



Reciprocal relationships between time pressure and mental or physical health in Australian mothers of preschool aged children

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ABSTRACT

The associations between time pressure and health are typically conceptualised and examined as unidirectional. This study examined the reciprocal relationships between time pressure and mental and physical health amongst working mothers of preschool children; a high-risk group for feeling time pressured. Using 5 waves of a panel study of Australian mothers when their children were aged 0–4 ($n = 3878$) and cross-lagged structural equation models, we find strong significant negative reciprocal associations between time pressure and mental and physical health, although these reciprocal associations were stronger and more consistent over time for mental health. Our results indicate that physical health takes a couple of years to deteriorate to a point where the reciprocal effects with time pressure become apparent, but for mental health the reciprocal effects are immediate, present at all time points and consistently strong. Findings suggest there are significant reciprocal health consequences of the time pressure experienced by working mothers and government policy encouraging mothers back into the workforce without adequate supports may be harmful for health.

1. Introduction

The subjective feeling of time pressure, that there is too much to do and not enough time to do it, is a social phenomenon that has increased in most western societies over the last decades (Craig and Mullan, 2009; Garhammer, 2007; Kay, 1998; Milkie et al., 2009; Roxburgh, 2004). At chronic levels, time pressure becomes a stressor that can have a negative impact on health and wellbeing (Roxburgh, 2004). Chronic time pressure may be experienced when the time and energy demanded from multiple social roles, such as being an employee, parent or partner, are frequent and sustained, making it difficult to cope (Fitzpatrick et al., 2012; Garhammer, 2007; Kleiner, 2014). The experience of time pressure varies by gender and over the life course; research suggests it is particularly acute for mothers in working families with pre-school children (Craig and Brown, 2017; Milkie et al., 2009; Zuzanek, 1998). Even though our understanding of the phenomena of time pressure, who experiences it, and its determinants, is improving (Szollos, 2009), knowledge of the health consequences remains relatively limited.

Most studies examining time pressure have drawn upon theories of role strain and stress (Goode, 1960; Gove, 1972; Greenhaus and Beutell,

1985; Ross et al., 1990), or stress process models (Pearlin, 1989), to explain how time pressure emerges and why it negatively impacts health. In these studies, time pressure is often conceptualised as a stressor, that along with other stressors and contextual factors negatively impact on health and wellbeing across a range of health outcomes (Nomaguchi et al., 2005; Ruppanner et al., 2018; Strazdins et al., 2016). With the exception of one study (Ruppanner et al., 2018), these studies are cross sectional. However, life is not static; the nature of social roles and their associated demands and conflicts change over time (Chen et al., 2014; Cooklin et al., 2016; Laurijssen and Glorieux, 2013; Zuzanek, 1998), thus further longitudinal research on the issue is important.

Moreover, existing approaches to understanding time pressure and health conceptualise the relationship between the experience of chronic time pressure and health as *unidirectional*, whereby time pressure diminishes health. In this paper, we draw upon Hobfoll's (Hobfoll, 1988, 1989, 2001) Conservation of Resources (CoR) theory of stress, to develop and test the proposition that the associations between time pressure and health may be *bi-directional*, or *reciprocal*. Using longitudinal data from a 5-wave panel study of Australian mothers (child aged 6 months–4 years) who were working before birth and employing

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cross-lagged structural equation models, we examine the extent to which time pressure negatively impacts on health over time, as well as whether poorer or declining physical and mental health is associated with increased feelings of time pressure. In short, we provide a theoretical and empirical contribution by investigating the relevance of a bi-directional association between subjective time pressure and health and thus, the extent to which time pressure and poor mental or physical health are mutually reinforcing and change over time.

Our investigation also examines both mental and physical health outcomes. While stress reactions have been found to have consequences for both mental and physical health, the majority of prior research has examined the consequences of time pressure for mental health (Roxburgh, 2004; Ruppanner et al., 2018), wellbeing (Nomaguchi et al., 2005) and health behaviours, such as physical activity and diet (Alm and Olsen, 2017; Strazdins et al., 2011; Venn and Strazdins, 2017). One exception is Strazdins et al. (2016) who examined self-reported general health as well as mental health and physical inactivity. Building on extant research, our study provides longitudinal evidence on the sustained and reciprocal impact of time pressure on new mother's physical and mental health.

2. Background

2.1. The experience of time pressure for mothers with young children

Over the last several decades, researchers and theorists have observed that the pace of contemporary social and family life has increased substantially (Rosa, 2015; Roxburgh, 2004; Strazdins et al., 2016). The commensurate increase in subjective time pressure experienced by mothers has largely been attributed to the increased participation of women in the work force, the rise of dual earner households and the overall increase in paid work hours in families (Fitzpatrick et al., 2012; Goodin et al., 2005; Laurijssen and Glorieux, 2013; Szollos, 2009). This is particularly the case in wealthy Western countries, like Australia, where incomes from both parents are often needed to support the lifestyle and consumption expectations of an achieving a good life and to provide opportunities for their children (Southerton, 2003).

In Australia, the employment rate of mothers of young children (under 5 years of age) is lower than that of mothers with older children, nonetheless their employment rate increased significantly from 30 per cent in 1981 to 56 per cent in 2011 (Baxter, 2013). Moreover, while Australian mothers' employment rates have increased, most fathers have not increased their contributions to unpaid labour in the household at a level commensurate with mothers' (Goldscheider et al., 2015). Australia has a particularly strong male breadwinner norm, and a long work hours culture. Even though most mothers are employed, they tend to work part time when children are young and are responsible for around 70% of the unpaid labour in households (Craig and Mullan, 2011). These societal forces place demands on the overall time resources of families in both work and family domains, but mothers usually take on the bulk of the additional responsibility for managing these multiple demands (Kleiner, 2014). Work-family policy support that could mitigate the demands placed on mothers is minimal in Australia (Yerkes and Hewitt, 2019). Mothers are encouraged to return to work before their children attend school, in fact the majority of Australian mothers return to work when their children are infants or pre-schoolers (Martin et al., 2015). At the same time, there are few supports in place to facilitate the reconciliation of paid work and care for mothers and balancing work and family is viewed as primarily a private responsibility not a public one (Whitehouse and Brady, 2019). The combination of few work-family supports and a long work hours creates a context in which time pressure and health concerns for mothers of young children may be paramount.

There is strong evidence that long work hours are associated with reporting high levels of time pressure overall, at work and at home (Craig and Brown, 2017; Gimenez-Nadal and Sevilla-Sanz, 2011; Rose et al., 2011; Zuzanek, 2004). Longitudinal evidence from Canada

suggests that one way of adapting to the time pressure associated with employment is for mothers to reduce their hours to part time (Laurijssen and Glorieux, 2013). However, Australian research also suggests that part time work does not necessarily alleviate time pressure for all mothers. Part time work hours, particularly longer part time hours are associated with a relatively large housework and childcare load which is not offset by partners contributions, or outsourcing, and as such is not effective in reducing time pressure (Craig and Mullan, 2009; Rose and Hewitt, 2019).

Simultaneously, with the rise of women's employment and dual income families, there has been an intensification of mothering (Hays, 1998). Several researchers have documented rising demands on parents, and mothers in particular, to provide stimulating high-quality activities and parent-child interactions alongside the usual, routine provision of care (Milkie et al., 2009; Roxburgh, 2011). Some caring activities, especially those that involve intense interaction with young children, such as feeding, changing nappies, and soothing, are more difficult to defer, speed up or predict than other activities (Milkie et al., 2009). Mothers are much more likely than fathers to take responsibility for these kinds of parenting activities (Rose et al., 2015). Indeed, many mothers experience or view these activities and intensive time spent with children as an important indicator of being a 'good' mother (Christopher, 2012). Furthermore, in addition to new caring responsibilities, housework chores increase after the birth of a child, particularly for women (Baxter et al., 2008).

This combination of adjacent and potentially conflicting time demands is likely to intensify mothers' feelings of time pressure after the birth of a child and when their children are young. Occupying multiple roles in life is not necessarily associated with poor health. Previous research suggests occupying multiple social roles can provide meaning, a sense of purpose, and attachment to broader networks and communities, which are likely to be beneficial for health (Roxburgh, 2004; Sachs-Ericsson and Ciarlo, 2000). However, in the current study we are primarily interested in the *subjective* feeling of time pressure that may be experienced when the demands from social roles become overwhelming, negatively impacting on health (Goode, 1960; Gove, 1972; Ross et al., 1990). Given that the hours in each day are fixed, mothers with heavy time commitments often try to 'save' time by rushing, multi-tasking and micro-managing daily schedules (Offer and Schneider, 2011; Southerton, 2003). Research also finds that mothers have less leisure time than fathers (Mattingly and Bianchi, 2003) and that their leisure time is of lower quality than fathers and women without children (Craig and Brown, 2017; Yerkes et al., 2020). This suggests that mothers are less likely to have sufficient, effective leisure time for rest and recovery. Thus, for mothers of young children, time pressure can be experienced and conceptualised as a *chronic* stressor, rather than acute, as the demands are ongoing and daily with little opportunity for quality free time (Roxburgh, 2004; Ruppanner et al., 2018; Yerkes et al., 2020).

2.2. Time pressure and health

Drawing on Strazdins et al. (2011, 2016), we conceptualise time as a critical health resource, and thus time scarcity as a health risk, one that is socially patterned, by gender, social roles and life stage. Inequalities in time are potential drivers of inequalities in health, for example, via overwork, or insufficient time to rest or pursue positive health behaviours. In support of this, there is strong evidence that subjective time pressure is negatively associated with mental health and health behaviours. For example, Nomaguchi et al. (2005) using data from the US 1997 National Study of the Changing Workforce found that perceptions of having not enough time with children and their spouse was negatively associated with mothers' psychological wellbeing. Roxburgh (2004), using survey data collected in 1999 on 790 people from Ohio, US, found that higher levels of time pressure were associated with depression for both mothers and fathers, but also found that for women, greater time spent in paid employment and housework exacerbated feelings of

depression from time pressure. More recently, [Ruppanner et al. \(2018\)](#) using longitudinal Australian panel data found that an increase of time pressure after the birth of a child was negatively associated with mental health for both men and women, but this association was stronger for women. [Strazdins et al. \(2016\)](#), also using Australian data, found that feeling more rushed or pressed for time was associated with increased odds of poorer mental health and self-rated health. Feelings of time pressure are also associated with poorer quality diet ([Alm and Olsen, 2017](#)) and lower levels of physical activity ([Spinney and Millward, 2010](#); [Strazdins et al., 2016](#); [Welch et al., 2007](#)).

There are some notable gaps in the extant literature and consequently in our understanding of how time pressure, sustained across time, affects health. Firstly, all previous research has treated the association between time pressure and health as unidirectional, thus we do not know whether feelings of time pressure are partly due to, or exacerbated by, poor health (mental or physical) or vice versa. Previous research has shown that work-family conflict, a related construct that is strongly linked to time conflict and pressure, shows reciprocal relationships with mental health, and this may be similarly true for time pressure ([Demerouti et al., 2004](#); [Rantanen et al., 2008](#); [Westrupp et al., 2016](#)). Secondly, our review of the literature found only one previous study that had examined the relationship between time pressure and self-reported general health ([Strazdins et al., 2016](#)). We know very little therefore about how time pressure is associated with physical health. Thirdly, as indicated earlier, the majority of prior research is cross sectional. We use longitudinal data and time varying measures to examine whether there is evidence of change in the association between time pressure and mental or physical health across time. This also enables us to adjust our analysis for changes in the demands mothers face as children age ([Luthar and Ciciolla, 2016](#)), as families have more children ([Ruppanner et al., 2018](#)) or mothers change their employment hours to suit the ever-changing developmental and financial needs of their families ([Laurijssen and Glorieux, 2013](#)).

3. Theory and hypothesis

3.1. The reciprocal effects of time pressure and health

To develop and test the idea that the associations between time pressure and physical and mental health are reciprocal, we draw on Hobfoll's Conservation of Resources (CoR) theory ([Hobfoll, 1988, 1989, 2001](#)). The underlying premise of Hobfoll's CoR theory is that individuals strive to obtain and keep the resources they value. Resources are broadly defined, encompassing "objects, personal characteristics, conditions or energies that are valued by individuals" ([Hobfoll, 1989](#) p.26). Individuals continuously evaluate how circumstances may deplete or threaten their valued resources and in response they develop strategies to protect and conserve those resources. One strategy to slow or prevent the depletion of a valued resource (i.e., time) is to rely upon other resources (i.e., physical and mental health). However, if these other resources are relied upon too much over time they cannot be replenished and decrease in quality, particularly if they are used unsuccessfully ([Hobfoll, 1989](#)). Thus, from this perspective, as health resources are drawn upon to help manage time pressure, health may also be diminished and in turn increase the experience of time pressure.

Research suggests that over the last few decades, work-life balance has emerged as a significant social problem ([Hobson, 2013](#)). Time scarcity and the management of time have become stressors of Western industrial societies with the greatest burden of this responsibility falling on mothers. In a small qualitative study in the UK, [Southerton \(2003\)](#) found that time was not only viewed as valuable in working families, but her participants expressed a moral and ethical understanding of time as a resource to be maximised and not wasted. Other research suggests that time is particularly valuable for parents of young children, who feel competing obligations to spend time with their children (intensive parenting) and to earn money to support their children ([Milkie et al.,](#)

[2009](#); [Southerton, 2003](#)). Within the context of the CoR framework, the experience of persistent time pressure suggests a loss of time as a resource.

As alluded to earlier, when experiencing time scarcity, mothers' resort to rushing, multi-tasking and micro-managing daily schedules to manipulate time and to maintain the pace of daily life. When this is sustained, mothers rely on health and wellbeing as resources to enable them to meet multiple and competing work and care demands. For example, mothers may draw down on mental health resources such as mood, energy and motivations, with prior research finding that mental energy is a mood state that is essential for getting through the day and completing daily tasks ([Cooke and Davis, 2006](#); [Lieberman, 2007](#)). Similarly, physical health is related to having the physical energy to get everything done, and for physical energy to be sustained mothers require sufficient rest and recovery ([Strazdins et al., 2011](#)). Chronic stress leads to low levels of physical energy, and lower levels of physical energy can also translate into not being able to accomplish all you want to in a given day ([Geiger, 2005](#)). As well as depleting mood and physical energy, time pressure likely impairs opportunities to rebuild these resources, via good nutrition ([Alm and Olsen, 2017](#)), exercise ([Alm and Olsen, 2017](#); [Spinney and Millward, 2010](#); [L. Strazdins et al., 2011](#)), or rest and quality leisure time ([Mattingly and Sayer, 2006](#); [Yerkes et al., 2020](#); [Zuzanek, 2004](#)). In effect, time pressure can lead mothers to override and trade-off time for their health and redirect it to rushing and multi-tasking to meet the demands of daily life, depleting their opportunities for recovery or for health-supportive behaviours.

Thus, while mothers might rely on their (good) health to help them manage demands and cope with time pressure, their mental and physical health may become eroded when time pressure is sustained. We argue that as health becomes depleted, mothers' ability to reconcile the competing demands is eroded, likely increasing feelings of time pressure in a feedback loop between time pressure and health. Previous longitudinal research has found evidence for reciprocal associations between work to home interference and exhaustion ([Demerouti et al., 2004](#)), psychological distress ([Westrupp et al., 2016](#)) and poor psychological wellbeing ([Rantanen et al., 2008](#)). The resultant time pressure is a particularly important type of chronic stressor, with reciprocal links to physical and mental health.

We therefore hypothesise that the associations between time pressure and health will be reciprocal, whereby:

H1. Higher perceived time pressure will be negatively associated with subsequent mental and physical health; and conversely

H2. Better levels of mental and physical health will be negatively associated with subsequent perceived time pressure.

We also investigate whether the strength or presence of these reciprocal associations changes over time. Prior longitudinal research on time pressure after birth has found that the experience of time pressure increases and continues to increase over time ([Ruppanner et al., 2018](#)), we therefore hypothesise that:

H3. The associations between time pressure and health will become stronger over time.

4. Methods

4.1. Data and analytic sample

The data come from all 5 waves of the Millennium Mums (MM) survey, an Australian longitudinal panel study of mothers who had babies late in 2011. The sample for Wave 1 was randomly drawn from an administrative database covering 97% of births that occurred in Australia during October and November 2011. Wave 1 was conducted in mid-2012, with 4201 mothers (response rate 73.5%) when their babies were 6–8 months old. Wave 2 was conducted late in 2012 when babies were around 12 months (retention rate of 84.1% n = 3487). Waves 3–5

were conducted annually when babies were aged 2, 3 and 4 with retention rates of 78.4% (n = 2815), 77.4% (n = 2289) and 80.7% (n = 2008), respectively.

Our sample included all mothers with at least one wave of data (n = 4207). There was missing data, due either to sample attrition or item non-response on the variables of interest at one or more waves. Specifically, over the 5 waves around 52% of mothers were lost to follow up and there were 206 mothers who had missing data on the dependent variables, 165 with information missing on employment status and work hours and 194 mothers with missing data on other variables of interest. Both types of missing data were handled using the `method(mlmv)` option in the structural equation modelling command in Stata 15.1. This option applies Full Information Maximum Likelihood (FIML) for missing data, which adjusts the likelihood function of the SEM so that each case in our sample of mothers contributes information on variables where they have responded (Allison et al., 2017). Thus, FIML uses all available information on mothers, irrespective of wave or item non-response over time. Previous research indicates that FIML is a robust estimator in SEM, performing better than alternative approaches such as pairwise deletion, listwise deletion, or imputation (Allison et al., 2017). After applying FIML, our final analytic sample, or the total number of mothers who contributed data to the models, comprised 3878 mothers.

4.2. Measures

4.2.1. Dependent variables

Mothers' health is measured using the Short Form 12 (SF-12). The SF-12 is a widely used and well-validated 12-item self-completion measure of health status that provides summary assessments of physical (PCS, 6-items) and mental health (MCS, 6-items) (Ware et al., 2000). The *Physical health component summary* (PCS) items included the subdomains of physical functioning, physical limitations, bodily pain, and general health. The *Mental health component summary* (MCS) items included the subdomains of self-reported vitality, social functioning, emotionally based limitations, and mental health symptoms. Each of the two scale scores range from 0 to 100 with a higher score indicating better physical and mental health.

4.2.2. Key independent variable: time pressure

Our measure of time pressure comes from a question asking mothers how often they feel rushed or pressed for time, with responses ranging from 1 = Never to 5 = Always. Thus, a higher score on the scale indicates higher levels of time pressure. This single item indicator has been widely used in population surveys (Craig and Mullan, 2009; Kleiner, 2014; Mattingly and Bianchi, 2003).

4.2.3. Covariates

We control for a range of covariates that are potential confounders in our models that are likely to be associated with both health and time pressure. We include measures of three social roles placing time demands on mothers: paid employment, housework and childcare. For paid employment, in line with previous Australian (Rose and Hewitt, 2019) and international (Yerkes and Hewitt, 2019) research, we distinguished between full time and part time employment, and differentiated longer part time hours from shorter part time hours. Our final measure combines mothers' employment status and work hours, with categories 1 = employed full time (36 h or more) 2 = employed long part time (30–35 h), 3 = employed part time (1–30 h), 4 = on leave, 5 = not in the labour force. We also include a measure of the number of hours spent doing housework each week taken from the question: *Approximately how much time per week do you spend in total on housework, including preparing meals, doing the dishes, shopping for food, doing the laundry vacuuming and cleaning?* And a measure of hours spent caring for children each week, taken from the question: *About how many hours per week do you spend in total looking after your (child/children) including taking them to activities, reading or playing with them or bathing, dressing,*

feeding or putting them to bed?" These were included in the models as continuous variables. In a further sensitivity analysis, we also included a continuous measure summing the total number of work hours (coded 0 if not working), housework hours and childcare hours reported by mothers.

The presence of a partner may also influence mothers' time pressure. The evidence is mixed, however, with some authors finding that partners may alleviate some of the home-based time demands and stress for mothers (Pittman et al., 1996), while other research suggests that living with a partner and the birth of a child increases women's time in housework (Baxter et al., 2008). To account for this ambiguity and investigate further, we developed three continuous measures for partners' contributions, including mothers proxy reports of partners' weekly work hours, time in housework and time in childcare. These were coded 0 if mothers were not living with a partner.

Age at time 1 was included as a continuous measure. Mother's education was measured using a categorical variable indicating: 1) high school or less (12 years of schooling or less; reference); 2) post-school qualification (diploma, trade or certificate); and 3) University qualification or higher degree. A measure of relationship status differentiated between mothers who were: 1) married; 2) cohabiting (reference); and 3) not living with a partner. The number of other children in the household was a categorical measure that indicated: 1) no other children (reference); 2) 1 other child; 3) two other children; and 4) three or more other children. Table 1 presents a summary of all model covariates over the 5 waves using the FIML estimated means of the indicators.

4.2.4. Analytic approach

To examine the reciprocal effects between time pressure and health, and whether the strength of these relationships change over time, we estimate a series of cross-lagged structural equation models, using all 5 waves. All analyses were conducted using Stata 15.1. Results are reported as standardized coefficients (Acock, 2013). Goodness of fit statistics for each model are reported in Table 2. We report the root mean squared error of approximation (RMSEA), CFI and the Coefficient of Determination (R²). Another common goodness of fit measure, the standardised root mean square residual (SRMR), cannot be estimated when using FIML because of latent missing values (Allison et al., 2017). To check the model fit with SMSR, we estimated the models without using FIML. The SMSR was 0.02 or lower for all models suggesting a good fit (results available from authors). We also correlate the errors for the dependent variables (Acock, 2013). Equality constraints were imposed on all model covariates, but not on the coefficient estimates for the associations between time pressure, mental and physical health.

The hypothesised relationships between time pressure and mental and physical health are presented in Fig. 1. To test our first two hypotheses, we estimated a cross-lagged model examining reciprocal associations between time pressure and health for each health outcome. Post-estimation tests for significant differences between the standardised coefficients were also undertaken to determine whether there were differences in the directional effects between time pressure and health and health and time pressure. To examine our third hypothesis, we conducted post-estimation tests to investigate if the strength of the association between time pressure and health increased or decreased over time. Covariates were only included in the models from waves two to five, as the cross-lagged models collapse the data set by one wave meaning wave two is the first wave where outcomes are estimated. The covariates are all time varying allowing for changes in mothers' time spent in the various social roles taken into account in the estimates, for example mothers have been found to adjust their work hours after they have children to reduce time pressure (Laurijssen and Glorieux, 2013).

5. Results

The descriptive statistics presented in Table 1 illustrate the change over time in the dependent variables and covariates. On average, mental

Table 1
Descriptive statistics of dependent variables, confounders and controls, Waves 2–5 (N = 3898).

| | Wave 1 | Wave 2 | Wave 3 | Wave 4 | Wave 5 |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|
| | Mean (SE)/% | Mean (SE)/% | Mean (SE)/% | Mean (SE)/% | Mean (SE)/% |
| Mental health (0–100) | 52.61 (.12) | 52.22 (.12) | 51.89 (.12) | 51.18 (.12) | 51.02 (.12) |
| Physical health (0–100) | 55.32 (.12) | 54.82 (.12) | 54.06 (.12) | 54.46 (.12) | 54.37 (.12) |
| Time pressure (1–5) | 3.45 (.02) | 3.59 (.02) | 3.65 (.02) | 3.82 (.02) | 3.88 (.02) |
| Covariates: | | | | | |
| Employment status: | | | | | |
| Full time | | 14.96 | 18.55 | 19.97 | 22.01 |
| Long part time | | 29.03 | 34.45 | 32.90 | 36.51 |
| Part time | | 26.18 | 20.32 | 18.87 | 18.86 |
| On leave | | 13.13 | 10.64 | 12.38 | 7.75 |
| Not in the labour force | | 16.70 | 16.04 | 15.88 | 14.87 |
| Hours of housework | | 24.19 (.26) | 22.80 (.26) | 23.48 (.29) | 24.68 (.32) |
| Hours of childcare | | 64.90 (.53) | 58.89 (.53) | 59.24 (.61) | 54.37 (.61) |
| Partner's work hours | | 41.66 (.31) | 41.34 (.34) | 40.80 (.39) | 40.50 (.41) |
| Partner's housework hours | | 8.49 (.15) | 8.24 (.16) | 8.16 (.17) | 9.08 (.20) |
| Partner's childcare hours | | 25.11 | 25.11 | 23.86 | 22.39 |
| Age (wave 1) | | 31.56 (.08) | 31.56 (.08) | 31.56 (.08) | 31.56 (.08) |
| Education: | | | | | |
| High school or less | | 25.76 | 17.16 | 16.01 | 18.22 |
| Trade/certificate/diploma | | 22.76 | 30.72 | 31.74 | 29.25 |
| Degree or higher | | 51.48 | 52.12 | 52.25 | 52.53 |
| Number of children: | | | | | |
| One (study child only) | | 54.34 | 39.92 | 24.07 | 16.28 |
| Two | | 31.82 | 43.03 | 59.71 | 63.77 |
| Three | | 10.65 | 13.07 | 12.58 | 15.75 |
| More than three | | 3.19 | 3.98 | 3.64 | 4.20 |
| Relationship Status: | | | | | |
| Married | | 74.74 | 74.22 | 73.36 | 73.77 |
| Cohabiting (ref) | | 20.00 | 18.96 | 18.48 | 17.24 |
| Not living with a partner | | 5.26 | 6.82 | 8.16 | 8.99 |

Note: mean values are taken from the FIML estimated means of the indicators (non-standardised). Controls and confounders are only included in the models from Wave 2.

*Mean and Standard Errors (SE) are reported for continuous indicators and percentage (%) is reported for categorical indicators.

Table 2
Goodness of fit statistics for Mental Component Score and Physical Component Score models.

| | M2: MCS | M2: PCS |
|--|---------|---------|
| RMSEA | 0.025 | 0.025 |
| CFI | 0.86 | 0.82 |
| Coefficient of determination (R ²) | 0.60 | 0.55 |

and physical health declined and time pressure increased over time, albeit by relatively small amounts. Mothers work hours increased over time, with more mothers working full-time and longer part-time hours and the proportion of mothers not working decreased over time. Mothers average time spent in childcare decreased over time, by about

10 h between Wave 2 and 5, but time in housework remained relatively stable. Around half of the mothers in the sample were having their first child at wave 1, but by the end of the study only around 16% of mothers still only had one child. The majority (over 90%) of mothers were partnered during the study, but the proportion of mothers not partnered increased over time from 5% to 9%. Partners' hours of paid employment, housework and children remained relatively stable over time, notably compared to mothers their childcare time only decreased by about 2 h between wave 2 and 5.

5.1. Time pressure and mental health

The results for the cross-lagged models for mental health (MCS) and time pressure are presented in Fig. 2. The results indicate that there is a strong positive association between time pressure over time, where higher levels of time pressure in the previous wave were associated with higher levels of time pressure at the current wave. There were similar results for mental health (MCS), where better mental health in the previous wave was strongly associated with better mental health in the current wave.

In support of our first and second hypothesis, the results indicate strong reciprocal cross-lagged effects at each wave between more time pressure and poorer mental health (MCS) and poorer mental health (MCS) and greater time pressure. Note that when time pressure is the dependent variable, coefficients are smaller due to the smaller range of the measure. We do not find any evidence that the MCS to time pressure pathway is stronger than the time pressure to MCS pathway. Rather, post-estimation tests of difference suggest there were no significant differences between these pathways, thus the time pressure to MCS pathway, and its reverse (MCS to time pressure) were similar in the strength of association. We also conducted post-estimation tests to investigate hypothesis three, that the cross-lagged effects would become stronger over time. For the time pressure to MCS cross-lagged effect, we find weak suggestive evidence that the association between waves one and two is slightly stronger (marginally significant at $p < .07$) than for the cross-lagged effects of time pressure to MCS between waves two to three, three to four and four to five. Results of the post-estimation tests also suggest that the MCS to time pressure cross-lagged association from wave three to four is significantly smaller than all other cross-lagged MCS to time pressure associations. However, there is no evidence of the expected systematic increase in the strength of the associations between time pressure and MCS, or vice versa, over time.

5.1.1. Time pressure and physical health

The results of the cross-lagged model for physical health (PCS) and time pressure are presented in Fig. 3. There was a strong significant positive association between physical health and time pressure over time, where better levels of physical health in the previous wave were associated with better levels of time pressure at the current wave. Our results provide some support for our first hypothesis. There were reciprocal effects between time pressure and physical health, but the cross-lagged associations were less consistent over time and weaker than for mental health. Support for our second hypothesis was less consistent for physical health, the cross-lagged effects between PCS and time pressure were significant at waves three to four and four to five, where poorer physical health was associated with higher levels of time pressure. The cross-lagged effects between time pressure and PCS were significant and negative at each wave. Our post-estimation tests suggest that the association between time pressure and PCS are stronger and more consistent across all waves than the PCS to time pressure associations. They also support our hypothesis that the path from time pressure to PCS is significantly stronger than the path from PCS to time pressure over the same time. Our third hypothesis, that the associations will get stronger over time, was not supported. None of the post-estimation tests indicated that there were significant differences in the cross-lagged associations between time pressure and PCS across the

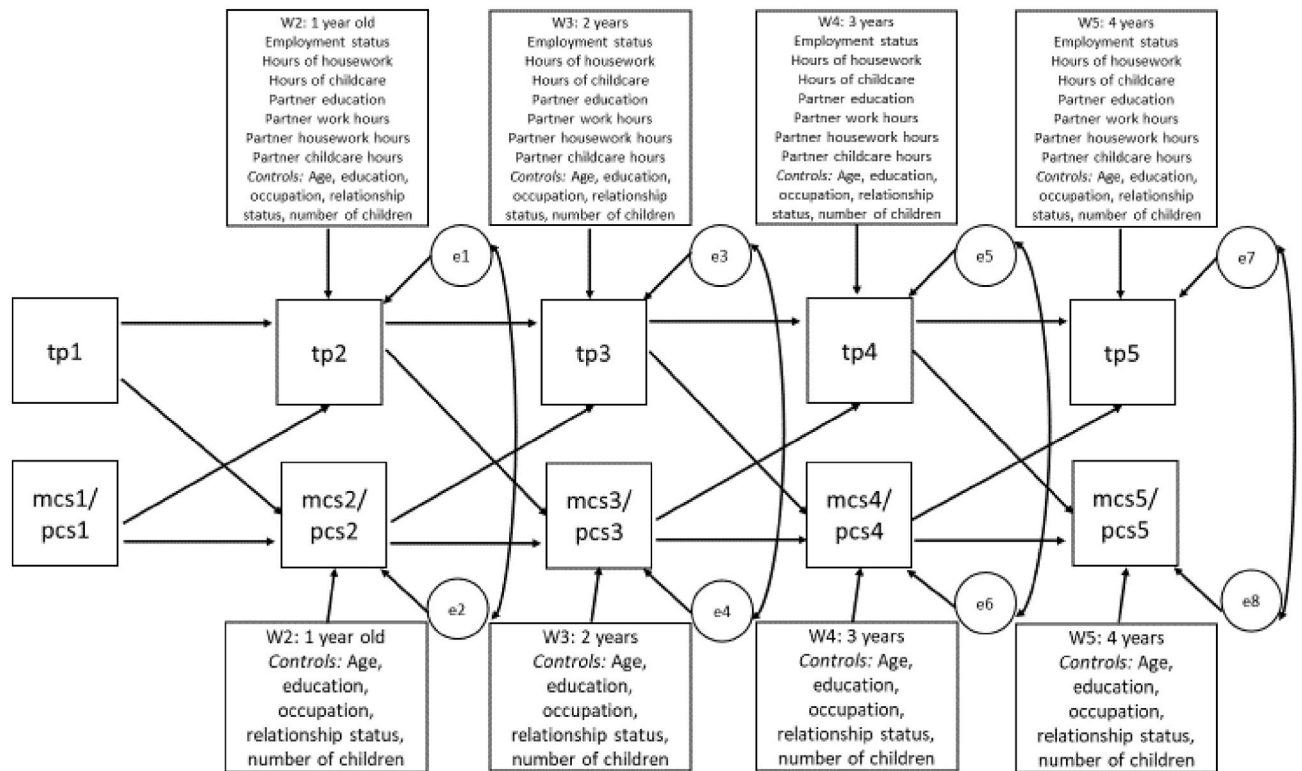


Fig. 1. Hypothesised reciprocal relationships between time pressure and mental and physical health, with controls and confounders.

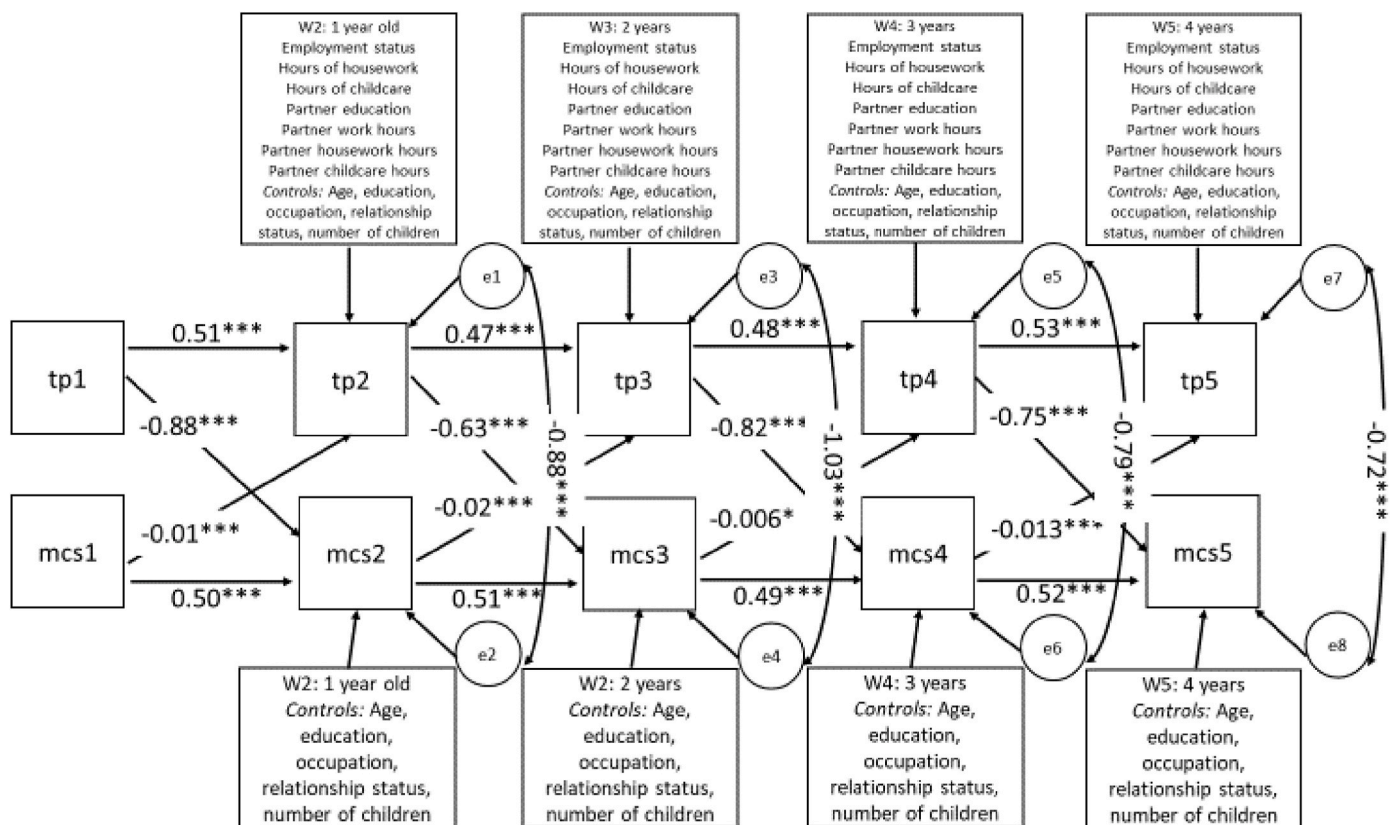


Fig. 2. Cross-lagged structural equation model of the associations between mental component scores (MCS) and time pressure (tp), children aged 6 months–4 years.

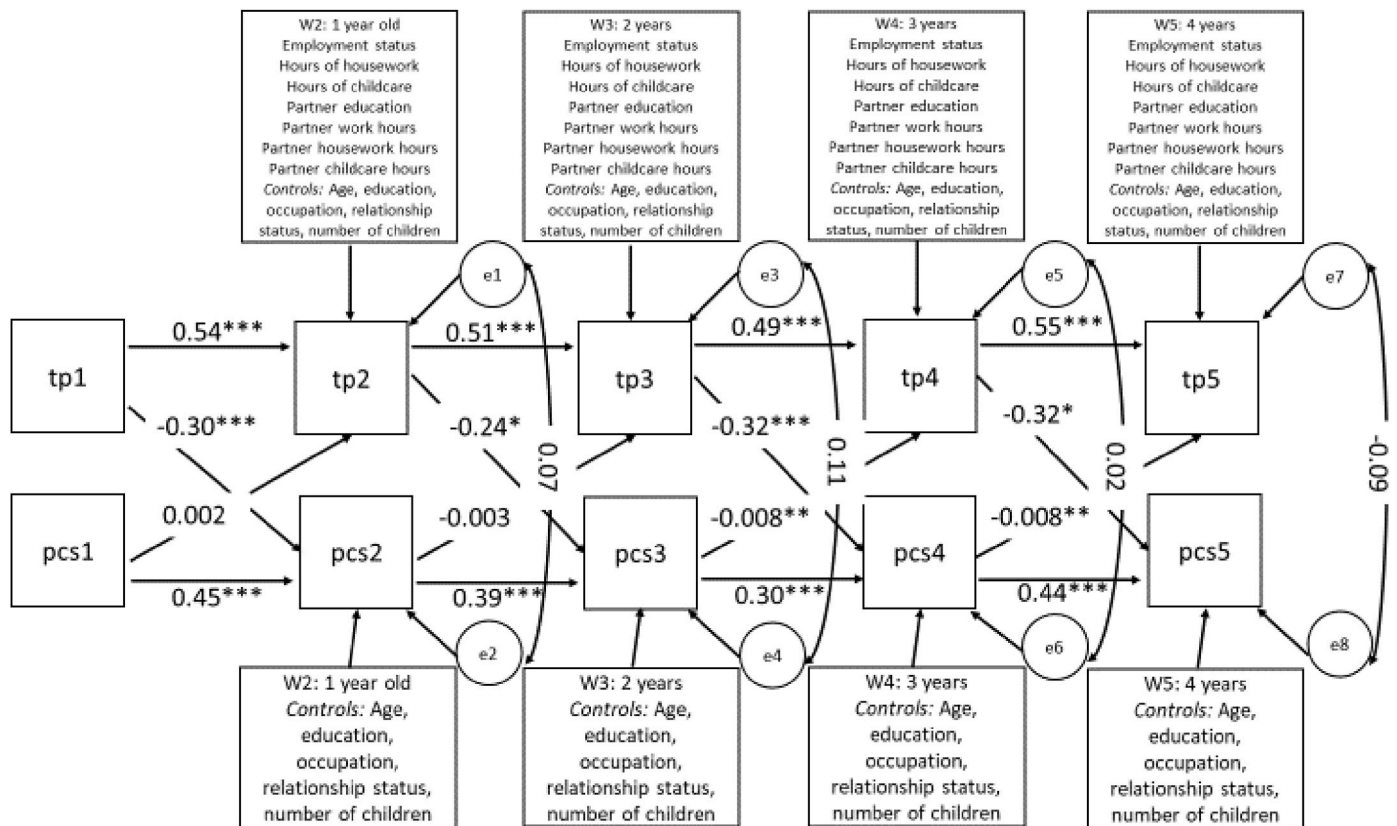


Fig. 3. Cross-lagged structural equation model of the associations between physical component scores (PCS) and time pressure (tp), children aged 6 months–4 years.

waves.

6. Discussion and conclusion

This study is one of the first to investigate reciprocal and longitudinal relationships between time pressure, mental and physical health in mothers following the birth of a child. This investigation was important because while prior research has assumed a link between time pressure and health effects, the reciprocal nature of the relationships have not been investigated longitudinally. We explore this in a sample of new mothers who were employed prior to birth, a relatively large and increasing group in the population (Baxter, 2013) that are particularly vulnerable to increased time pressure and its potential health effects (Goldscheider et al., 2015). Additionally, we drew upon Hobfoll’s conservation of resources theory of stress (Hobfoll, 1989) to test the novel argument that there may be reciprocal effects between time pressure and health. We tested three hypotheses.

Our first two hypotheses, that the associations between time pressure and health would be reciprocal, had strong support for both mental and physical health. Overall, the associations were more consistent for mental health. Notably, we see that time pressure exacts a mental health cost for women from one wave to the next, but also that women with poorer mental health were more likely to report time pressure. This is an important finding. While previous research has found that mothers experiencing high levels of time pressure have more depressive symptoms (Nomaguchi et al., 2005; Ruppner et al., 2018), none has examined the reciprocal cost of this depletion in mental health to mothers’ subjective feelings of being time pressured. That such depletion can become long term, and is mutually reinforcing, signals a significant, major harm to mothers’ mental health which very few interventions address.

For physical health we find a consistent association across all waves, whereby time pressure exerts an adverse effect on mother’s self-reported

physical health. This is a novel finding, where we show that time pressure is not only a persistent mental health stressor, but a sustained physical health stressor as well, even in this population sample of healthy recent mothers. Our findings do not support a health selection effect at work, whereby recent mothers in the poorest health report the most time pressure at wave 1. Rather, this is one of the first studies to show that time pressure has measurable physical health effects at subsequent waves, which persist beyond the postpartum and recovery period. Prior research has shown that women, particularly mothers, who perceive they are time scarce under the demands of work, housework and childcare, may have poorer sleep and forgo self-care, physical activity, quality leisure time and other physical health-promoting behaviours, as these may be seen as ideal, rather than necessary (Dugan and Barnes-Farrell, 2020; O’Brien et al., 2017). Diminished opportunities for self-care and recovery may explain the physical health changes we see as a result of time pressure. The reciprocal effects, where time pressure was negatively associated with physical health, were only present in the final two waves when children were aged 3 and 4. As argued earlier, CoR theory suggests that it may take time for some resources to deplete (Hobfoll, 1989). Thus, our results suggest that physical health, in this relatively healthy population sample of working mothers of young children, takes longer to deteriorate to a point where the reciprocal effects with time pressure become apparent. Further, although we did not investigate this specifically, many mothers had another child in later waves of this study, which previous research has suggested compounds feelings of time pressure (Ruppner et al., 2018). While we adjust for additional children in the longitudinal models, this needs further investigation. Overall, our findings suggest that there are important, albeit delayed, reciprocal associations between mental and physical health and time pressure experienced by mothers with young children.

While we expected reciprocal associations, we also expected the association between time pressure and both mental and physical health

to be stronger than the association between health and time pressure. It was predicted that time pressure would deplete health, which would in turn deplete health resources for coping and increase time pressure. For mental health this was not the case. The strength of the associations in each direction was equally strong. This may be because diminished mental health has an immediate and direct impact on mothers' capacity to manage the substantive increased demands that the birth of an infant confers. Established evidence shows that mothers' poor mental health is commonly explained by diminished access to protective resources such as social, partner or professional support, adequate income, and health services, as well as adverse family circumstances such as isolation, violence or unsettled infant health or behaviour (Austin and Highet, 2017; Lund et al., 2018). It follows that the poor mental health conferred by these circumstances would undermine mothers' capacity to manage the substantive demands of early parenting, in turn increasing feelings of time pressure.

We did not find this reciprocal effect was as strong for physical health. The cross-lagged effects of time pressure on physical health were more consistent and stronger than the effects of physical health on time pressure. Further, as indicated earlier, the association between physical health and time pressure only became significant when the children were older, aged 3 and 4 years. While the precise mechanism is not discernible from the current study, these results suggest that possibly changes in physical functioning or symptomology take time to develop and be detectable, unlike mental health, whose symptoms are far more responsive to contemporaneous risks and exposures. Prior research has shown that for mothers, the 'juggle' and conflicts between work and family peak not during infancy, but when children are older than 3 years of age (Allen and Finkelstein, 2014). This may in part explain the results here, whereby risks and exposures such as returning to work or increasing work hours when children start kindergarten or preschool at 3–4 years of age (O'Connor et al., 2016) may start to take more of a toll on mothers physical health in ways that increase their feelings of time pressure.

Our third hypothesis was not well supported. For mental health (but not physical health), there was weak evidence that the reciprocal associations between time pressure and mental health were strongest in the first year after birth. This is plausible as the first year postpartum marks a major transition for families, when paid and unpaid work gets divided along gender lines most markedly, particularly after a first birth (Baxter et al., 2008; Rose et al., 2015; Yavorsky et al., 2015). While all parents face the increased demands of infant care and unpaid work, extant Australian research indicates that even when mothers are employed, this care gap is not filled by fathers (Craig and Mullan, 2010; Rose et al., 2015). Overall, however, our results do not provide strong or consistent evidence of a systematic incline or decline in the strength of the associations between time pressure and either mental or physical health, or vice versa, over time. The inclusion of a time varying co-variate for employment status accounts for the possibility that women adjust their work schedules to alleviate time pressure and stress (Laurijssen and Glorieux, 2013). Thus, our results suggest that time pressure is a consistent and chronic strain for mothers with infants and young children, which has important implications for their health.

We note some limitations. Our analysis focuses on mothers; however, time pressure is experienced by both men and women. While the focus on mothers of young children is a limitation in one sense, evidence suggests women, and mothers in particular, experience the highest burdens of time pressure (Mattingly and Sayer, 2006; Nomaguchi et al., 2005). We therefore capture the experiences of working mothers during one of the most time-crunched stages of the life course, when they have young children, have intensive parenting responsibilities and are attempting to manage the return to work after birth (Craig and Brown, 2017). By concentrating on the time pressure - health relationship, the paper does not explicitly model how other resources available to mothers, such as social support or economic resources, may mediate or moderate the associations between time pressure and health. This is an

important direction for future research.

Our analysis also focuses on the experience of Australian mothers. The Australian social and policy context strongly supports a male breadwinner household model, with few work-family policies to support parents in the reconciliation of paid work and care, relative to other developed countries (Gornick, 2015; Whitehouse and Brady, 2019). These cross-country differences in culture and policy are also likely to influence experiences of time pressure and wellbeing by gender, family status and life stage (Garhammer, 2007). Future analysis utilizing cross-national longitudinal data would allow for an investigation of whether the reciprocal health impact of time pressure is also present in other country contexts. Existing studies make clear, however, that cross-country differences aside, mothers universally experience more time pressure than fathers.

Limitations aside, together our findings provide key contributions to our understanding of the relationship between time pressure and mothers' health. Theoretically, and empirically, the findings show that the relationship between time pressure and health is reciprocal, not unidirectional. In particular, mothers who experience higher levels of time pressure are more likely to immediately experience poorer mental health and vice versa, our study suggests that it takes a little longer for physical health to deteriorate. This underscores the need for strong government and workplace supports. Without such supports, mothers will continue to face the adverse mental and physical effects of what appears to be a growing chronic stress — being pressed for time. The ongoing impact on women's lives extends into workplaces (e.g., increased absenteeism, reduced performance, reduced work hours) and societies (e.g., higher health care costs, reductions in women's labour force attachment), constituting yet another pathway that links social and gendered time inequalities, with adverse health consequences.

Credit Author statement

Belinda Hewitt: Data curation, Writing – original draft preparation, Writing- Reviewing and Editing. **Mara Yerkes:** Writing – original draft preparation, Writing- Reviewing and Editing. **Amanda Cooklin:** Writing – original draft preparation, Writing- Reviewing and Editing. **Lyndall Strazdins:** Writing – original draft preparation, Writing- Reviewing and Editing.

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