# Childrearing, Parental Health, and the Moderating Role of Mattering

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**ABSTRACT**

This study tests whether the sense of mattering – i.e., the feeling that one meaningfully impacts the lives of salient others – buffers the negative effects of childrearing on the biological health of parents. We analyze cross-sectional survey and biomarker data from Vanderbilt University's Nashville Stress and Health Study, a probability sample of non-Hispanic white and black working-age adults from Davidson County, Tennessee (2011–2014; n = 1,000). Our analyses confirm that the number of children living in a respondent's home is associated with increased allostatic load (AL), especially when this number exceeds two. Moreover, the sense of mattering attenuates (buffers) the association between children and AL, particularly for parents with multiple children in the home. Our findings underscore the importance of mattering as a key protective personal resource. We discuss the implications and limitations of our findings and outline avenues for future research.

**KEYWORDS**

childrearing; parenting; mattering; allostatic load; stress process

## INTRODUCTION

Although countless studies have explored the myriad ways parents influence the health of their children, researchers have paid less attention to understanding how children affect parental well-being. Moreover, studies that have examined links between childrearing and parental health have yielded complex and inconsistent results. For instance, a number of studies stretching as far back as the mid-twentieth century discovered that the presence of children in the home predicted diminished mental health for parents (LeMasters 1957; Gove and Geerken 1977; Ross 1995; Evenson and Simon 2005; Stanca 2012). Nevertheless, other studies have found that children in the home actually predicts improved mental health, at least after accounting for parents' social and economic resources (Ross and Huber 1985; Bird 1997). Several studies have also shown that mothers tend to report disproportionately worse mental health than fathers (Gove and Geerken 1977; Bird 1997; Helbig et al. 2006), especially working mothers who lack access to reliable child care (Ross and Van Willigen 1996; Terrill et al. 2012; Jacobs et al. 2016). In another study of dual-earner couples, however, researchers failed to find any notable gender differences in parenting-related distress (Deater-Deckard and Scarr 1996). To complicate matters further, studies have also demonstrated that the health effects of parenting can vary substantially across different stages of a parent's life course (Umberson and Gove 1989; Mirowsky and Ross 2002; Umberson, Pudrovska, and Reczek 2010).

What these studies highlight, perhaps more than anything, is the need to account for social context when assessing the health effects of childrearing (Umberson 1989). Not all parents experience the burdens of childrearing equally (Goldsteen and Ross 1989), and many parents have mixed feelings about their children and their role as a parent (e.g., Umberson and Gove 1989). Thus, parenting stress appears to be most damaging for parents who either lack flexible

social and economic resources, or who do not derive any deeper meaning and purpose from the parental role (Nelson et al. 2013; Nelson, Kushlev, and Lyubomirsky 2014).

Our review of prior literature also reveals a clear need to expand analyses beyond self-reported mental health outcomes. Indeed, even the small number of studies that have examined the physical health effects of parenting have mostly relied on self-report measures. As one example, a review of the family and health literature of the 1980s concluded that "children at home have small, inconsistent, or insignificant effects on parents' physical health" (Ross, Mirowsky, and Goldsteen 1990: 1066). However, none of the studies under consideration analyzed objective biomarker data, relying instead on self-reported measures such as the number of chronic conditions and functional limitations. Fast-forward nearly thirty years later and this still appears to be the dominant trend in the parenting and health literature (Song et al. 2014). Such blunt physical health measures possess a number of limitations, perhaps the most relevant being they fail to capture the physiological effects of parenting stress that predate disease onset (Taylor, McFarland, and Carr 2018). If we want to understand how childrearing affects the physical health of parents, and perhaps intervene before parenting stress leads to chronic health conditions, then we need to go straight to the source and collect relevant biomarkers.

Our study makes two novel contributions to the parenting and health literature. First, we incorporate survey and biomarker data to test whether the presence of children in the home is associated with parental biological dysregulation. Second, we consider whether the sense of mattering, an overlooked psychosocial resource in the stress and health literature, conditions the health effects of childrearing. Mattering is a unique component of the self-concept constituted by feelings that one meaningfully impacts the lives of salient others (Rosenberg and McCullough 1981). Though related to other dimensions of self-concept (e.g., self-esteem and mastery), mattering is considered the "most interactional and interconnected part of the self-concept," and

thus indispensable to the study of role occupancies and the health consequences thereof (Fazio 2010: 153; Thoits 2011). As we argue in more detail below, there is good reason to assume that parents with a diminished sense of mattering will suffer the worst health effects of childrearing.

In what follows, we first develop our study hypotheses within a stress process conceptual model. According to this model, childrearing is a potential chronic stressor that could undermine parental health and the sense of mattering is a psychosocial resource that might buffer these adverse health effects. We then test our hypotheses with survey and biomarker data from the Nashville Stress and Health Study, a probability sample of black and white working-age adults from Davidson County, Tennessee (n = 1,000). After presenting results from regression analyses, we discuss the implications and limitations of our findings and outline avenues for future research.

## BACKGROUND

### *Childrearing and Allostatic Load: A Stress Process Perspective*

Stress process models identify health outcomes as stemming from the dynamic interactions between stressors, social statuses, and psychosocial resources (Pearlin et al. 1981; Pearlin 1989). Stressors broadly refer to circumstances that necessitate a fundamental alteration of lifestyle, behavior, or worldview, which may consequently undermine a person's adaptive capabilities and cause poor health (Lazarus and Launier 1978). Stressors typically surface as three distinct types: (1) acute or traumatic events; (2) chronic strains, such as recurrent financial hardship; and (3) daily hassles, such as commuting in rush-hour traffic (Turner, Wheaton, and Lloyd 1995). Moreover, numerous studies have demonstrated that the links between stressors and health outcomes can be moderated by social statuses, as well as the presence or absence of psychosocial resources (Wheaton 1985). For example, studies have shown that people with

robust self-concepts and/or reliable support networks tend to maintain greater well-being in the face of various chronic and acute stressors (Turner and Roszell 1994; Turner and Lloyd 1999).

From a stress process perspective, childrearing can be treated as a potential chronic stressor that may undermine a parent's adaptive capacities and eventually lead to physical burnout. The concept of *role overload* provides a useful explanation of how this particular stress process could unfold. Role overload denotes a condition in which competing role obligations accumulate to such an extent that "demands on energy and stamina exceed the individual's capacities" (Pearlin 1989: 245). In the context of childrearing, parents are responsible for meeting their children's basic physiological needs for food, clothing, and shelter, which can require persistent vigilance and adaptation. Parenting may also increase risk for stressful interpersonal and inter-role conflicts in other realms of social life. For example, parents may face recurring interpersonal conflicts with children who are overdemanding and uncooperative. These same parents may also struggle with numerous conflicting demands between their children, spouse, work, and family and friends. Extended over a long period of time, such childrearing burdens could eventually lead to exhaustion and biological dysregulation (Deater-Deckard 2008; Terrill et al. 2012).

Allostatic load (AL) theory explicitly describes how the incompatible demands of childrearing could eventually "get under the skin" to affect the biological functioning of parents. According to AL theory, humans have evolved intricate physiological systems for maintaining homeostasis in the face of numerous demands from our physical and social environments. Although allostatic systems can be helpful in the short-term, chronic exposure to environmental stressors can perpetuate a cycle of physiological stress responses, such as elevated blood pressure and nervous system reactivity, all of which can exact a high toll on allostatic systems over time.

The concept of AL therefore refers to the physiological "price of adaptation" to chronic stress exposure.

A body of empirical literature corroborates the hypothesis that parenting stress could lead to biological dysregulation. As one example, a recent study by Priest and colleagues (2015) analyzed biosocial data from the National Survey of Midlife Development in the United States (MIDUS) to test whether "negative family emotional climate" (NFEC) predicted increased AL and chronic disease. In their study, NFEC consisted of two components measuring (1) strain received from the respondent's family, and (2) strain given to the family by the respondent. The measure of strain from the family, for instance, consisted of four indicators asking how often the respondent's family made too many demands, criticized them, let them down, or got on their nerves. Their analyses revealed that NFEC predicted increased AL which in turn predicted chronic disease activity. Priest and colleagues' research nevertheless represents only one of several studies that have found similar effects of negative family relations on biological functioning (e.g., Seeman et al. 2002; Kiecolt-Glaser, Gouin, and Hantsoo 2010; Yang, Schorpp, and Harris 2014; Yang et al. 2016).

Past theoretical and empirical literature is thus consistent with the notion that childrearing could pose biological health risks for parents, at least in cases where children contribute to chronic role overload and interpersonal conflicts. Still, these same studies also imply that the quality of parent-child relations, particularly the ways parents perceive themselves in relation to their children, could moderate physiological responses to parenting stressors. In keeping with the language of the stress process, we surmise that childrearing stressors will be moderated by the presence or absence of parental psychosocial resources. In the following section, we consider how one particular resource – the sense of mattering – may be vital for conditioning the effects of childrearing on the biological health of parents.

### *The Moderating Role of Mattering*

Rosenberg and McCullough (1981: 165) were the first to conceptualize mattering as a distinct component of the self-concept comprised of feelings that "others depend on us, are interested in us, are concerned with our fate, or experience us as an ego-extension." In other words, people with a strong sense of mattering feel that others (a) rely on them for support and care, (b) acknowledge and value their presence, and (c) are emotionally invested in their successes and failures. The sense of mattering is a vital human motivation tied to more basic needs for belongingness and purpose, all of which are defining features of personal well-being (Pearlin and LeBlanc 2001; Hughes 2006). Not surprisingly, empirical inquiries into the health effects of mattering have linked increased mattering to reduced symptoms of depression and suicidal ideation (Taylor and Turner 2001; Elliot et al. 2005; Milner et al. 2016), as well as to improved psychological well-being (Demier et al. 2011; Taniguchi 2015; Marshall 2001; Rayle 2005). The sense of mattering has also shown to buffer the effects of chronic and acute stressors on depressive symptoms (Turner, Taylor, and Van Gundy 2004). A small handful of recent studies even suggest that mattering can be beneficial for physical health, (Fazio and Ngyugen 2014; Raque-Bigdan et al. 2011; Thoits 2011), especially for buffering the effects of chronological aging on AL (Taylor et al. 2018).

There are also sound reasons to expect that the sense of mattering will moderate the biological effects of childrearing. For one, early proponents of AL theory noted substantial interindividual differences in physiological stress responses, a fact which can be attributed to the distinct ways people cognitively appraise potential stressors (Lazarus and Folkman 1984). On the one hand, someone who perceives a circumstance as a threat to his or her existential security is likely to experience an adverse stress response. On the other hand, if this same circumstance is perceived as less threatening or totally benign, then a stress response will either not occur or will

be significantly diminished (McEwen 1998: 34). A similar logic is applicable in the context of childrearing. For someone who feels they make a meaningful difference to the lives of their children, spouse, friends, and family, the demands of childrearing could reinforce a deeper sense of purpose and importance and ultimately alleviate some of the parenting stress (Thoits 2011). Conversely, childrearing duties will probably feel increasingly burdensome and thus amplify stress responses for parents who generally feel devalued and disrespected by salient others (Goldsteen and Ross 1989; Hughes 2006; Deater-Deckard 2008).

Although no study we are aware of has explicitly tested whether the sense of mattering buffers the effects of childrearing on parental AL, there is a theoretical basis for anticipating this relationship. For instance, over the past several decades, psychologists have developed and tested models showing that parents who maintain positive self-perceptions not only tend to be better at coping with the strains of parenting (Mash and Johnston 1990; Deater-Deckard 2008), but also tend to report enhanced psychosocial well-being (Nelson et al. 2013, 2014). In addition, a recent study by Song and colleagues analyzed MIDUS data and found that positive affect – e.g., feeling cheerful, optimistic, and really good about oneself – buffered the association between caring for children with developmental disorders and increased AL (Song et al. 2014). Taken together, these studies support the claim that the extent to which parents feel they matter to salient others could also significantly moderate physiological responses to childrearing stressors.

***Conceptual Model***

To summarize, our study conceptualizes (a) childrearing as a potential chronic stressor that may lead to increased AL, and (b) the sense of mattering as a psychosocial resource that could condition (buffer) the effects of childrearing on parental AL. This logic is consistent with a *stress-buffering* conceptual model. In statistical terms, we expect the sense of mattering to attenuate (buffer) the positive association between childrearing and parental AL, such that any

associations between childrearing and AL will be diminished for parents with a stronger sense of mattering. This conceptual model is depicted below in Figure 1. We now turn to our data and measures.

[FIGURE 1 ABOUT HERE]

## METHODS

### *Data*

We tested our conceptual model with survey and biomarker data from Vanderbilt University's Nashville Stress and Health Study (NSAHS). The NSAHS is a probability sample of non-Hispanic white and black working-aged adults living in Davidson County, Tennessee between 2011 and 2014. The primary objective of the NSAHS was to investigate social inequalities in population health outcomes and to gauge the effectiveness of various psychosocial resources for alleviating stressors. Survey Sampling International first produced a random sample of 199 block groups in Davidson County. To gather an adequate sample of black households, block groups were stratified by the percentage of black residents according to 2010 Census data. The final sampling frame consisted of 2,400 randomly sampled households of which 2,065 were contacted to participate in the study. Nearly 61% of contacted households eventually agreed to participate, resulting in a sample of 1,252 adult residents. Interviews were computer-assisted and conducted either in the respondent's home or on Vanderbilt campus. Trained interviewers conducted the interviews and were matched with respondents based on race. The average interview lasted approximately three hours. All respondents received $50 for their participation in the survey phase of the interview.

During the survey interview, respondents also received instructions and materials for collecting biomarkers. The morning following the survey interview, a trained clinician visited the respondent before breakfast to collect (1) a 12-hour urine sample, (2) a venous blood sample, (3)

three blood pressure readings (spaced by 2-minute intervals), and (4) anthropometric measurements of hip, waist, height, and weight. Respondents received an additional $50 for providing biomarkers. Due to the complex design of the NSAHS, data collection lasted from April 2011 to January 2014 or roughly three years (Taylor et al. 2018).

***Measures***

*Allostatic Load*. NSAHS researchers collected eleven biomarkers from the following four regulatory systems of the body: (1) central nervous system (sympathetic stress response), (2) hypothalamic-pituitary-adrenal or HPA axis (parasympathetic stress response), (3) cardiovascular, and (4) metabolic. Markers of sympathetic stress response included epinephrine (ug/ml) and norepinephrine (ug/ml). HPA axis biomarkers included dehydroepiandrosterone sulfate or DHEA-S (ug/dL) and cortisol (ug/L). The averages of three readings for systolic and diastolic blood pressure were taken to measure cardiovascular activity. Biomarkers associated with metabolic activity included BMI, waist-to-hip ratio, total glycosylated hemoglobin (Plasma A1C %), total cholesterol (mg/dL), and high-density lipoprotein (mg/dL). The descriptive statistics for each biomarker are listed in Appendix 1 (see also Turner, Brown, and Hale 2017).

There are generally two different methods for calculating composite AL scores. One method takes the average of the normal scores (z scores) for each continuous biomarker. Another method is to dummy-code each biomarker into "high risk" quartiles and then sum each dummy-coded biomarker to create a count index (Seeman et al. 1997). We decided to stick with the first method for two reasons. First, we tried both coding schemes and our main findings were comparable in either case. Second, our study hypotheses require testing interaction terms in our regression models, which poses substantial methodological challenges for count variable estimations. Indeed, interpreting interactions in Poisson or negative binomial regression models

is not straightforward, as the magnitude and statistical significance of the interaction term can vary widely in accordance with other covariates in the model (Mustillo, Lizardo, and McVeigh 2018). For the sake of clarity, our final models predict standardized allostatic load scores using ordinary least squares (OLS) regression techniques. DHEA-S and high-density lipoprotein were reverse-scored in these analyses, since their depletion (rather than accretion) reflects greater allostatic load.

*Childrearing.* Our models test three functional forms of childrearing. First, we test a count measure of the number of children living in the respondent's home during the time of the interview (e.g., Bird 1997). This measure assumes a dose-response relationship between childrearing and health, such that each additional child in the home is thought to contribute incrementally to parental role strain and AL. Respondents were first asked whether they had any children. Those without children were given a score of zero. Respondents who answered affirmatively were then asked, "How many children live with you now?" Responses were coded as a count of the number of children currently living with the respondent. Second, in line with previous research (Mirowsky and Ross 2002), we also estimate a quadratic term for the number of children in the home. This measure will test the assumption that each additional child in the home increases AL at an accelerating rate.

Our third operationalization is a categorical variable of parental status (e.g., Evenson and Simon 2005). This variable consists of the following groups: childless (reference), empty-nest parents, parents with one child in the home, and parents with multiple children in the home. This categorical measure may have certain advantages over the first two. For one, it relaxes stringent assumptions of linearity between childrearing and AL. This variable also distinguishes between childless and empty-nest parents, both of whom are coded as 0 in our first two operationalizations. This distinction could be important considering past studies have found that

empty-nest parents can differ from their childless and full-nest counterparts in terms of well-being (Evenson and Simon 2005). Finally, although the categorical variable relaxes assumptions of linearity, it could also provide robustness tests of linear and quadratic relationships. For instance, if a linear function best explains the relationship between the number of children in the home and AL, then we should expect to find (a) no difference in mean AL scores between childless respondents and empty-nest parents, but (b) incremental increases in mean AL scores between childless respondents and parents with one to multiple children in the home.

*Sense of Mattering*. The sense of mattering was measured with a five-item index first conceptualized by Rosenberg and McCullough (1981) and later validated by Taylor and Turner's (2001) community study in Toronto, Canada (see also DeForge and Barclay 1997; Schieman and Taylor 2001). This index included the following items gauging the extent to which respondents felt: (1) important to other people, (2) that other people paid attention to them, (3) that others would miss them if they went away, (4) that people were generally interested in what they said, and (5) that other people depended on them. Responses ranged from 1 (not at all) to 4 (a lot). We averaged responses to the five items with higher scores reflecting a greater sense of mattering ($\alpha$ = .75). All five items loaded onto a single factor with an eigenvalue of 2.02. While related to measures of social support, prior factor analyses of the NSAHS data confirmed that mattering is empirically distinct from other indices of family, friend, and coworker support (Taylor et al. 2018).

*Control Variables*. Sociodemographic controls include *age* (in years), *gender* (1 = female, 0 = male), *race-ethnicity* (1 = black, 0 = white), *marital status* (1 = married, 0 = not married), *education* (year of highest grade completed), *employment status* (1 = employed, 0 = unemployed), and a standardized mean index of *financial resources* (ordinal measures of

household income, liquid assets, and value of home; $\alpha = .80$). Table 1 provides weighted descriptive statistics of study variables.

[TABLE 1 ABOUT HERE]

***Analytic Strategies***

All statistical analyses were conducted in Stata 14. We predicted standardized AL scores with ordinary least squares (OLS) regression techniques. Table 2 reports the results of our multivariable analyses in a series of six models. Model 1 reports net associations between AL, the number of children in the home, mattering, and controls. Model 2 then introduces a child $\times$ child interaction term to test for a quadratic association between the number of children in the home and AL. Model 3 estimates a child $\times$ mattering interaction term to test whether the sense of mattering moderates the linear association between the number of children and AL. Model 4 introduces a three-way, child $\times$ child $\times$ mattering interaction term to test whether the sense of mattering moderates the quadratic association between children and AL – i.e., whether mattering is particularly impactful for parents with multiple children in the home. Model 5 then replaces the variable for number of children with the categorical childrearing variable. Finally, Model 6 introduces an interaction term between the categorical childrearing variable and mattering.

All regression models adjusted for post-stratification weighting, cluster sampling by block group, and control variables. All continuous interaction term variables were mean-centered. To facilitate the presentation of findings, we also generated a series of graphs depicting (a) direct associations between childrearing and AL, and (b) interaction terms between childrearing and mattering. Accompanying these graphs is a table of estimated marginal effects of the number of children on standardized AL scores at representative values of mattering (Table 4). In other words, this table details changes in AL scores for every additional child in the home while holding mattering at specified values ranging from -2 to +2 standard deviations from its

mean. Finally, the following variables had missing data: AL (n = 252), sense of mattering (n = 10), and financial resources (n = 44). With the exception of AL, we followed the advice of Johnson and Young (2011) and replaced these missing values with 25 iterations of multiple imputation by chained equation. Main findings were substantively identical before and after imputation.

[TABLE 1 ABOUT HERE]

## RESULTS

### *Childrearing and Allostatic Load*

Table 2 reports unstandardized coefficients from ordinary least squares (OLS) regression models predicting standardized AL scores. All models adjust for control variables, but these coefficients were excluded to preserve space. First, Model 1 provides evidence of a linear association between the number of children living in a respondent's home and AL. Holding all other variables in the model constant, each additional child in the home predicted an average increase of 0.04 standard deviations in AL scores ($ß_{children} = 0.04$; $p < .01$). Second, Model 2 provides inconclusive evidence of a quadratic association between the number of children and AL. That is, the quadratic term introduced in Model 2 was in the expected positive direction but was only marginally significant at $p < .10$. Finally, the categorical variable entered in Model 5 shows that respondents with multiple (2+) children in the home, as a group, scored an average of 0.10 standard deviations higher on AL than their childless counterparts ($ß_{multiple\ children} = 0.10$; $p < .05$). On the other hand, empty-nest parents and parents with only one child in the home did not significantly differ from childless respondents in terms of AL. Mean differences in AL scores by parental status are depicted below in Figure 2. Taken together, these findings suggest that the presence of children in the home contributed to increased AL, especially for parents with multiple children in the home.

[TABLE 2 ABOUT HERE]

[FIGURE 2 ABOUT HERE]

***The Moderating Role of Mattering***

We also found complex interactions between childrearing and the sense of mattering. First, Model 3 of Table 2 provides evidence that the sense of mattering attenuated the linear association between the number of children in the home and AL ($ß_{children \times mattering} = -0.04$; $p < .05$). Figure 3 provides a clearer interpretation of this moderating pattern. This figure depicts standardized AL scores (y-axis) as a function of the number of children in the home (x-axis) and standardized mattering scores. As this graph shows, respondents who scored -2 SD on mattering tended to exhibit the steepest inclines in AL as a function of the number of children in the home, whereas respondents who scored above the mean on mattering tended to show below-average AL scores regardless of the number of children (see also Appendix II).

Second, Model 4 of Table 2 also offers evidence that the sense of mattering attenuated the quadratic association between the number of children in the home and AL ($ß_{children \times children \times mattering} = -0.02$; $p < .05$). Figure 4 clarifies this complicated interaction and uncovers a more nuanced dynamic between children, mattering, and AL. As this figure suggests, the sense of mattering did not moderate the association between children and AL until the number of children reached two, at which point respondents with lower mattering scores appeared to exhibit exponential increases in AL for each additional child in their home. The interaction term in Model 6 corroborates the three-way interaction in Model 4 by showing that, compared to their childless counterparts, only respondents with multiple (2+) children in their home exhibited significantly lower AL scores as a function of increased mattering. Figure 5 provides visual confirmation of this moderating pattern. This graph shows that, as a group, respondents with two or more children in their home presented above-average AL scores if they also reported below-

average mattering scores, but reported below-average AL scores if they also reported above-average mattering scores. The other parenting groups, on the other hand, did not significantly differ from childless respondents in AL scores at any level of mattering (see Appendix II). We discuss the implications of these findings in more detail below.

[FIGURES 2 – 5 ABOUT HERE]

***Sensitivity Analyses***

We also ran a series of sensitivity analyses to assess the stability of our findings. First, 20% (n = 252) of respondents were missing AL scores. These missing data could be particularly relevant for our study considering respondents with children in their home may have been more likely to select out of biomarker collection due to scheduling conflicts. To determine whether this was the case, we estimated multivariable logistic regression models predicting odds of respondents missing AL scores. Our analyses confirmed that the number of children in the home was not associated with missing AL data (odds ratio = 0.97; $p = .81$). Second, because mattering and the number of children in the home were weakly and positively correlated ($r = .08$; $p < .01$), we estimated nested models to test whether the sense of mattering mediated or suppressed the association between the number of children and allostatic load (or vice-versa). Results indicated that both coefficients remained stable after removing the other variable from the model.

Third, we disaggregated the allostatic load and mattering indices to determine whether individual index items were driving our main findings. For example, feeling important to others may be more relevant for a parent's health than feeling that others pay attention to you. Likewise, averaging together distinct biomarkers may obscure underlying nuances between childrearing and biological health outcomes. Results from these analyses confirmed that no single item from either index was disproportionately responsible for our main findings. Finally, past research suggests that the health effects of childrearing and mattering may vary by gender

(Ross and Van Willigen 1996; Schieman and Taylor 2001). We ran a series of gender-stratified models to test this hypothesis but failed to find any consistent gender interactions. We also failed to find any significant interactions between childrearing and age, race-ethnicity, marital status, education, employment status, or financial resources. We therefore believe the presented findings provide the best test of our research hypotheses.

## DISCUSSION AND CONCLUSION

In this paper we tested two hypotheses: (1) That the number of children is positively associated with AL; and (2) that mattering conditions this relationship. Our findings supported both hypotheses. The number of children in a respondent's home was associated with increased AL and the sense of mattering attenuated this association, such that parents with diminished feelings of mattering exhibited the greatest increases in AL. Although our results were consistent with a linear, dose-response relationship between the number of children and parental AL – i.e., each additional child in the home was associated with an incremental increase in AL – we also found evidence of non-linear relationships. In particular, parents with multiple children in the home showed significantly higher AL scores compared to their childless counterparts, whereas empty-nest parents and parents with only one child in the home did not significantly differ from childless respondents in terms of AL. The sense of mattering also buffered the association between children and AL primarily for these same parents with multiple children in the home.

The direct association between the number of children and increased AL supports our argument that the numerous conflicting demands of childrearing can outstrip the adaptive capacities of parents, leading to role overload and eventually physical burnout. We offered several specific explanations of this association. First, providing children with basic physiological needs such as food, clothing, and shelter can be stressful for any parent, inasmuch as doing so requires substantial physical and mental energy. Children can also be difficult and

uncooperative at times, which may exacerbate otherwise trivial childrearing demands and trigger significant distress. Moreover, having to juggle childrearing duties on top of work, romantic relationships, friends, and extended family ties can further amplify parenting stress and subsequent burnout. Our findings indicate that parents with multiple children in the home were particularly vulnerable to increased AL, which is consistent with the notion of parental role overload. By the same token, parents rearing multiple children also appeared to benefit the most from feeling they mattered to others.

Indeed, perhaps the most novel finding of our study is that the sense of mattering buffered the association between children and AL. In fact, very few studies have considered mattering as a potential stress-buffering resource and no study we are aware of has tested the stress-buffering effects of mattering in the context of childrearing. We suggested above that mattering may benefit the biological health of parents by facilitating benign appraisals of parental role obligations. Accordingly, parents with strong feelings of mattering likely interpreted their parental duties as contributing to a deeper sense of purpose and thus experienced fewer stress responses when managing childrearing demands. Conversely, parents who lacked a sense of mattering probably felt unrewarded and overburdened by their parental obligations, and may have consequently undergone more intense physiological stress responses in the face of parenting stressors.

Although we developed our study within a stress process conceptual model, the explanatory pathways offered above – i.e., social relations interacting with cognitive appraisals to affect biological functioning – are also consistent with a broader biopsychosocial model of human health. This model likewise views biological health as resulting from the interaction between social stressors and individual cognitions (Clark et al. 1999; Harris 2010). Future research nevertheless is needed to untangle exactly how perceptions of mattering blunt

physiological responses to parenting stressors. New studies implicate the prefrontal cortex (PFC), a region of the brain responsible for personality expression and other complex social behavior, as one potential starting point in this investigation (Wiley et al. 2017). For example, a recent review of stress-related biosocial mechanisms of discrimination pinpoints regions of the PFC as crucial neural processors of social interaction and emotion regulation (Goosby, Cheadle, and Mitchell 2018). In the context of parenting stress, PFC functioning may modulate how parents perceive themselves in relation to their children, as well as any emotional and physiological responses to parent-child interactions.

Our study was also limited in certain respects. First, because the NSAHS data were cross-sectional, we could not definitely establish causal direction between the number of children and AL. It could be that the association between children and AL is bidirectional and changes over the life course. For example, declining health associated with increased AL may prevent some people from rearing children in the first place. Moreover, younger parents could be more physically fit than older parents and may experience less physical exhaustion from childrearing. Although our models controlled for the age of respondents, an ideal study would follow a prospective cohort of parents over multiple waves to see how childrearing affects AL at different phases of the life course, and how the sense of mattering moderates these effects along each step of the way. A second limitation of our study is that our sample was drawn from residents of Davidson County, Tennessee. To generalize beyond this population, future studies could test similar hypotheses with nationally representative samples or samples from other geographical locations.

Despite current limitations, our study has made novel contributions to the parenting and health literature. First, our study is one of few to link childrearing to biomarkers of health, rather than to self-reported mental and physical health outcomes. Second, few studies have ever tested

the stress-buffering effects of mattering and ours is the first to explore whether the sense of mattering buffers the effects of childrearing on parental health. Future studies can build on this one by pinpointing the neurological mechanisms that explain how the sense of mattering conditions physiological responses to parenting stressors. Researchers can also expand this line of inquiry by assessing whether our findings generalize to other distinct role sets, populations, and life course stages.

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## TABLES AND FIGURES

**Table 1.** Nashville Stress and Health Study: Weighted Descriptive Statistics of Study Variables (n = 1,000).

| | Mean | SD | Range |
|---|---|---|---|
| **Dependent Variable** | | | |
| Allostatic load (standardized) | -0.04 | 0.40 | -1.02−1.76 |
| **Childrearing** | | | |
| # of children in the home | 0.82 | 1.10 | 0−8 |
| Childless (reference) | 0.30 | 0.46 | 0−1 |
| Empty-nest parent | 0.24 | 0.43 | 0−1 |
| One child in the home | 0.22 | 0.41 | 0−1 |
| Multiple children in the home | 0.24 | 0.43 | 0−1 |
| **Psychosocial Resource** | | | |
| Sense of mattering | 3.33 | 0.48 | 1−4 |
| **Control Variables** | | | |
| Age | 43.83 | 11.69 | 22−69 |
| Gender[a] | 0.50 | 0.50 | 0−1 |
| Race-ethnicity[b] | 0.27 | 0.44 | 0−1 |
| Marital status[c] | 0.59 | 0.49 | 0−1 |
| Education | 14.56 | 2.91 | 0−28 |
| Employment status[d] | 0.79 | 0.41 | 0−1 |
| Financial resources | 0.18 | 0.83 | -1.26−2.18 |

[a]Gender: 0 = *male*, 1 = *female*. [b]Race-ethnicity: 0 = *white*, 1 = *black*. [c]Marital status: 0 = not *married*, 1 = *married*. [d]Employment status: 0 = *unemployed*, 1 = *employed*.

**Table 2.** Ordinary Least Squares (OLS) Regression Models Predicting Standardized Allostatic Load Scores (n = 1,000).

| | (1) | | (2) | | (3) | | (4) | | (5) | | (6) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Focal Variables** | | | | | | | | | | | | |
| Sense of mattering | -0.01 | | -0.01 | | -0.01 | | 0.02 | | -0.01 | | 0.00 | |
| | (-.01) | | (-.08) | | (-.01) | | (.02) | | -(-.02) | | (.00) | |
| # of children in the home | 0.04 | ** | 0.03 | ** | 0.04 | *** | 0.03 | * | | | | |
| | (.12) | | (.08) | | (.12) | | (.09) | | | | | |
| Empty-nest parent[a] | | | | | | | | | -0.02 | | -0.02 | |
| | | | | | | | | | -(.02) | | -(.02) | |
| One child in home[a] | | | | | | | | | -0.01 | | -0.02 | |
| | | | | | | | | | -(.01) | | -(.02) | |
| Multiple children in home[a] | | | | | | | | | 0.10 | * | 0.10 | * |
| | | | | | | | | | (.11) | | (.11) | |
| **Interaction Terms** | | | | | | | | | | | | |
| Children × Children | | | 0.01 | † | | | 0.00 | | | | | |
| | | | (.05) | | | | (.02) | | | | | |
| Children × Mattering | | | | | -0.04 | * | 0.01 | | | | | |
| | | | | | (-.06) | | (.01) | | | | | |
| Children × Children × Mattering | | | | | | | -0.02 | * | | | | |
| | | | | | | | (-.09) | | | | | |
| Empty-nest × Mattering | | | | | | | | | | | -0.05 | |
| | | | | | | | | | | | -(.03) | |
| One child × Mattering | | | | | | | | | | | 0.13 | |
| | | | | | | | | | | | (.08) | |
| Multiple children × Mattering | | | | | | | | | | | -0.14 | * |
| | | | | | | | | | | | -(.08) | |
| Adjusted $R^2$ | .227 | | .228 | | .230 | | .232 | | .226 | | .237 | |
| RMSE | .343 | | .343 | | .342 | | .342 | | .343 | | .340 | |

Notes: Unstandardized coefficients reported with standardized coefficients in parentheses. Models adjust for probability weighting, cluster sampling by block group, and control variables.

[a] Reference = childless respondents.

† $p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed).

**Appendix I**. Weighted Descriptive Statistics of Biomarkers (n = 1,000)

| Biomarker | Mean | SD | Range |
|---|---|---|---|
| Epinephrine (ug/ML)[a] | 0.003 | 0.005 | 0.0001−0.1523 |
| Norepinephrine (ug/ML)[a] | 0.025 | 0.019 | 0.0024−0.2580 |
| DHEA-S (ug/dL)[b] | 151.177 | 105.958 | 15−868 |
| Cortisol (ug/L)[a] | 11.287 | 11.890 | 1−194 |
| Systolic BP | 121.449 | 13.881 | 80−189 |
| Diastolic BP | 77.646 | 9.143 | 52−119 |
| BMI | 29.804 | 7.538 | 15.21−64.40 |
| Waist-to-hip ratio | 0.895 | 0.089 | 0.636−1.327 |
| HbA1C (%)[b] | 5.525 | 0.898 | 3.3−17.4 |
| Total cholesterol (mg/dL)[b] | 188.400 | 41.024 | 81−372 |
| High-density lipoprotein (mg/dL)[b] | 47.772 | 15.007 | 18−141 |

*Note*: Biomarkers collected by urine[a] and venous blood[b] samples.

**Appendix II**. Marginal Effects (MFX) on Linear Predictions of Allostatic Load (n = 1,000).

| Model | Variables | MFX | |
|---|---|---|---|
| (3) | **Number of children:** | | |
| | @ Mattering = -2 SD | .080 | ** |
| | @ Mattering = -1 SD | .060 | ** |
| | @ Mattering = Mean | .041 | *** |
| | @ Mattering = +1 SD | .022 | ** |
| | @ Mattering = +2 SD | .002 | |
| (4) | **Number of children (squared):** | | |
| | @ Mattering = -2 SD | .014 | * |
| | @ Mattering = -1 SD | .009 | † |
| | @ Mattering = Mean | .003 | |
| | @ Mattering = +1 SD | -.002 | |
| | @ Mattering = +2 SD | -.007 | |
| (6) | **Empty nest** (ref. = childless)**:** | | |
| | @ Mattering = -2 SD | .003 | |
| | @ Mattering = +2 SD | -.071 | |
| | **One child** (ref. = childless)**:** | | |
| | @ Mattering = -2 SD | -.151 | |
| | @ Mattering = +2 SD | .120 | |
| | **Multiple children** (ref. = childless)**:** | | |
| | @ Mattering = -2 SD | .243 | * |
| | @ Mattering = +2 SD | -.037 | |

Note: MFX based on Table 2.

† p < .10, *p < .05, **p < .01, ***p < .001 (two-tailed).

**Figure 1.** Stress-Buffering Conceptual Model.

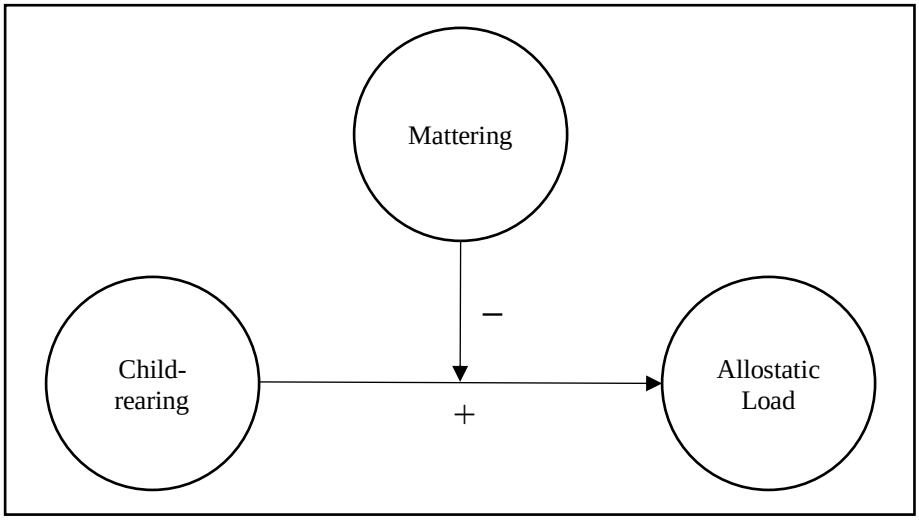
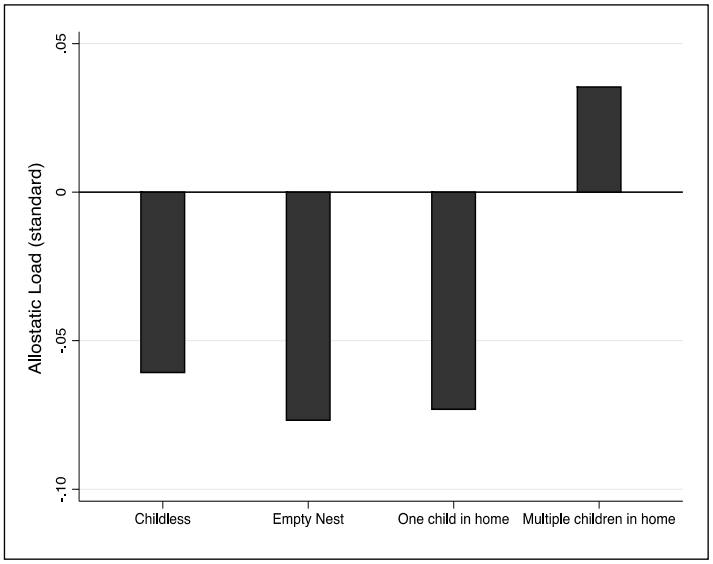
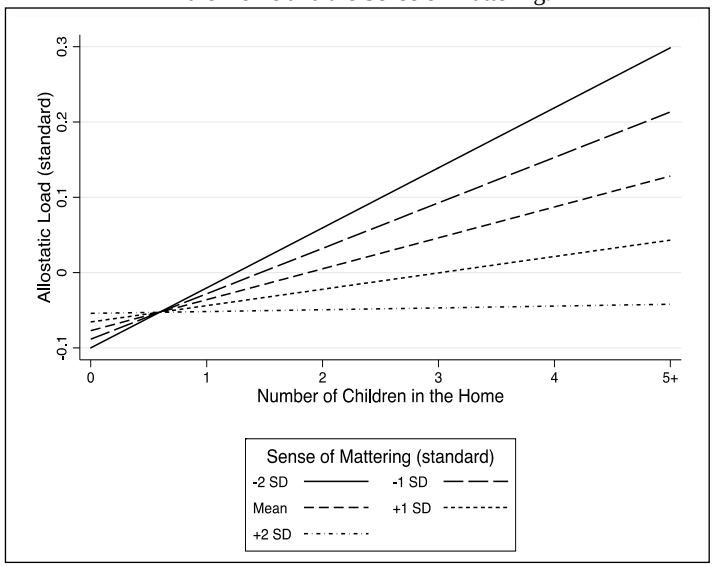


**Figure 2.** Mean Allostatic Load Scores by Parental Status.



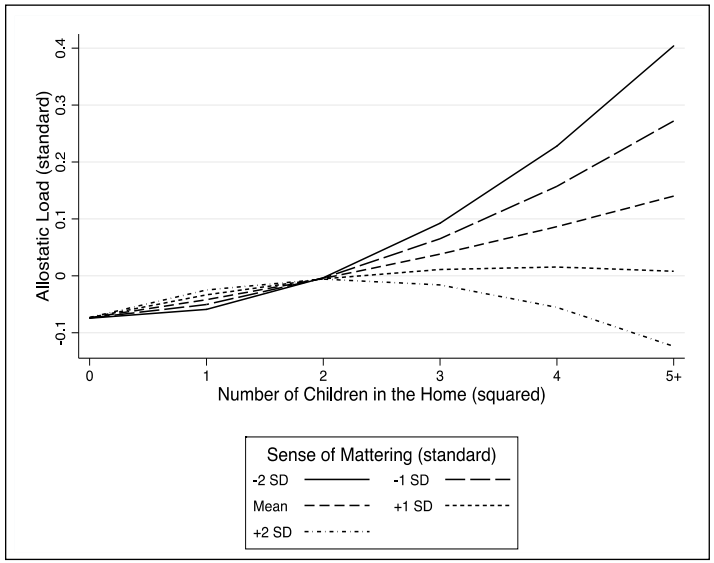

Note: Based on Table 2, Model 5.

**Figure 3.** Allostatic Load as a Function of the Number of Children in the Home and the Sense of Mattering.



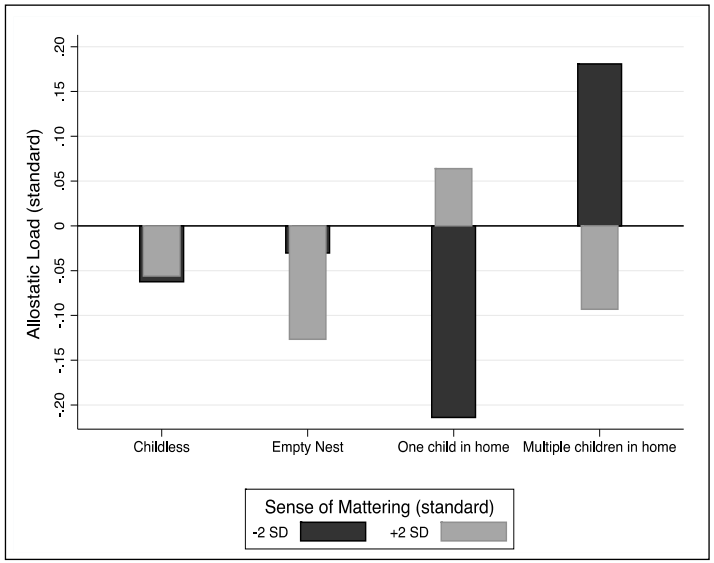

Note: Based on Table 2, Model 3.

**Figure 4.** Allostatic Load as a Function of the Squared Number of Children in the Home and the Sense of Mattering.




Note: Based on Table 2, Model 4.

**Figure 5.** Allostatic Load as a Function of Parental Status and the Sense of Mattering.




Note: Based on Table 2, Model 6.