

Original Research

The Impact of Stress on Father Involvement in Early Infancy: Examining Risk and Protective Factors in Residential and Nonresidential Fathers

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Abstract

Residential and nonresidential fathers are taking an increasingly greater role in their children's lives, and father involvement predicts positive child outcomes across development. This study utilized data from a large sample of racially and ethnically diverse fathers of low to middle income (n = 1,112) to test if paternal stress is associated with lower father involvement in early infancy and whether perceived social support is protective. Exploratory analyses examined whether the effects of stress on father involvement differ depending on whether a father lives with his child. Multiple regression analyses tested associations between three different forms of stress (perceived general stress, financial stress, major life events) and father involvement measured as time spent with infant, father confidence, and father provision of tangible support, and to examine whether social support moderated the relation.



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Controlling for residential status, results showed that perceived and financial stress in fathers were significantly associated with lower father confidence in parenting and lower provision of tangible support. In addition, higher paternal perceived stress related to less time spent with infants. Some patterns differed for residential versus nonresidential fathers. Further, only perceived available affectional social support emerged as protective. These results highlight the importance of identifying the unique types of stress that affect father involvement in the first few months of life, what may be protective, and a possible need to distinguish between residential and nonresidential fathers as they enter parenthood.

Keywords

Paternal involvement; paternal stress; early infancy

1. Introduction

In the United States, approximately 72.2 million men are fathers, with an increasing number actively involved in childcare starting at infancy [1]. Ninety percent of residential fathers eat dinner, read to, and play with their infants daily, while 41% of nonresidential fathers reported doing this several times a week [2]. Prior research has elucidated the positive benefits of fathers' involvement on child development, including cognitive, language, behavioral, and emotional benefits [3-12]. Thus, it is critical to understand what predicts father involvement, particularly in early infancy when involvement typically starts. Several variables in the literature are associated with father involvement, including perceived stress and various types of support [13-17]. However, it remains unclear how different types of social support might mitigate the effects of various kinds of paternal stressors. The present study examined how paternal stressors and support related to father involvement with infants, specifically father confidence, time spent with their infant, and tangible support.

According to Lamb's conceptualization of parental involvement, it is typically broken down into one of the following categories: engagement, accessibility, and responsibility [18]. *Engagement* focuses on one-on-one interaction between parent and child. For infants, father engagement may mean feeding, changing, or bathing their child. In this study, this concept is represented by the father confidence variable, as it relates to how comfortable and efficacious a father feels when caring for their infant. *Accessibility* refers to how available a parent is to their child. For example, an accessible father might be home in order to be available to their child should they need them. The overall time spent with the infant is used to capture accessibility in this study. Finally, *responsibility* is considered one of the broadest categories of father involvement. Responsibility does not focus on actual one-on-one interaction with the child but rather on the father engaging in needed childcare activities. This can include the father setting up doctor appointments, ensuring their child has appropriate clothing to wear, and providing monetary contributions to their child's wellbeing. In the context of this study, this concept is measured by the tangible support variable. In sum, this study uses father confidence, time spent with infant, and tangible support to measure father involvement in infant parenting.

Much research suggests that father involvement is critical in infant and toddler development, with studies linking father involvement with cognitive, behavioral, and emotional child outcomes [3-12, 18-20]. For instance, Henry and colleagues found that positive father involvement (e.g., time spent talking to their child) was associated with children being more social, having an increased ability to regulate their emotions, and having academic success (e.g., having better vocabularies and problem-solving abilities) [12]. These associations were maintained from infancy into adolescence and were particularly strong for children from lower socioeconomic statuses with access to subpar education systems [12]. Similarly, past research has linked increased father confidence with decreased stress and increased satisfaction in fathers during the infancy period [21].

1.1 Paternal Stress

Father stress may also play a critical role in child outcomes as it can affect father involvement. For example, Dubois-Comtois and colleagues found that paternal parenting stress was associated with children's internalizing and externalizing behavioral problems, and that this effect was mediated by father-child interactive play [8]. This suggests that stress in fathers may significantly affect their child's development due to how stress can affect their involvement. According to the transdisciplinary model of stress, it is a multidimensional concept and includes objective environmental factors (stressors) as well as subjective perceptions or appraisals of the ability to cope with such stressors (stress responses) [22]. Crosswell and Lockwood recommend that stress studies measure the form of stress that is most salient to the population being studied [23]. For fathers, previous research suggests that negative life events and financial stress (both stressors), and perceived stress (stress appraisals) may be particularly salient [23]. Negative life events are unique sudden and acute stressors that encapsulate traumatic events, and include sudden deaths, unexpected job loss, or accidents that lead to disability. Financial stress occurs when individuals cannot meet their family's financial needs or have difficulty doing so. Finally, perceived stress refers to the degree to which an individual appraises their life situation as overwhelming, uncontrollable and difficult with which to cope [24]. This is particularly relevant to new fathers who may be experiencing new environmental stressors such as child care tasks, supporting their partner, time pressure, or lack of sleep, coupled with their resources being overwhelmed.

Studies examining the effects of stress on father involvement have been later in development, with toddlers and children. For example, Halme and colleagues [25] found that paternal stress was associated with fewer parent-child interactions in children ages 3-6. Results showed that some of the most significant stress-related factors were a lack of paternal self-efficacy, a child's demandingness, and a father's isolation. Further, stress had a compounding effect, such that fathers' commitment to parenthood was more adversely affected as the number of stressors/stressful episodes increased. A study by Harewood and colleagues [26] found that financial stress experienced by fathers was associated with lower cognitive outcomes for children, including poor language development. Similarly negative life events can have lasting effects on parent's willingness to engage and be involved in their children's lives and can negatively affect their confidence in their parenting abilities [27, 28]. Lyons and colleagues [29] found that more maternal negative life events were related to increases in negative parenting practices, although this study did not involve fathers. More research is needed to consider which types of stress are associated with father involvement in the early months. Further, research with lower-income, and racially and ethnically diverse

samples is needed as they better represent a majority of new fathers and they are a group at risk for increased stress and structural challenges resulting from racism [30, 31].

1.2 Social Support

Social support has been suggested to have a buffering or moderating effect against the negative effects of stress and may protect against the effects of stress for new fathers [32]. Indeed, meta-analyses have pointed to the moderating effects of social support against the adverse effects of stress on parenting behaviors in mothers [33]. For fathers as for mothers, social support can come from different sources, including friends, family members, and community members and may be in many forms including emotional/informational, tangible, positive social interaction, and affectionate support [34]. Emotional and informational support focuses on compassion, caring, and empathy, listening, and providing useful advice or information. Tangible support involves providing concrete resources such as assistance in tasks and money or material goods. Positive social interactions are the availability of others to spend time with the person. Finally, affectionate support includes physical displays of affection, such as hugs and kisses. Fagan and colleagues [14] studied 50 adolescent African American first-time fathers and found that grandparent support for adolescent parents acted as a buffer against the detrimental effects of stress on parenting (e.g., time spent with their infant and physical contact with their infant). Further, they found that the quality of social support was more important than quantity and that grandparent support had a more significant effect on paternal involvement than maternal involvement. For nonresidential fathers, higher levels of broad social support were shown to positively predict father involvement in a diverse sample but did not examine which type of social support was best [35]. There remains a paucity of literature focusing on diverse samples of fathers and how social support may ameliorate the impacts of stress during their child's early infancy.

1.3 Nonresidential Fathers

Nonresidential fathers have more access to their children now than in years prior, with joint custody rates increasing from 11% to 50% from 1989 to 2011 [36]. This, in part, is due to changes in custody evaluations, as well as options provided in divorce proceedings [37]. However, research regarding nonresidential fathers has been limited and had mainly focused on increasing their involvement. As of 2005, only 1% of research focusing on parenting and child psychopathology concentrated solely on father involvement compared to 48% of research in this area that focused exclusively on mother involvement [38, 39]. This trend of underrepresentation has continued in more recent decades [40] largely due to residential and nonresidential not being asked to participate [41]. Like residential fathers, nonresidential fathers spend a significant amount of time feeding, bathing, and caring for their infants, making it essential to understand how their experience of stress impacts their involvement earlier in their children's lives. While paternal stress levels seem to be similar in residential and nonresidential fathers paternal stress may affect residential and nonresidential fathers differently [42, 43]. Coley and Hernandez [44] found that psychological distress was not associated with father involvement for nonresidential fathers but was significantly associated with father involvement for residential fathers of preschool children. Guarin and Meyer [45] examined if low earnings were a barrier to nonresidential fathers' involvement with children and found that extremely low earnings (\$1-\$5,000 in the previous year) were a barrier for

nonresidential fathers. A median income was associated with a greater likelihood of seeing their child at least once yearly. Clearly there is a paucity of research that considers residential status, and while both may experience stress in the early months of fatherhood, the effects on their ability to be involved with their infant may differ.

1.4 Aims and Hypotheses

The current study examines a diverse sample of approximately 1,758 residential and nonresidential fathers, mostly from lower socioeconomic backgrounds, as part of a study by the Community Child Health Network (CCHN) of mothers and fathers of newborns. The aims of the present study are to examine how different types of paternal stress relate to various aspects of father involvement with infants in residential and nonresidential fathers. This study also explores whether different types of social support can protect against the adverse effects of stress in fathers in these early months. Having a variety of measures of father involvement helps ensure a broader view of father involvement that can encompass many of the components of involvement, not just one type. Further, this study examines multiple kinds of stress and social support to increase understanding of what is most influential in father involvement early in their child's life.

This study tested three aims concerning father involvement that included father confidence, tangible support, and time spent with infant. The first aim was to examine if stress of different types (perceived stress, financial stress, negative life events) were associated with lower father involvement. We hypothesized that increases in all stress variables would relate to decreased father involvement across variables. Second, we examined whether different types of perceived available social support (emotional/informational, tangible, positive interaction, affectionate) moderated the effects. We expected that social support would protect against the negative effects of stress but did not hypothesize which types of social support would be most important. Finally, exploratory analyses examined the effects of stress on father involvement separately in residential and nonresidential fathers. The investigators did not have any specific hypotheses on this issue because the limited research in this area is inconclusive as to whether there are differences between residential and nonresidential fathers.

2. Materials and Methods

2.1 Design Overview

This study used data from the Community Child Health Network (CCHN), a multi-site network that recruited participants from five separate areas in the United States (Los Angeles, California; Washington, D.C.; Baltimore, Maryland; Lake County, Illinois; and several rural counties in North Carolina.). CCHN recruited mothers shortly following birth. Eligibility criteria for the study were being between 18-40 years old, identifying as Black, Latina, or White, able to speak English or Spanish, having 4 or fewer children, and having no plans to sterilize following the birth. CCHN oversampled women living in low-income neighborhoods. Of a total of 2,500 mothers, 1,923 gave permission to contact the father of their newborn. The current study utilized data from these fathers one month after birth. Father participants were interviewed in home settings by trained interviewers at one, six and twelve months after birth [46, 47]. Fathers were interviewed in their

homes. If fathers were currently living with their child’s mother, they were interviewed separately from their partner.

2.2 Participants

At one month after birth of their child 1,923 fathers were contacted, of whom 1,758 agreed to participate (91%). After conducting missing data analyses, 1,214 participants had data on all variables and were included in the analyses. In this sample, 42.9% identified as Black, 27% identified as Latino, 26.2% identified as White, 3.3% identified as multiracial or Asian American/Pacific islander, and 2.6% did not identify their racial/ethnic identity. Fathers, like mothers, tended to have low incomes and education levels in this study due to the demographics of the geographical areas selected for studying health disparities. Additional sample descriptive statistics are in Table 1.

Table 1 Demographic Information.

Characteristic	n	Percentage
Ethnic Background		
African American/Black	520	42.9
Caucasian/White	318	26.2
Latino/Hispanic	328	27.0
Asian American/Pacific Islander	9	0.7
Multiracial	31	2.6
Other	7	0.6
Children Outside of Household		
No	936	77.1
Yes	276	22.9
Cohabitate With Baby		
Nonresidential	176	14.6
Residential	1032	85.4
Paternal Education		
Primary, Elementary, Middle School	284	23.4
High School or GED	505	41.6
Tech or Vocational School	193	15.9
Some college	209	17.2
Associates	23	1.90
Father Employment Category*		
On paid leave from job	701	57.7
Unpaid leave from job	155	12.8
Part time	244	20.1
Full time	20	1.6
Unemployed	11	0.9
Other**	83	6.9
	M (SD)	Minimum-Maximum
Father Age (years)	29.23 (7.12)	17.94-62.72

Household IPC (\$)	19356.43 (31671.82)	0-375,000
IPC Adjusted for Cost of Living (\$)	16342.76 (25306.86)	0-279,173.65

*Many of these participants were on paid leave due to the birth of their infant. **Other includes students or individuals receiving disability. IPC = income per capita.

2.3 Measures

2.3.1 Father Involvement Measures

The following father involvement measures were adapted from the Fragile Families and Child Well-Being Study (FFCWS) [48]. The FFCWS was a longitudinal study conducted from 1998 to 2000 that followed 4,900 families in the United States. The CCHN obtained these materials and they were reviewed for us by community and academic partners, and piloted before finalizing the interview guide [49, 50].

Interviewers asked fathers to respond to four items regarding the amount of *time spent* with their infants. These questions included: (1) On an average weekday from Monday to Friday, do you spend any waking hours with [BABY]? (2) On an average weekday from Monday to Friday, do you spend time alone with [BABY]? (3) On an average weekend day, meaning Saturday and Sunday, do you spend any waking hours with [BABY]? (4) On an average weekend day, meaning Saturday and Sunday, do you spend time alone with [BABY]? Responses were then coded into either a 0 (*no*) or a 1 (*yes*). Scores ranged from 0 to 4, where a higher score indicated more time spent with their infant.

Father confidence was measured with six questions adapted from the FFCWS. These items were: “How confident or comfortable you feel when you” (1) hold baby, (2) put baby to sleep, (3) wash or bathe baby, (4) change baby’s diaper, (5) feed baby, and (6) soothe baby when he/she is upset. Here, responses ranged from 0 (*not at all*) to 4 (*very much*). We averaged responses to determine perceived parenting confidence, with higher scores indicating greater confidence. At one month, the internal consistency Cronbach’s alpha reliability coefficient for these items was 0.68.

Ten items were included to measure the degree of *fathers’ tangible support* for their infants. Fathers reported how often they provided their baby with material support of (a) clothing, (b) medicine, (c) furniture or equipment, (d) childcare items, such as diapers, baby wipes, (e) food, (f) babysitting, (g) money, (h) health insurance, (i) toys, and (j) other. Here, responses included 0 (*no*), 1 (*yes, occasionally*), and 2 (*yes, regularly*). Scores were summed and ranged from 0 to 20. Higher scores were indicative of greater tangible support towards their infant. At one month, the internal consistency Cronbach’s reliability alpha coefficient for these items was 0.77.

2.3.2 Measures of Stress

Perceived Stress. The Perceived Stress Scale [24] has ten items and examines fathers’ feelings and thoughts since [BABY] was born. Items were on a 5-point Likert scale: 1 (*never*), 2 (*almost never*), 3 (*sometimes*), 4 (*often*), and 5 (*almost always*). Examiners confirmed the fathers’ understanding of items 2, 6, and 10, as they have double negatives. Cohen and colleagues originally validated the Perceived Stress Scale (PSS) [24] on three separate sample groups (two groups were college students, and one was a group of those enrolled in smoking cessation groups.) Subsequent reviews determined robust internal consistency and test-retest reliability for the measure [51].

Financial Stress. Financial Stress was measured using a CCHN-developed questions about financial well-being and food scarcity [52]. Participants answered two questions regarding financial well-being. The first was “How difficult is it for (you/your household) to meet the monthly payments on your (household’s) bills?” answered on a five-point Likert type scale ranging from “extremely difficult” to “not difficult at all.” The second question was: “How much do you worry that your total (household) income will not be enough to meet your (household's) expenses and bills?” with response options ranging from 1 (a great deal) to 4 (not at all). Additionally, participants answered two questions regarding food security. These questions were “in the last 12 months... The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” And “In the last 12 months, were you ever hungry but didn’t eat because you couldn’t afford enough food?” The former was measured using a three-point Likert type scale ranging from “often true” to “never true.” The latter was answered yes or no. The total Financial Stress score was calculated using a standardized composite of the four items with lower scores were indicative of greater stress surrounding financial well-being.

Negative Life Events. Participants completed the Life Events Checklist, a survey on negative life events [53]. It was comprised of 24 questions that evaluated different types of negative life events they may have experienced since the past year (e.g., loss of housing, death of a loved one, or experience of physical violence.) Participants were able to respond “yes” or “no” to items. If participants responded yes, they were queried: “How was this experience for you personally?” Responses were coded on a 7-point Likert scale: very negative or undesirable (1), somewhat negative or undesirable (2), slightly negative or undesirable (3), neither negative or positive (4), slightly positive or desirable (5), somewhat positive or desirable (6), or very positive or desirable (7). Items responses were summed, where lower scores indicated a more negative effect of the negative life event on the participant. Kappa statistics for all items were found to be 0.50 or higher ($p < 0.001$) (41). In addition, the Life Events Checklist was found to have adequate convergent validity with items related to traumatic exposure.

2.3.3 Measure of Social Support

Participants completed the *Medical Outcome Survey of Social Support* (MOS-SSS). This 19-item measure assesses four dimensions of *perceived available social support*: emotional/informational (someone to confide in or receive information), tangible (someone to help with chores), positive social interaction (someone to share enjoyable experiences with), and affectionate support (someone to provide physical comfort and affection). Responses were on a 5-point Likert scale: none of the time (1), a little of the time (2), some of the time (3), most of the time (4), all of the time (5). Here, higher scores indicated higher levels of perceived social support, which refers to the belief that there are people in their social network that can provide this type of support [54]. The MSS-SSS is a robust measure that has been used extensively and translated into many languages, including Spanish [55-58]. The scale has been found to have adequate divergent validity compared to other measures [34]. Additionally, it has been found to have high evidence of internal consistency reliability across several studies as well as cross-cultural validity. In this sample, the internal consistency Cronbach’s reliability alpha coefficient for these items was 0.95.

2.4 Data Analytic Plan

Analyses were conducted using SPSS (Version 27.0) and the PROCESS MACRO. To test how different types of stress related to father involvement in infancy, primary analyses used multiple regression to examine the association between father stress and early father involvement, controlling for father age, residential status, education, and race/ethnicity. Father stress variables of perceived stress, financial stress, and negative life events were included in the same regression model to examine the unique effects of each type of stressor on early father involvement. Three separate models were run, examining the effects of stress on father confidence, tangible support, and time spent with infant. To investigate which types of social support buffer against the negative effects of stress on early father involvement, social support variables were added to multiple regression models as a predictor and interactive term with the father stress variables that were significantly related to father involvement. Specifically, emotional/informational support, tangible support, positive social interaction, and affectionate support were all examined as possible protective factors. Interactions with significant stress variables were examined in separate models. We probed significant interactions using simple effects analyses (-1SD, mean, +1SD) [59] and Johnson-Neyman analyses (to determine regions of significance) [60]. It should be noted that because social support was so high in the sample, there were no data points 1SD above the mean, and instead, the maximum amount of social support was used. Finally, we repeated the multiple regression analyses separately for each group to examine the differential effects of stress on early father involvement between residential and nonresidential fathers. These models controlled for father age, education, and race/ethnicity. Given the mismatch in sample sizes, these analyses are considered exploratory and will be used to inform future research. Post-hoc power analyses conducted with G*Power revealed adequate power (0.80) to find a small effect size (or greater) with residential fathers, and adequate power (0.80) to find a medium effect size with nonresidential fathers.

All sites received approval from their respective institutional review boards.

3. Results

3.1 Descriptive Analyses

Table 2 summarizes demographic characteristics and descriptive information on all the study variables. Notably, fathers in this sample had generally high perceived levels of social support. Table 3 shows the bivariate correlations among study variables. The only variables that were not significantly correlated were Father Confidence with negative life events and financial stress.

Table 2 Descriptive Findings for Study Variables (N = 1,214).

	M (SD)	Minimum-Maximum
Perceived Stress	10.71 (6.11)	0.00-35.00
Financial Stress	1.25 (0.998)	0.00-5.00
Life Event Count	4.91 (3.56)	0.00-19.00
Life Event Impact	4.93 (1.29)	1.00-7.00
Time Spent with Infant	0.850 (0.219)	0.00-1.00

Tangible Support	14.24 (3.99)	0.00-20.00
Father Confidence	3.61 (0.482)	1.00-4.00
Emotional Social Support	82.94 (20.14)	3.13-100
Tangible Social Support	84.13 (19.49)	0-100
Affectionate Social Support	91.21 (16.88)	0-100
Positive Interactions	88.30 (17.84)	0-100
Total Social Support	85.47 (17.15)	1.31-100.00

Table 3 Bivariate Analyses (N = 1,214).

	1	2	3	4	5	6	7	8	9	10
1. Emotional Social Support	-	0.70*	0.71*	0.74*	0.95*	0.23*	0.22*	-0.35*	-0.29*	-0.29*
2. Tangible Social Support		-	0.66*	0.65*	0.84*	0.15*	0.22*	-0.33*	-0.25*	-0.26*
3. Affective Social Support			-	0.76*	0.83*	0.16*	0.23*	-0.31*	-0.27*	-0.22*
4. Positive Interactions				-	0.86*	0.18*	0.19*	-0.29*	-0.25*	-0.24
5. Total Social Support					-	0.22*	0.24*	-0.37*	-0.30*	-0.29*
6. Father Confidence						-	0.17*	-0.23*	-0.13	-0.17
7. Tangible Support							-	-0.20*	-0.16*	-0.17*
8. Perceived Stress								-	0.36*	0.32*
9. Negative Life Events									-	0.35*
10. Financial Stress										-

* $p < 0.01$.

3.2 Primary Analyses

3.2.1 Stress and Early Father Involvement

Table 4 shows results of the multiple regression analyses examining the associations between father stress and early father involvement. The first model examined the associations between stress variables and father confidence ($F(7,886) = 8.94, p < 0.001; R^2 = 0.07$). Perceived stress and financial stress were both uniquely associated with early father confidence. Negative life events in the past year were not associated with father confidence during their child’s infancy. The next model examined the associations between stress variables and father tangible support ($F(7,886) = 21.56, p < 0.001; R^2 = 0.14$). Similarly, perceived stress and financial stress were uniquely associated with early father tangible support, but negative life events were not. The last model examined the associations between stress variables and father time spent with infant ($F(7,886) = 7.16, p < 0.001; R^2 = 0.05$). Only perceived stress was significantly associated with time fathers spent with their infant. Financial stress and negative life events did not relate to this early father involvement variable.

Table 4 Unique Effects of Paternal Stress on Early Father Involvement.

	Father Confidence	Tangible Support	Time Spent with Infant
	β	β	β
Perceived Stress	-0.21**	-0.13**	-0.12**
Financial Stress	-0.09*	-0.11**	0.01
Negative Life Events	0.02	-0.02	0.04

All analyses controlled for father age, education, race, and residential status. n.s. not significant; †p < 0.10; *p < 0.05; **p < 0.01.

3.3 Effects of Stress in Residential versus Nonresidential Fathers

Table 5 shows results of the multiple regression analyses examining the associations between father stress and early father involvement separately for residential and nonresidential fathers. The first models examined the associations between stress variables and father confidence for residential ($F(6,750) = 8.71, p < 0.001; R^2 = 0.08$) and nonresidential fathers ($F(6,124) = 3.19, p < 0.01; R^2 = 0.09$). The second models examined the associations between stress variables and father tangible support for residential ($F(6,752) = 12.78, p < 0.001; R^2 = 0.09$) and nonresidential fathers ($F(6,128) = 2.34, p < 0.05; R^2 = 0.06$). The last models examined the associations between stress variables and father time spent with infant for residential ($F(6,752) = 3.03, p < 0.01; R^2 = 0.02$) and nonresidential fathers ($F(6,128) = 2.23, p < 0.05; R^2 = 0.05$). For residential fathers (n = 1,038), perceived stress and financial stress were both uniquely associated with early father confidence and tangible support. As previously, negative life events in the past year were not associated with these measures of father involvement. Further, no stress variable significantly related to the amount of time residential fathers spent with their infant. For nonresidential fathers, perceived stress uniquely related to their early confidence and tangible support. In addition, perceived stress significantly related to the amount of time they spent with their infant. Financial stress and negative life events in the past year did not relate to any aspect of father involvement for nonresidential fathers.

Table 5 Unique Effects of Paternal Stress on Early Father Involvement for Residential versus Nonresidential Fathers.

	Residential Fathers (n = 1,038)			Nonresidential Fathers (n = 176)		
	Father Confidence β	Time Spent with Infant β	Tangible Support β	Father Confidence β	Time Spent with Infant β	Tangible Support β
Perceived Stress	-0.20**	-0.07	-0.12**	-0.21*	-0.25**	-0.22*
Financial Stress	-0.10*	0.02	-0.11**	-0.08	-0.05	-0.09
Negative Life Events	0.04	0.02	-0.05	-0.06	0.05	0.09

All analyses controlled for race/ethnicity, age, and father education. * $p < 0.05$. ** $p < 0.01$.

3.4 Social Support as a Moderator

The interaction between father perceived stress and tangible social support was marginal in predicting father tangible support of their infant ($b = 0.0017$, $SE = 0.001$, $p = 0.07$). The Johnson-Neyman analysis did not indicate any significant transition points. However, simple effects showed that the negative effect of perceived stress on father tangible support was stronger when their tangible social support was low (1SD below: ($b = -0.12$, $SE = 0.028$, $p < 0.001$); 1SD above: ($b = -0.06$, $SE = 0.026$, $p = 0.016$).

Father’s perceived affective support protected against the negative effect of father perceived stress on their confidence but exacerbated the negative effect of father financial stress on their tangible support for their infant. Specifically, there was a significant interaction between father perceived stress and affective support predicting father confidence ($b = 0.0004$, $SE = 0.0001$, $p = 0.01$). There were no significant transition points observed in the Johnson-Neyman analysis, but simple effects showed that the negative effect of perceived stress on father confidence was stronger when their affective support was low (1SD below: $b = -0.02$, $SE = 0.003$, $p < 0.001$); 1SD above: ($b = -0.01$, $SE = 0.003$, $p < 0.001$).

On the other hand, there was a significant interaction between father financial stress and affective support predicting father tangible support for their infant ($b = -0.01$, $SE = 0.005$, $p = 0.042$). Simple effects showed that the negative effect of father financial stress on tangible support was stronger when affective support was high (1SD below: $b = -0.31$, $SE = 0.14$, $p = 0.02$); 1SD above: ($b = -0.58$, $SE = 0.14$, $p < 0.001$). Johnson Neyman analyses showed that the region of significance split the sample at 1.28 standard deviations below the mean of affective social support. For 90% of fathers with high affective support, there was a significant relationship between financial stress and tangible support. But for the 10% of fathers with the lowest affective support, there was no relation between financial stress and the tangible support they provided their infant.

All other interactions between social support and stress variables predicting father involvement were non-significant. Full results can be found in Supplementary Material.

4. Discussion

In the current study, we sought to examine how paternal stress relates to early father involvement in a sample of racially and economically diverse residential and nonresidential fathers. We explored different types of risk and protective factors in order to inform next steps for policy and intervention that targets new fathers.

4.1 Stress and Father Involvement with Infants

The primary aim of this study was to test if different types of paternal stress related to various aspects of father involvement in early infant care. We tested three types of stress and found perceived stress and financial stress related to early father involvement, but negative life events did not. Further, patterns differed by residential status of the new fathers. Perceived stress, which is the father's report of all sources of stress and feelings of being overwhelmed, unable to cope, and out of control was associated with lower levels of all three father involvement measures. Fathers with more perceived stress spent less time with their infants, had lower confidence in parenting, and provided less tangible support. Prior research demonstrated that when parents are exhausted due to mental overload, it adversely influences their ability to be mentally present with their child [61-63]. If fathers feel like they are overwhelmed by demands and cannot cope, this will likely affect their confidence in their parenting ability and/or their ability to know which material resources would be best for their infants.

However, when we examined residential and nonresidential fathers separately, it became clearer that perceived stress was negatively associated with time spent with infants only for the nonresidential father group. Time spent with their baby may be a more important involvement metric for nonresidential fathers who do not live with their infants and will have to make an extra effort to see them. When fathers do not live with their infants and are experiencing an excess of challenges, it seems plausible that they would be unable to spend time driving or planning time to see their infant. On the other hand, residential fathers are close in proximity to their infants, so when they are experiencing high levels of perceived stress, there are fewer barriers in being able to spend time with their child.

Financial stress was also negatively associated with father confidence and father provision of tangible support and may be an important source of the stress that new fathers experience. Financial stress may be a potent stressor for early fathers due to the tremendous societal pressure placed on fathers to be the top financial contributors to their families [64]. The link between financial stress and father provision of material supports (e.g., clothing, diapers, medicine, money) is straightforward- a father with financial stress may have fewer monetary resources to provide for a child. In addition, men socialized to be financial providers may struggle significantly in their confidence to be a parent when they cannot live up to this expectation [65].

Of note, financial stress was negatively associated with father provision of tangible support only for residential fathers. Similarly, financial stress was negatively associated with father confidence, also only for residential fathers. In both cases, fathers that were experiencing high levels of financial stress felt less confident and provided less material support (e.g., diapers, clothes, formula) to their infants. For fathers experiencing low levels of financial stress, this relationship was attenuated. When fathers live in the home, they may face higher expectations to provide financially or tangibly for their infants possibly due to level of commitment to the mother and their relationship [66]. The

added stressor of being in a single-income household (if the mother is on maternity leave) or the burden of childcare if a mother is not able to stay on maternity leave, may lead fathers to feel as if they cannot provide as many tangible supports for their children [67]. For nonresidential fathers, they may not need to support multiple individuals on their income (due to not cohabitating with their infant/mother of their child), and it may be less likely that they have this expectation due to current negative stereotypes surrounding nonresidential fathers and their ability to provide for their children [66].

Contrary to hypotheses, major negative life events that occurred in the year prior to the child's birth did not significantly relate to any measures of father involvement. While this finding diverges from prior literature, the current sample of racially and economically diverse fathers, as well as the sampling time point, one month after birth, significantly differ from prior studies. This might suggest that negative life events may have fewer notable effects on fathers in the first month of fatherhood versus later in their child's development, which is when most prior research has been conducted [27, 29]. Alternatively, fathers from diverse backgrounds may experience the stress of negative life events differently than White, middle-class fathers, and more research is needed.

4.2 Social Support as a Protective Factor for Fathers

This study also explored whether social support acted as a buffer against the negative effects of stress for early fathers. Results showed that the interactions between social support and stress predicting father involvement were mostly non-significant. Fathers in the current sample reported a high level of perceived social support. However, none of these forms of perceived social support protected against the effect of perceived stress on their time spent with their infant. While previous research has demonstrated that social support can buffer the effects of stress on parental involvement, it is important to highlight that these studies have been done later in childhood and adolescence, not infancy, and generally not with low-income fathers of color [68, 69]. Based on the current study, which focused on this earlier developmental period and in a racially and ethnically diverse and low to middle income sample, it unfortunately appears that stress can affect early father involvement even when there is high social support available in a variety of forms. There could be several reasons why social support may not act as an impactful buffer in the early months. For instance, negative effects of stress for fathers early in their child's lives may be more affected by external factors like policy rather than internal factors like social support. For example, paid parental leave is associated with improved parenting outcomes (more quality time) and decreased parenting stress. Knoester and colleagues [70] found that paternity leave-taking and lengths of leave are positively associated with father engagement.

Though most types of perceived social support did not protect against the negative effects of stress on father involvement, some interactions are worth discussing. There was a significant interaction was between father perceived stress and perceived available affective support for fathers predicting father confidence. The perceived availability of affective support, like receiving a hug, seemed to ameliorate the impacts of perceived stress on the father's confidence. This finding may mean when fathers were experiencing higher levels of stress, having others in their lives that could express their regard and affection for them aided them in feeling more confident. However, analyses also revealed that perceived affective support seemed to exacerbate the negative effects of financial stress on fathers' tangible support they provided for their infants. This finding was

stronger for those who perceived higher levels of affective support; in other words, those who were knew they could receive more affection seemed to provide less tangible support to their baby. For the fathers with the lowest 10% of perceived affective support, financial stress still negatively affected the tangible support they provided for their infants. One possible explanation for this finding might be that fathers who are experiencing financial trouble may feel less pressure to spend money they do not have when they are receiving assurance from others. Future research should replicate these analyses with samples that have larger variation of social support.

4.3 Limitations

The findings from the current study must be interpreted in light of its limitations. First, the current study involved analyses that are cross-sectional with data on all variables at one point in time which limits the ability to make causal inferences [71]. Future studies should be with longitudinal designs and measures over time of paternal stress, support and parenting behaviors. Second, the sample sizes for residential versus nonresidential fathers were unequal. Non-significant findings within the subgroup of nonresidential fathers (e.g., the relation between financial stress and tangible support) may be due to lack of power rather than lack of effect. Future studies with larger samples of nonresidential fathers are recommended although these are difficult groups to recruit. Third, studies of infancy provide only information about that time point in parenting, and it is possible that results may differ in another developmental period. For example, fathers who experience stress may be less involved in infant care and less confident of parenting an infant, but more involved in parenting later in the child's life. In addition, the lack of variability in social support may have limited our ability to test for its protective effects. Specifically, the current sample had uniformly high social support, which made it difficult to test for buffering effects of the effect of stress on father involvement. It is not clear why these fathers felt high perceived support although these reports do not indicate how much support they actually were receiving which may be more relevant [54]. Further, while the study did have several measures of stress, there was not a specific measure of parenting stress in the study until later in the study assessments. Similarly, the study did not include any observational measures of father behavior which are ideal and the reliability estimates for some stress measures were lower than preferred. Taking into consideration previous research by Lyons and colleagues [29] that suggests that parents can evaluate themselves more negatively, it is important to get multiple measures when feasible. As a final note, many of the effect sizes in this study were in the small to medium range. This may suggest that other factors not captured in this study may be affecting father involvement.

5. Conclusions and Implications

The results of this study have important implications for interventions that will improve outcomes for new fathers and their infants. Current public policy (e.g., paid paternity leave, early intervention program resources) does not adequately support fathers who remain highly stressed [72]. When looking at macro level changes needed to support parents, specifically fathers, it would be important to target early intervention program resources specifically for fathers and their needs. Moreover, policymakers must make changes in parental leave policies within the United States. The United States the Family and Medical Leave Act of 1993 (FMLA) allows for 12 weeks of unpaid leave for parents [73]. With finances being a major source of stress for many parents, the lack of paid

paternity leave can lead fathers to return to work early rather than getting to take time to bond with their children. Knoester and colleagues [70] reported that one year after birth, father engagement with their babies was positively associated with taking paternity leave and the length of the leave. Because father involvement is pivotal in several different aspects of child development, it is important that as a society there is an increase in engagement of including fathers in research as well as mental health treatment.

We know that fathers are less likely to be the focus of research, which can impact how society is able to adequately nurture their unique needs. Further, fathers are less likely to be encouraged to engage in the therapeutic process for treating their children's mental health or to participate in family-based interventions [38]. However, given that fathers independently contribute to their child's well-being it is important to encourage them to attend treatment when appropriate [7, 8, 11]. This should include contacting fathers directly to invite them to engage in the process, increasing the use of community-based recruitment, and including fathers in parenting interventions. This can be especially beneficial for nonresidential fathers whose improved parenting and co-parenting skills can improve their relationship with their child who they may see less frequently [74]. In general, nonresidential fathers do not tend to be included in parenting programs so it would also be important to add them and study their specific needs as they relate to stress and parenting outcomes [75].

This study showed how stress could negatively affect involvement with infants for a diverse group of residential and nonresidential fathers. It is vital to determine ways to increase involvement, as we know that father involvement early in life can be protective for fathers, their partners, and their children. It is important to continue to involve fathers in research to better understand how stress (among other variables) is associated with their ability to parent. Moreover, by including fathers in research, policymakers, society, and psychologists can better create specific, targeted interventions to benefit fathers and their families, starting at birth.

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Author Contributions

Alyssa Krueger, first author contributed with extensive writing, review, and editing. Dr. Kelsey Smith, second author, wrote the original draft. Arielle Pollock, third author, contributed to review, editing, and visualization. Dr. Christine Dunkel Schetter, fourth author, contributed with conceptualization and funding acquisition of the original CCHN study and was PI of the study. Dr. Nicole Mahrer, final author, conducted the data analyses, wrote the results section, and reviewed and edited the manuscript.

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Competing Interests

The authors have declared that no competing interests exist.

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