	−.03	.02	[−0.07, 0.01]	−.06*	.03	[−0.12, −0.00]
Bedtime routine (14–36 months)	.05*	.01	[0.03, 0.07]	.10**	.03	[0.04, 0.16]
Child sex (baseline)	−.17**	.04	[−0.25, −0.09]	−.08**	.04	[−0.16, −0.01]
Child emotionality (14 month)	−.01	.02	[−0.05, 0.03]	—	—	—
Child orientation (14 month)	—	—	—	.06*	.03	[0.00, 0.12]
Maternal depression (14 month)	−.14*	.05	[−0.24, −0.04]	−.02	.06	[−0.14, 0.10]
Poverty ratio (14 month)	.07**	<.01	[0.05, 0.09]	.07**	<.01	[0.05, 0.09]

Note: *$p < 0.05$ (2-tailed).
**$p < 0.01$ (2-tailed).

outcomes, such as sleep duration, parent-child bonding, and child overall health. Understanding the mediating role of bedtime routines provides valuable insights into potential avenues for intervention and support. By emphasizing the importance of consistent and predictable bedtime routines, interventions can be designed to help children from households experiencing instability establish a stable and nurturing environment that promotes emotional well-being and attentional development. Moreover, this knowledge informs parents, caregivers, and professionals working with young children about the critical role of bedtime routines in fostering optimal development in self-regulation.

Although bedtime routines were expected to buffer the negative impact of early household instability on children's self-regulation, the interaction effects were not statistically significant for either emotional regulation or attentional regulation. Several possible explanations may account for these null findings. It is possible that while bedtime routines are beneficial overall for both aspects of self-regulation, their protective influence may not be strong enough to counteract the broader and more pervasive stressors associated with household instability, such as financial hardship, frequent moves, or caregiver disruptions. The non-significant moderation effect of bedtime routines may, in part, be attributable to how it was measured in this study. The bedtime routine variable had a possible range of 0 to 9, with a mean of 4.55 and a standard deviation of 2.18, suggesting moderate variability but potentially limited representation of consistently high-quality routines across the sample. Among families enrolled in Early Head Start—many of whom face structural disadvantages such as poverty, housing insecurity, and demanding work schedules for parents—establishing and maintaining consistent bedtime routines can be especially challenging (e.g., Raikes et al., 2006; Pudasainee-Kapri et al., 2025; Rosanbalm & Murray, 2017). As a result, the routine practices reported may reflect partial or inconsistent implementation. This may have constrained the potential for bedtime routines to function as moderators, especially in buffering the cumulative impact of early household instability. Furthermore, the measurement captured the consistency of routine activities and sleeping arrangements rather than nuances such as time spent on reading or the emotional tone of bedtime interactions, all of which might be more strongly associated with resilience in the face of adversity. These measurement limitations highlight the importance of developing more nuanced assessments of daily bedtime routines, particularly within low-income and high-stress contexts.

5 | IMPLICATIONS

Findings from this study carry valuable implications for Head Start teachers and staff, school administrators, and early childhood educators, who are well-positioned to support parental education on the importance of consistent early bedtime routines in fostering emotional regulation and healthy development in children facing early life risks. As consistent bedtime routines can contribute to positive developmental outcomes, including child emotional and attentional development, they could be a good candidate for recommended positive parenting practices. This includes a consistent night sleeping arrangement and regular bedtime activities, such as reading before bedtime (Christodulu & Durand, 2004; Hale et al., 2011; Mindell et al., 2017). Practitioners working with young children from racially and ethnically diverse backgrounds can apply these findings by equipping families with tools to strengthen bedtime routines—such as access to storybooks or digital resources—and by highlighting the long-term developmental benefits of emotional and attentional regulation. These findings also offer practical implications for

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policymakers and community-based programs addressing housing and support for low-income families. For example, initiatives like Dolly Parton's Imagination Library, which distributes free books to children under age 5, could be leveraged to encourage consistent bedtime reading routines and provide additional support for families facing socioeconomic challenges.

6 | LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The primary limitation of this study is the restricted number of items used to measure household instability and early bedtime routine. The household instability composite provides a useful index of environmental disruption but does not include fluctuations in employment or family income. This omission is particularly relevant for families enrolled in Early Head Start, many of whom experience frequent job changes, varying work hours, or seasonal employment as part of their economic reality. Such employment-related transitions can substantially influence family routines, stress, and childcare. For early bedtime routines, while the available items from this dataset covered important aspects related to an optimal bedtime routine, such as consistency (e.g., maintaining a regular bedtime) and reading routines (Zajicek-Farber et al., 2014), other significant areas were not included, such as avoiding electronic devices before bedtime, tooth brushing, and avoiding snacks or drinks before bed (Kitsaras et al., 2018; Morrell & Cortina-Borja, 2002). Future studies are encouraged to incorporate more extensive measures of early bedtime routine—such as the Bedtime Routines Questionnaire (Henderson & Jordan, 2010)—to allow for a more thorough evaluation of their role in children's developmental outcomes. Additionally, our use of a cumulative bedtime routines score aggregated across three waves (14, 24, and 36 months) provides an overall measure of engagement but may obscure important developmental patterns, such as families who initiate bedtime routines later versus those who discontinue them over time. These different trajectories may have distinct implications for children's self-regulation outcomes. Recent person-centered and growth modeling studies have highlighted the value of distinguishing such temporal patterns in child routine (e.g., Selman et al., 2025). Future research may benefit from modeling these trajectories using longitudinal latent class or growth mixture approaches to understand how changes in routine timing relate to children's development.

In addition to measurement scope and timing, cultural context is another important consideration when evaluating bedtime routines in early childhood. Researchers need to understand cultural and ethnic differences when measuring bedtime routines for children, as they can vary significantly across different societies and communities. Previous research has indicated that there may be ethnic differences in bedtime routines for children. For example, in some cultures, such as many Asian and African cultures, co-sleeping is a common practice where children sleep in the same bed or room as their parents or other family members (Mckenna & Gettler, 2007; McKenna & Volpe, 2007). This differs from Western cultures, where independent sleeping arrangements are more prevalent and recommended (McKenna & Volpe, 2007; Teti et al., 2022). Bedtime routines in many cultures encompass traditions such as bedtime stories or oral storytelling and specific rituals or prayers within religious communities (Mindell & Williamson, 2018). These cultural practices hold significant value in promoting parent-child relationships and children's emotional regulation before sleep. It is important to recognize that these practices are not typically included in standard measures used in Western medical contexts, where they may be considered optional aspects of bedtime routines for children. By overlooking or not acknowledging these cultural practices, there is a risk of undervaluing the strength and impact rooted in certain cultural bedtime routines (Mindell & Williamson, 2018). Western practices and suggestions may fail to account for the richness and importance of these cultural practices in promoting children's positive development. Therefore, it is crucial to consider and respect the cultural practices surrounding bedtime routines to ensure a comprehensive and culturally sensitive approach to promoting healthy sleep habits and parent-child interactions.

Lastly, although the direct effects of and the mediation effects of early bedtime routines reached statistical significance, the effect sizes were generally small. This suggests that the observed relationships explain only a modest proportion of the variance in children's self-regulation outcomes. These small effects underscore the complexity of developmental processes in early childhood, which are likely influenced by a wide range of individual, familial, and environmental factors beyond those examined in this study (Sameroff, 2010). As such, findings should be interpreted with caution, particularly when considering implications for intervention or policy. At the same time, even modest improvements in routine consistency may set the stage for broader regulatory benefits when practiced consistently across early childhood. From a practical perspective, such findings point a direction for scalable, low-cost interventions—such as parent education on bedtime routines (e.g., Martin et al., 2011)—that may yield meaningful gains at the population level. Future research should explore potential cumulative and synergistic effects of multiple routines and contextual factors to better estimate their practical significance.

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7 | CONCLUSION

This study provides insight into how household instability and early bedtime routines relate to emotional and attentional regulation in children by the age of 36 months. The findings highlight the protective role of consistent bedtime routines in supporting young children's self-regulatory capacities, especially in emotionally and cognitively demanding contexts. These results reinforce the importance of promoting structured bedtime practices as a practical and low-cost approach to fostering emotional well-being and attention control in early childhood—particularly among children from low-income and ethnically diverse backgrounds served by programs like Head Start (e.g., Mindell & Williamson, 2018). Promoting consistent and nurturing routines may play a supportive role in fostering positive developmental outcomes among children facing heightened environmental stress.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The current manuscript uses the public available data from Early Head Start Research and Evaluation (EHSRE) Study, which can be downloaded at: https://www.childandfamilydataarchive.org/cfda/archives/cfda/studies/3804. The scripts to reproduce all study findings are available upon request.

PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

Not applicable

CLINICAL TRIAL REGISTRATION

Not applicable.

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