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ORIGINAL PAPER

The Contribution of Household Chaos and Fatigue to Maternal Stress

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Abstract

Parenting stress can be detrimental to child outcomes and there is evidence that both parental fatigue and household chaos are associated with the stress experienced by parents. There has been little investigation of the relative contributions these variables make to stress and even less consideration of the changes that may occur in the impact of and associations among these variables as children mature. This study explored the contribution of fatigue and household chaos to parental stress in a large sample of Australian mothers of children and adolescents. Participants completed the Parental Stress Scale, the Fatigue Assessment Scale and the Confusion, Hubbub and Order Scale. There was no group difference on the measure of stress. While parents of young children reported slightly higher levels of fatigue and household chaos than those of adolescents, effect sizes were small. Household chaos contributed to maternal stress over and above the impact of fatigue; however, there was a complex interaction between the effect of chaos and fatigue on stress. As the level of chaos increased, the impact of fatigue on maternal stress decreased. This interaction was not moderated by child age. As the data were collected during the COVID-19 pandemic, our considerations of the results of the study include some speculation about the influence of this on our results.

Keywords Parents · Mothers · Stress · Fatigue · Chaos · Disorganization

Highlights

- Household chaos contributes to maternal stress beyond the impact of fatigue.
- Maternal reports of fatigue and household chaos reduce only slightly with child age.
- Mothers with fewer children report lower levels of stress, fatigue and household chaos.
- The interaction of fatigue and chaos has a complex impact on parental stress.

Given the extensive and compelling evidence demonstrating the influence of parenting on behavioral, social and emotional outcomes for children, it is critical to focus on the factors that affect parental behavior. A key determinant of parenting behavior is parental stress (e.g., Madarevic et al., 2022; Streit & Davis, 2021), with a potential mechanism being the depletion of the physical and psychological resources that are required to perform the parenting role (Farmer & Lee, 2011; Geikina & Martinsome, 2015). While stress is widely acknowledged as inherent to the parenting role, a review by Cronin et al. (2015) made it clear that prolonged or excessive stress can have detrimental consequences for both parents and children. The current study investigated variables hypothesized to associate with parental stress in a large sample of Australian mothers of children under 18 years of age.

Belsky (1984) developed a model for understanding the determinants of parenting behavior, suggesting that parents are influenced by psychological and contextual factors, as well as child characteristics. In the research reported here, we used Belsky's model to inform our choice of variables that may influence parental stress. These included: fatigue (psychological factor), household disorganization (contextual factor), and child age (child characteristic).

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Parental Fatigue

Tiredness is a common experience for parents, especially new parents whose sleep is likely to be disrupted. Chronic tiredness (fatigue) interferes with the ability to meet everyday demands (Kienhuis et al., 2010). Fatigue has been found to be related to anxiety and depression in parents (Giallo et al., 2011; Wilson et al., 2019), to lower sense of parental self-efficacy (Cooklin et al., 2012; Lesniowska et al., 2016) and to parental stress (Loutenhiser et al., 2015). While associated, it is distinct from these constructs (Giallo et al., 2011). Cooklin et al. (2012) found that parental fatigue accounts for a small but significant portion of variance in parental stress, over and above demographic factors, coping strategies, social support and physical health.

Fatigue is well recognized as a part of the experience of parenting when children are very young, before sleep routines are established. This recognition has resulted in research being focused on early childhood (0–6 years; e.g., Chau & Giallo, 2015; Lesniowska et al., 2016). Parents may also experience fatigue at other periods in their life cycle (e.g., Shi et al., 2022); however, examinations of parental fatigue in families with older children are rare, and likely to be focused on families with substantial stress due to factors such as parental ill-health (e.g., Chen & Panebianco, 2020). An Australian study found that mothers of younger children reported more exhaustion than those of older children; however, the age range of children in the study was not reported (Wiemer & Clarkson, 2023). It is important to understand the contribution of fatigue to parental stress in non-clinical samples of parents of children and adolescents.

Household Chaos

The construct of household disorganization or chaos (henceforth household chaos) encapsulates multiple factors that disrupt routine and order within the household, including ambient noise, environmental traffic, crowding and disorganization (Matheny et al., 1995). Research on the effects of household chaos in recent years has highlighted its importance to parental and family wellbeing (Marsh et al., 2020). Household chaos is associated with a range of non-optimal parenting practices (see Lawrence et al., 2021; Zvara et al., 2020) as well as poor outcomes for children (e.g., Garrett-Peters et al., 2019; Tucker et al., 2018).

While it might be expected that household chaos contributes to stress in parents, to date only a small number of papers have examined this relationship. Several recent studies investigated household chaos in relation to parental anxiety and depression and reported significant positive associations (e.g., Gordon-Hacker et al., 2022; Zhang, 2022). Dumas et al. (2005) examined household chaos, parenting and child outcomes, and found a significant positive correlation between household chaos and parental stress. More recently, Yalcintas et al. (2021) reported that household chaos predicted stress in their cross-sectional study of 158 mothers of 6-year-old twins, and Spinelli et al. (2021) also identified a positive association in Italian families of children between the ages of 2 and 14 years.

Household chaos may change over a family's life course as parents become more accustomed to their parental role or as children are able to take on more personal responsibility. It may also be differentially related to parental stress as children mature. We could identify no studies that examined differences in household chaos related to child age or to associations with stress at different stages of the life cycle.

Impacts of Fatigue and Household Chaos on Parenting

Giallo, Wood et al. (2011) theorized that fatigue affects parenting via the same mechanism as parental stress, in that it depletes resources that are required to meet personal expectations of parenting; however, it is plausible that fatigue contributes directly to parental stress as well as having indirect effects through its impact on contextual characteristics such as household (dis)organization. Studies of the association of fatigue and household chaos are relatively few, but all reported findings have been in the expected direction, with a positive association between these two constructs (see Thomas & Spieker, 2016; Whitesell et al., 2018).

Although relationships of stress with both fatigue and household chaos are well-established in the parenting literature, very few researchers have considered either the relative contributions of fatigue and chaos, or their combined effect, on stress. Thomas and Spieker (2016) found that fatigue, household chaos, depression and sleep disturbance were associated in mothers of infants. However, the relationships among fatigue, depression and sleep disturbance were attenuated after controlling for household chaos. This finding points to the potential influence of household chaos on maternal functioning. It is plausible that household chaos accounts for a significant amount of variance in parental stress over and above other factors that have been found to contribute. It is also possible that household chaos and fatigue interact in complex ways to influence stress. In the current study we aimed to examine these hypotheses.

A notable gap in the existing literature is the investigation of experiences of fatigue, household chaos and stress for parents of children of varying ages. We included child age in this study because the majority of work examining fatigue and household disorganization has focussed on early

parenting, even though parenting older children and adolescents can also be stressful as adolescents move towards a more egalitarian relationship with parents that potentially leads to increased conflict (Branje, 2018). The time demands involved in caring for young children, as well as their limited capacity to assist with household chores and manage their own behavior (in contrast to adolescents, Nigg, 2017) suggest that parents of younger children will likely experience more fatigue and chaos. Despite the importance of child stage to a number of aspects of family life, the extant research on household chaos has focused on experiences of parents of young children, and there appear to be no studies comparing differences in household chaos for parents of young children and parents of older children.

In the current study we aimed to determine if experiences of stress, fatigue and household chaos differ for parents as a function of child age. Given the extra demands associated with parenting young children (e.g., monitoring development, disruptions to sleep, increased need for supervision), we hypothesized that parents of younger children would report more fatigue and household chaos than parents of older children. As noted above, parental fatigue and chaos have been found to be positively associated with stress. We expected that more fatigue and household chaos would be reported by parents of younger children, leading to the hypothesis that parental stress would also be higher in these families. We also hypothesized that household chaos would contribute to parental stress, over and above that attributable to parental fatigue, and considered that chaos and fatigue would be likely to interact and produce increases in parental stress. The final question to be addressed was whether child age influenced the associations between the measures and any interactions observed in the data.

Method

Participants

The participants were 3,050 Australian mothers aged between 20 and 58 years ($M = 39.15$, $SD = 5.62$) with children aged 17 and younger. Family size ranged from 1 to 11 children ($M = 2.22$, $SD = 0.89$). The sample comprised 9% of participants with high school as their highest level of education, 27% with a certificate or diploma, 39% with an undergraduate degree, and 25% with a postgraduate qualification. Information was also collected on current employment status: 28% were employed full time, 55% had part—time employment, and 17% were not working outside the home. Compared with the general Australian population, the sample comprised higher proportions of mothers with university degrees (ABS, 2022a) and in paid employment (ABS, 2022b).

The full-sample dataset was split to allow comparisons between mothers of younger and older children. Two groups were formed comprising one group with at least one child aged six or younger, but no children aged 13 or older ($N = 1{,}609$; hereafter called the early childhood group) and one group with at least one child aged 13 years or older, but no children aged six years or younger ($N = 747$; hereafter the adolescent group). The mothers in the early childhood group were somewhat younger than those in the adolescent group ($M = 36.31$, $SD = 4.48$, range = 20 to 51 years compared with $M = 44.02$, $SD = 4.7$, range = 32 to 58 years). In both groups, the average number of children was 2.2. A higher proportion of mothers in the early childhood group had completed university undergraduate or postgraduate degrees (69% compared with 59%). The proportions of mothers who were engaged in part-time work were similar in the two groups, but more mothers in the adolescent group were working full-time (39% compared with 20%), and 21% of mothers with younger children reported not working outside the home, compared with 9% in the adolescent group.

Procedure

Ethical approval for the study was granted by the Human Research Ethics Committee at Queensland University of Technology (approval number 1900000658). A survey was developed to gather demographic information and to present the questionnaires used to measure the variables of interest. The survey was distributed both online, using Key Survey, and in hard-copy format to mothers within the researchers' personal networks. Participants who completed the hard-copy version were provided with reply-paid envelopes for its return. The online survey was advertised on the researchers' personal social media platforms and on a popular Australian Facebook site for parents. Ninety-nine percent of participants responded using the online option. All were provided with an information sheet outlining the purpose of the study which also stated that submission of the survey indicated consent for their data to be used. They were given the opportunity to enter a draw to win one of three $100 shopping vouchers. Participant recruitment occurred between 3rd February 2021 and 30th June 2021, with prize draws occurring at three different time points. While the impact of the COVID-19 pandemic was not a focus of the study, data collection coincided with this disruptive period of time.

Measures

Demographic variables

Participants were asked to report their age, highest level of education (response options: junior high school; senior high

school; certificate or diploma; undergraduate university degree; postgraduate university degree), employment status (response options: full-time, part-time/casual, not currently employed), number of children in the family, and age of children.

Parental Stress Scale (PSS; Berry & Jones, 1995)

The 18-item PSS was administered to measure perceptions of parental stress. Participants respond to items on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The possible range of scores is 18 to 90, with higher scores reflecting higher levels of stress. Items include "The major source of stress in my life is my child" and "There is little or nothing I wouldn't do for my child if it was necessary". Berry and Jones reported that the PSS has strong validity, as well as excellent test-retest reliability ($r = .81$) and internal consistency ($\alpha = .83$). In the current study Cronbach's alpha was .85.

Fatigue Assessment Scale (FAS; Michielsen et al., 2003)

The FAS was used to measure parental fatigue. While the FAS was not developed to measure fatigue specific to parenting, it has been used in several parenting studies (see Chau & Giallo, 2015; Cooklin et al., 2012; Giallo, Wood et al., 2011). It is a 10-item measure of the frequency of fatigue symptoms, with responses recorded on a Likert scale ranging from 1 (*never*) to 5 (*always*). Scores may range between 10 and 50. Higher scores indicate greater fatigue. Items include "Physically, I feel exhausted" and "I have problems thinking clearly". The FAS has been found to be a valid instrument and to have excellent internal consistency (Michielsen et al., 2003) including in a more recent study of Australian mothers (Lesniowska et al., 2016). In the study reported here $\alpha = .89$.

Confusion, Hubbub, and Order Scale (CHAOS; Matheny et al., 1995)

Perceptions of household chaos were measured using the CHAOS. The CHAOS captures the extent of disorganization within the home environment, including the level of noise, crowding, and home traffic (Matheny et al., 1995). There are 15 items including "We almost always seem to be rushed" and "There is often a fuss going on at our home" that are rated true or false by parents. In the current study, to enable finer grained analysis, the response options were changed to a Likert scale anchored by 1 (*false*) and 10 (*true*). Possible scores range from 15 (low levels of chaos) to 150 (highly chaotic households). The CHAOS has been found to have adequate psychometric properties, including internal consistency ($\alpha = .79$), test-retest reliability ($r = .74$) and validity (Matheny et al., 1995). In the study reported here, the Cronbach's alpha was .87, indicating excellent internal consistency.

Missing Data

There were small amounts of missing data ranging from 0.1% to 0.4% across all variables included in the study. A missing value analysis (Little's Missing Completely at Random test in IBM SPSS, version 27) indicated that the missing data were completely at random, $\chi^2(2334, N = 3050) = 2416.37$, $p = .12$). Following Tabachnick and Fidell (2019), missing data within the key measures (i.e., PSS, FAS and CHAOS) were mean substituted. This was permissible as there were few points of missing data and the instruments all had high internal consistency with values of alpha at .85 or above.

Statistical Methods

The first hypothesis regarding differences on PSS, FAS and CHAOS scores as a function of age was addressed using independent *t* tests with child age group (early childhood; adolescence) as the independent variable. Welch's *t* test was used for analyses of the PSS and the CHAOS, as Levene's test of equality of variances identified that the variances were not equal between the two groups. Pearson's correlations were performed to establish associations among the continuous variables measured in the study, using the full data set, and separately for the early childhood and adolescent groups. Kendall's tau-b was used to calculate correlations between ranked variables (maternal education and employment status) and continuous variables.

To test the hypothesis that household chaos accounted for a unique portion of variance in parental stress over and above demographic factors and parental fatigue, hierarchical multiple regression analysis (MRA) was performed. Prior to conducting MRA, we tested assumptions, including absence of outliers, independence of errors, absence of multicollinearity, normality, linearity and homoscedasticity of residuals, and all were satisfied. Histograms and PP plots of residuals demonstrated no notable deviation from normality. Examination of the standardised predicted score by standardised residuals scatterplot showed no evidence of fanning, unevenness, or curvature suggesting that both linearity and homoskedasticity assumptions had been met. The Durbin-Watson statistic was within acceptable bounds suggesting independence of errors. Tolerance and VIF values were above and below associated cut off values suggesting multicollinearity was not present.

Number of children in the family was included in the regression equation because it was the only demographic variable to have a notable association with any of the key

Table 1 Means and standard deviations (SD) of the Parental Stress Scale, Fatigue Assessment Scale, Confusion, Hubbub and Order Scale

	Parental Stress Scale (Berry & Jones, 1995)		Fatigue Assessment Scale (Michielsen et al., 2003)		Confusion, Hubbub and Order Scale (Matheny et al., 2011)	
	M[a] *(SD)*	Range of scores (Possible range 18–90)	*M (SD)*	Range of scores (Possible range 10–50)	*M (SD)*	Range of scores (Possible range 15–150)
Total sample N = 3050	45.73 (9.00)	19–79	27.78 (7.49)	10–50	70.36 (20.48)	16–144
Younger group N = 1609	45.80 (8.75)	21–76	28.21 (7.47)	11–54	71.80 (20.11)	21–144
Older group N = 747	45.10 (9.36)	20–78	26.81 (7.43)	11–50	66.70 (21.09)	20–140

[a]According to detail provided by Louie et al. (2017) in a review of studies that used the Parental Stress Scale, parents of children who were developing typically had mean scores between 36.30 to 36.79 and those with a child with some difficulty (e.g., developmental disability or behavior problems) had mean scores that ranged from 37.45 to 63.79.

Table 2 Correlations among parenting measures and number of children for three groups (correlations with number of children partialled out)

Variables	Total sample N = 3060	Early childhood group N = 1609	Adolescent group N = 747
Number of children & PSS[a]	.13***	.15***	.16***
Number of children & FAS[b]	.06***	.05	.07
Number of children & CHAOS[c]	.25***	.29***	.23***
PSS & FAS	.57*** (.57***)	.58*** (.58***)	.58*** (.58***)
PSS & CHAOS	.57*** (.56***)	.58*** (.57***)	.56*** (.56***)
FAS & CHAOS	.52*** (.52***)	.53*** (.54***)	.50*** (.49***)

***$p < .001$

[a]Parental Stress Scale

[b]Fatigue Assessment Scale

[c]Confusion, Hubbub and Order Scale

parenting measures. Initially, three separate regressions were run (total group; early childhood group; adolescent group). As the results were very similar, we report the regression analysis for the complete sample only.

To explore whether the effects of fatigue and household chaos on parental stress were additive or multiplicative and whether any effects were further moderated by child age, an exploratory moderated moderation analysis was conducted. As there were no three way or two way interactions involving child age group (all $ps > 0.26$), for simplicity, a simple moderated regression exploring the roles of household chaos and fatigue was conducted. In this analysis, fatigue was cast as the independent variable and household chaos as the moderator in order to try to gain more insight into the way in which these variables worked together to impact on parental stress.

Results

There was no significant difference in stress on the PSS for mothers of young children and adolescents, $t(1370.61) = 1.72$, $p = .085$, $d = 0.08$. A significant difference was found for the FAS, with mothers with young children reporting more fatigue than mothers of adolescents, $t(2354) = 4.23$, $p < .001$, $d = 0.19$. Welch's t test was also statistically significant for CHAOS scores, with mothers of children in the early childhood age bracket reporting more household chaos than mothers of adolescent children, $t(1393.27) = 5.54$, $p < .001$, $d = 0.25$. Using Cohen's (1988) guidelines, effect sizes of significant results were all small. Means of all three groups (early childhood/adolescent/total) suggest mothers were experiencing substantial levels of stress (see Table 1).

There were a number of correlations among the measures of interest (PSS, FAS and CHAOS) and demographic variables that reached significance; however, these were all very low and considered to be meaningless (significant correlations ranged from $r = -.08$ to .06) and so were not included in further analysis. Number of children was significantly correlated with two of the measures (PSS and CHAOS) and explained sufficient variance to be considered in the prediction of parental stress (see Table 2). Significant correlations were found among the measures of stress, fatigue and household chaos for each of the three groups. These associations were similar for the total group and the two smaller, age-based groups (see Table 2).

In step 1 of the hierarchical MRA, number of children accounted for 1.6% of the variance in parental stress,

$R^2 = .02$, $F(1, 3048) = 49.99$ $p < .001$. Fatigue was added at step 2 and accounted for an additional 31.4% of the variance in parental stress, $R^2_{change} = .31$, F_{change} (1, 3047) = 1429.18, $p < .001$ (large effect size, using Cohen's conventions). When household chaos was added to the equation it explained an additional 9.8% of the variance in PSS scores, $R^2_{change} = .1$, F_{change} (1, 3046) = 519.35, $p < .001$, indicating that our second hypothesis was supported, although the effect size of its contribution over and above that of the other two variables was small, according to Cohen (1988). Overall, the three predictors accounted for 42.8% of the variance in parental stress, $R^2 = .43$, adjusted $R^2 = .43$, $F(3, 3046) = 759.19$, $p < .001$. A combined effect of this magnitude can be considered large (Cohen, 1988). See Table 3.

In the simple moderation analysis, both fatigue (B = 0.45, 95% CI [0.41, 0.49], beta = .37, $p < .001$) and household chaos (B = 0.17, 95% CI [0.16, 0.18], beta = .39, $p < .001$)) had significant direct effects on stress. These additive effects were, however, qualified by a significant interaction between the two predictors on stress (B = −0.004, 95% CI [−0.005, −0.003], beta = −.07, $p < .001$), suggesting that the impact of fatigue and household chaos on stress was multiplicative rather than purely additive. See Table 4. We used Johnson-Neyman simple slopes analysis using the PROCESS macro (see Hayes, 2022) to examine the interaction, reported in Table 5. The output demonstrated that, when household chaos was low, fatigue had the strongest impact on parental stress while its impact was weakest when household chaos was high. As can be seen in Table 5, using Cohen's (1988) rule of thumb, the effect size for fatigue was large (ß = .50+) when CHAOS scores were low (e.g., the CHAOS score of 16 corresponded with the large beta of .55), and reduced to a small effect (ß = .10–.29) when CHAOS scores were high (e.g., the high score of 144 was associated with a small beta of .13). Figure 1 demonstrates this interaction using the simple slopes.

Table 3 Hierarchical multiple regression predicting parental stress (N = 3050)

Variable	*B* [95% CI]	β	sr^2
Step 1			
Number of children	1.3 [0.93, 1.65]*	0.13	.02
Step 2			
Number of children	0.94 [0.64, 1.23]*	0.09	.01
FAS	0.67 [0.64, 0.71]*	0.56	.31
Step 3			
Number of children	0.10 [−0.18, 0.38]	0.01	.00
FAS	0.44 [0.41, 0.48]*	0.40	.10
CHAOS	0.17 [0.15, 0.18]*	0.38	.10

CI confidence interval

*$p < .001$

Discussion

The aim of the current study was to determine the contribution of household chaos to maternal stress, taking into

Table 5 Conditional effect of fatigue on parental stress at values of CHAOS using the Johnson-Neyman approach

CHAOS			95% Confidence interval (ß)	
values	*B*	ß	Lower limit	Higher limit
16.00	.66	.55	.48	.63
22.10	.64	.53	.46	.60
28.19	.61	.51	.45	.57
34.29	.59	.49	.44	.55
40.38	.58	.47	.42	.52
46.48	.54	.45	.41	.50
52.57	.52	.43	.39	.47
58.67	.50	.41	.38	.45
64.76	.47	.39	.36	.43
70.88	.45	.37	.34	.40
76.95	.42	.35	.32	.38
83.05	.40	.33	.30	.37
89.14	.38	.31	.28	.35
95.24	.35	.29	.25	.33
101.33	.33	.27	.23	.32
107.43	.30	.25	.20	.31
113.52	.28	.23	.17	.29
119.62	.26	.21	.15	.28
125.71	.23	.19	.12	.26
131.81	.21	.17	.10	.25
137.91	.18	.15	.07	.24
144.00[a]	.16	.13	.05	.22

All significant at $p < .001$ with exception of [a] where $p = .004$

Table 4 Moderated multiple regression results for the prediction of parental stress (N = 3050)

Variable	*B* [95% CI]	SE *B*	ß	R^2	ΔR^2
Constant	13.99*** [11.02, 16.96]	1.51			
Fatigue Total	0.73*** [0.62, 0.84]	0.06	.37		
Chaos Total	0.28*** [0.24, 0.32]	0.02	.39		
Fatigue x Chaos	−0.004*** [−0.005, −0.002]	.001	.07	.43***	.005***

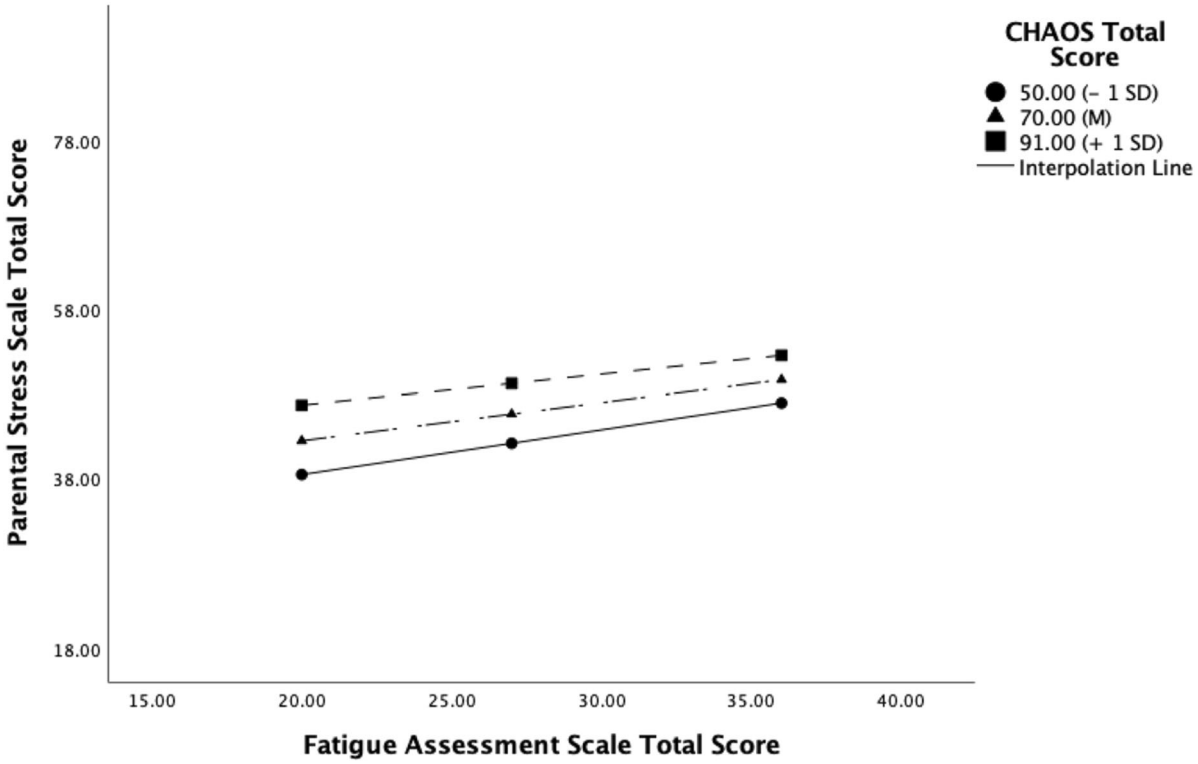

Fig. 1 Changes to parental stress as fatigue and chaos change: interaction effect

account the established association with maternal fatigue. We also wanted to understand how the age of children in the family was associated with levels of stress, fatigue and household chaos, and to establish if the associations among these variables were impacted by the age of children in the family. Our hypotheses about the association of child age and the measures of interest in this study were upheld with respect to fatigue and household chaos. Nevertheless, the effect sizes were small, so the differences are unlikely to be of clinical importance. Our hypothesis about the additional impact of chaos on parenting stress beyond that provided by fatigue was also supported; however, we established that these variables had a multiplicative effect whereby as chaos decreased, the impact of fatigue on parental stress increased. Child age group did not moderate this association.

The context in which these data were collected should be kept in mind when interpreting the results. In 2021, during the COVID-19 pandemic, lockdowns led to school closures and much uncertainty with respect to all aspects of life including employment and health. This was a stressful time for families, with most experiencing significant disruptions to daily routines, economic challenges, and limited access to usual supports and community services. Household chaos consequently increased for many families (Cassinat et al., 2021) and there were flow on effects for mental health, with many parents reporting higher levels of depression and anxiety (Cameron et al., 2020; Racine et al., 2021) as well as more parent-child conflict (Cassinat et al., 2021). Certainly, there is evidence that Australian parents found the parental role much more difficult during this period (Wiemar & Clarkson, 2023).

As noted above, we had hypothesized that mothers of young children would experience more parental stress than those of adolescents. This hypothesis was not supported. One speculation for this lack of support relates to the impact of COVID-19 on adolescents in contrast to young children. It is possible that adolescents experienced more negative impacts of COVID-19 than did young children – for example, reduced contact with friends is likely to have been perceived more negatively by the older children (see Crosnoe, 2000). These experiences may then have spilled over into their relationship with their mother, resulting in higher maternal stress than usual. In support of this speculation, the mean scores for both groups of mothers in the study were in line with parents whose children have developmental disabilities or behavior problems (Louie et al., 2017). Some studies have found adolescence to be no more stressful for parents (e.g., Östberg et al., 2007) and it is possible that our results reflect normative child age-related impacts on parents.

Our other hypotheses related to differences in maternal fatigue and chaos in the two age groups were supported; however, the effect sizes were small. Again, it is possible that the impact of COVID-19 on family functioning

overwhelmed any large differences between the groups. Alternatively, it may be that there is little difference in the levels of maternal fatigue and household disorganization as children age but the contributors to fatigue and chaos may differ. This speculation is worth pursuing in future research.

Significant correlations were found among parental stress, parental fatigue and household chaos, and these were very similar for each of the two child age groups and the total sample. The number of children in the family was associated with levels of reported stress as well as with household organization. This variable has been found to be associated with parental stress in several previous studies across cultures (Algarvio et al., 2018 [Portuguese]; Creed, 2014 [Australian]; Taylor et al., 2007 [African American]). In our study, the effect became non-significant when both fatigue and chaos were added to the model. Matheny et al. (1995) has previously reported a positive correlation between number of children and chaos scores, and Creed (2014) found a similar association. The connection between number of children and household disorganization is expected, as both the propensity for disorder, and the level of resources required to organize the environment, increase with the addition of each household member.

Our hypothesis that household chaos would account for a unique and significant amount of variance in parental stress, over and above other factors, was supported and the result was very similar for mothers of younger and older children. However, the association was revealed to be quite complex when we examined the interaction of chaos and fatigue. While level of fatigue and level of household chaos impacted on mothers' reports of stress, these variables interacted in such a way that as household chaos increased, the impact of fatigue on stress reduced. This was an unexpected finding and it is difficult to offer an explanation that fits the data. Potentially, COVID-19 and its impacts, such as the inability to access usual supports and services, have contributed in unknown ways to the manner in which these variables affected mothers and their experience of stress. It is also possible that other variables are influencing the relationship. This possibility requires further exploration with consideration of variables such as family support, maternal efficacy, and marital status/relationship.

Limitations and Strengths of the Study

As is common in family research, our sample was skewed with respect to education and work status compared with the population from which it was drawn. Thus, the participants may have had fewer socio-economic stressors in their lives than the Australian population of mothers, which limits generalizability of the findings. As the data were collected during a period of time when family functioning was likely to be disrupted by the COVID-19 pandemic, the results need to be treated with caution when considering family functioning during more settled times.

Another limitation is the use of self-report measures for all aspects of the data collection. Common method bias may have contributed to the strong correlations among stress, fatigue and chaos. Stress and fatigue can only be measured by self-report; however, chaos can be observed (see, for example, Garrett-Peters et al., 2019; Vernon-Feagans et al., 2016). Combining self-report and home observation would provide a more robust measure of household chaos and this approach may be beneficial in future research.

The cross-sectional design of this study means that we are unable to unpack any causal relationships between measures. A longitudinal study that was able to determine these would be most helpful for the development of interventions to support family functioning. The research reported here collected data from mothers only; associations for fathers may differ as parenting is often experienced differently by mothers and fathers (e.g., Meier et al., 2018; Trumello et al. 2023), and so results cannot be assumed to apply to fathers. In addition, there are a number of other family variables that potentially impact the associations between parental stress, fatigue and household chaos. These include, but are not limited to, the number of parents in the home, the availability of family support and financial resources (see, for example, Meier et al., 2016).

Despite these limitations, the current study has a number of notable strengths including its large non-clinical sample, and the inclusion of parents of both younger and older children. Explorations of parental stress and fatigue have almost always focused on parents of young children. In addition, our focus on household (dis)organization as a contributor to parental stress, particularly in its relationship with fatigue, has highlighted the importance of this variable.

Implications and Directions for Future Research

The results of our study provide evidence for the contribution of household chaos to mothers' experiences of stress throughout parenthood. These findings may inform clinical interventions for mothers experiencing elevated parental stress. Although stress, fatigue and household chaos are likely to be reciprocally influencing, it might be expected that interventions which focus on reducing household disorganization would have most chance of success in reducing parental stress. We make this speculation based on the behavioral nature of (dis)organization, in contrast to the psychological character of fatigue and stress.

While a direct focus on household (dis)organization does not appear to be a central element of parenting interventions, many (e.g., Positive Discipline in Everyday Parenting (Durant, 2016) and Triple P (Sanders et al., 2014) do include the development of routines related to 'pressure

points' within the family, such as getting ready for school or bedtime. This may be insufficient to meet the needs of families when disorganization is extreme (see commentary by Scott et al., 2001). Programs have also been developed to target both fatigue and stress in parents. For example, the "Wide Awake Parenting" program (Giallo et al., 2012) was developed to assist parents of young children manage fatigue by providing psychoeducation and behavioral strategies for conserving and replenishing energy. It has three major elements: understanding fatigue, strategies for saving energy, and strategies for becoming energised. Its restriction to those with young babies means that it is unlikely to be used for those whose children are well beyond this stage of development. The "Parent Problem-Solving" intervention (Kazdin and Whitely, 2003) was developed to reduce parental stress by encouraging parents to consider alternative solutions to problems and to adopt effective strategies for coping with stress. While both these interventions have been shown to be effective, they require full engagement and motivation for change, and therefore may not be appropriate for parents who are experiencing high levels of chaos. It may be beneficial to supplement interventions such as these with an intervention aimed at making tangible, adaptive changes to the home environment in order to reduce chaos. The utility of this suggestion has not yet been confirmed through empirical studies. The only intervention we identified that was designed specifically to reduce household chaos was not shown to be effective in achieving this reduction (Andeweg et al., 2022).

Conclusion

This study investigated parental stress, an experience that is known to influence outcomes for both parents and children, in a sample of Australian mothers of children under 18 years of age. The findings indicate that fatigue and household chaos reduce only slightly as children mature; however, the social disruption occurring at the time of data collection may have influenced these findings. The dominant focus of research in this area on parents of young children to the relative exclusion of those with older children and adolescents needs to be expanded. The current study extends previous research by showing that household chaos contributes to parental stress beyond the impact of fatigue. While further research is needed, our findings suggest that household chaos is indeed an important and influential factor, and that interventions for household chaos could have numerous benefits for parents and families.

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Compliance with Ethical Standards

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