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GENDER, MOBILITY AND PARENTAL SHARES OF DAILY TRAVEL WITH AND FOR CHILDREN

This is a post-peer-review, pre-copy edited version of an article, published as Lyn Craig, Theun Pieter van Tienoven 2019 Gender, mobility and parental shares of daily travel with and for children: a cross-national time use comparison *Journal of Transport Geography* 76, 93-102. The definitive publisher-authenticated version is available online at doi.org/10.1016/j.jtrangeo.2019.03.006

Abstract

Daily mobility varies by gender and is likely related to contextual factors including the gender division of employment and family work, options for modes of transport, and support for work-family reconciliation. This paper compares travel time patterns of men and women using nationally representative time-diary data from Australia, the UK, Spain and Finland (n=14,176). Despite similarities in men and women's total travel time within countries, results show substantial gender variation in the purpose of daily travel, the transport mode used, who is present, and the way parents in couple-headed households share travel with and for children in relative terms. The extent of the gender gaps vary cross-nationally in ways consistent with prevalent patterns in the gendered division of labour and social parenting norms, but relative gaps in child-serving travel were universal, attesting to the ubiquity of gendered mobility constraints in households with children.

Highlights

- Daily mobility varies cross-nationally by gender in purpose, mode and company
- Gendered mobility reflects national patterns of gendered division of labour
- Gendered mobility reflects national patterns of parenting norms and social trust
- Relative gender gaps in parents' travel with and for children are universal

Keywords: gender; mobility; travel time; transport; travel for children; travel with children;

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1 Introduction

Time scarcity is at the center of significant concern about the quality of contemporary life (Edwards & Wajcman, 2005; Jacobs & Gerson, 2004). An important part of time commitment is the need to get from place to place, often keeping to tight deadlines while doing so, which means travel is a discrete source of time demand. Like other forms of daily time commitment, travel patterns vary by gender (Hanson, 2010; Schwanen, 2007). The specifics of gendered 'daily mobility' (Law, 1999) are likely related to contextual factors including the transport options available, the timetabling of children's activities, school and daycare, characteristics of the labour market and support for work-family reconciliation. Such factors influence and reflect gendered behavior patterns in ways that vary cross-nationally (Altintas & Sullivan, 2016, 2017; Sayer, 2016), yet little research has explicitly examined country differences in men and women's daily mobility. This paper contributes to the literature by using time-diary analysis to compare gendered travel-time patterns in Australia, the UK, Spain and Finland, including the purposes for which men and women undertake daily travel, the transport modes they use, who they are with when they make trips, and how travel with and for children is shared by mothers and fathers within couple-headed households.

2 Background

2.1 Gender and daily mobility

It is recognized that gender and mobility are 'inseparable, influencing each other in profound and often subtle ways' (Hanson, 2010, p. 1). Although gaps are closing, a substantial body of research has shown that women travel shorter distances than men, particularly to work (Crane, 2007; Frändberg & Vilhelmson, 2011; Gustafson, 2006; Hjorthol & Vågane, 2014; Scheiner, 2010). This has largely been attributed to social gender roles, specifically in relation to the division of household work and employment. Women are more likely than men to be responsible for home duties and childcare and thus to be more spatially constrained (Pocock, Skinner, & Williams, 2012; Schwanen, 2007). Household- and passenger-serving activities are often located close to home, and their scheduling can create a 'temporal treadmill' (Dowling, 2000, p. 347), that puts 'fixity constraints' on women's travel patterns (Kwan, 2000, p. 1; Schwanen, Kwan, & Ren, 2008). For example, ferrying children to and from school and day care must be done at certain times of day, and this task falls disproportionately to women (Authors 2019). This means they are often travelling under time pressure, and the scheduling in turn affects women's employment, such that it is more likely to be part-time and closer to home than men's employment (Kim, Sang, Chun, & Lee, 2012; McQuaid & Chen, 2012).

Also, women tend to juggle their roles as workers and care-givers more actively over the course of the day than men do (Author A, 2016). In relation to travel, this means that they are more likely than men to undertake multipurpose trips, with the sequence of travel activity leading to more complex 'trip-chains' (Cao, Mokhtarian, & Handy, 2008; Lee, Hickman, & Washington, 2007; Scheiner & Holz-Rau, 2017). It is more usually women than men who undertake *ad hoc* care-related travel at short notice (Pocock et al., 2012). The urgency of travelling for unplanned contingencies such as when a child falls sick at school creates time pressure and can jeopardise employment. Travelling with children involves ensuring their safety and monitoring their behaviour, so can be a subjectively more demanding experience than travelling without them (Author A, 2016).

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Women are also more likely than men to use slower and cheaper modes of travel such as walking and public transport, whilst men are more likely to travel by car (Barker, 2008; Dobbs, 2005). Notwithstanding, public transport can be inadequate to meet complex family schedules (Dowling, 2000; Pocock et al., 2012) and some have found mothers' car use is associated with *more* household responsibilities (Schwanen, 2011). When available, cars confer freedom and flexibility (Lang, Collins, & Kearns, 2011), and mitigate perceived risks such as stranger danger (Murray, 2008). Convenience, incorporating drop-offs and pick-ups into trip-chains and concerns about traffic danger are the main reasons parents ferry children by car (Carver, Timperio, & Crawford, 2013).

Some gender differences in mobility are becoming less pronounced. In Western Europe, aggregate patterns have been converging, apparently due to overall slower growth in every day mobility and a rapid increase in women's travel (see for an overview Frändberg & Vilhelmson, 2011; Scheiner, Sicks, & Holz-Rau, 2011). Rising female driver license attainment and vehicle ownership, in association with higher workforce participation have engendered more gender similarity, particularly in younger cohorts (Tilley & Houston, 2016). However, this is mainly for *work-related* travel time; gender differences in *household-related* travel time persist (Fan, 2017). This implies that gender convergence in overall daily travel time comes from women adding longer commutes to existing household- and passenger-serving travel, rather than from men taking more home-related trips, or from household-related travel becoming less burdensome upon women

2.2 Linked lives

The relative complexity of women's travel underlines that individual lives are not 'lived in isolation', but rather are interwoven with the lives of significant others (Elder & Giele, 2009, p. 13). Relevant here is that time is both an individual and a family resource, and the way each member of a household spends time has implications for how others in the family spend theirs (Author A, 2017). This is clearly pertinent to travel. For example, if one partner in a couple has a long commute, they are less available to do household-serving activities, so they fall to the other partner. Previous research has shown that women's time allocation is much more sensitive to household and spousal characteristics than men's (Bianchi & Milkie, 2010; Levine, Bonner, & Klugman, 2014; Offer, 2014; Sayer, 2016), and we expect this would be the case for inter-spousal time effects on travel also.

To a significant extent, such differences arise because social meanings and expectations attached to household-serving labour differ for men and women, with gender roles constructed and reproduced within the family (see Bianchi & Milkie, 2010 for an overview; Ferree, 2010; West & Zimmerman, 2009). Ideals of 'femininity' and 'masculinity' both reflect and maintain norms of appropriate behaviour (Connell 2013). Family functioning, children's wellbeing and the cleanliness of one's home have long been seen more as a reflection on women's competence as a 'wife and mother' than on men's competence as a 'husband and father' (Bianchi, 2000, p. 95). Despite expansion in women's public opportunities, the family remains a primary site for socialization and perpetuating gender roles through everyday interactions and behaviour (Deutsch, 2007; England, 2011; Goldscheider, Bernhardt, & Lappegard, 2015; Risman, 2009). Women are still widely expected by both themselves and others to be responsible for housework and for meeting the physical and emotional needs of their spouse and children (Bianchi & Milkie, 2010; Goldin, 2014). Thus although deciding who ferries children around may seem like a practical private matter to be arranged between couples, it is imbued with gendered social norms (Schwanen, 2007; Solá & Vilhelmson, 2012). These norms inform large choices as well as small. Many gendered mobility

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patterns are shaped by major life course decisions such as choosing residential and employment location, which are not easily changed on a day-to-day basis. Key life course events that change travel behaviour include marriage or divorce, parenthood, entering or leaving the labour market, changing jobs or moving house (Scheiner, 2014). Any of these often-interrelated events could affect women's access to resources and commitment to family care (Scheiner & Holz-Rau, 2012), and lead to them being the default provider of family-serving travel.

2.3 Situated lives

Lives are also situated within communities and nations. Family life is inseparable from the context in which it occurs. There are stronger constraining factors upon women in some contexts than others, so gendered travel patterns likely differ from place to place. Turner & Grieco (2000) argue, for example, that if welfare and urban services are centralized and not neighbourhood-based, more stress is put on women's schedules. Relevant are spatial planning policies (e.g. access to shops, schools and medical services), family policies (e.g. long day care, before and after school care), and transport policies (e.g. cost and extent of public transport coverage). Urban design with safer roads and good local schools means more children can be independently mobile (Fyhri & Hjorthol, 2009; Fyhri, Hjorthol, Mackett, Fotel, & Kyttä, 2011; O'Brien, Jones, Sloan, & Michael, 2000), thus reducing the time burden upon parents. Flexible work schedules or employment conditions such as teleworking could also relieve the pressure (Fan, 2017; Fyhri et al., 2011).

The implication is that daily mobility and how it varies by gender is underpinned by multiple contextual factors including social norms, gender patterns in care work and workforce participation, availability of day care services, urban design and average commuting distance, cost and mix of private and public transport options (Dowling, 2000; Ferree, 2010; Jane Lewis, 2009; Ridgeway, 2009; Scheiner & Holz-Rau, 2012; Schwanen, 2007). Yet prior research has rarely looked at gendered mobility patterns in cross-national perspective, so it is not clear whether gendered norms of behaviour ensure men are advantaged over women in relation to mobility notwithstanding contextual variation. In this paper, we address this gap, and compare gender patterns in travel in Australia, the UK, Spain and Finland. We choose these countries because they represent welfare regimes with different patterns of gendered workforce participation, social policy and social norms.

2.4 Country context

A conceptual framework for comparative analyses has categorised countries into typologies according to how they draw on the pillars of welfare: states, markets and families (Esping-Andersen, 1990, 2009; O'Connor, Orloff, & Shaver, 1999). Esping-Andersen (1990) originally proposed that de-commodification, the degree to which people can be independent of market work, should be the major differentiating marker of welfare regimes. However, this approach failed to adequately acknowledge that a major dimension of social risk for women is whether they have the freedom to provide or to not provide caring services outside the labor market (Arts & Gelissen, 2002; Crompton, 2006; Lewis, 2018). Consequently, familialization - the degree of social reliance upon on family support and (women's) care provision - became an essential further criterion for categorising welfare regimes (Arts & Gelissen, 2010; Esping-Andersen, 2009; Korpi, Ferrarini, & Englund, 2013).

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Using these criteria, Spain is classified as a Mediterranean 'familialistic' country in which the family is an important source of social support, gender roles are traditional, and women perform high levels of unpaid care and housework (Lombardo, 2017). The UK and Australia are liberal/market based countries in which working-age income support is tightly means tested (Arts & Gelissen, 2002, 2010) and although there is formal gender equality in the public sphere, care is regarded as a private responsibility which falls disproprtionately to women (Craig & Mullan, 2010). Finland is an example of a non-familialistic social democracy that espouses involved fatherhood and facilitates gender equality through public services, including subsidised childcare, which reduce reliance on family care provision and encourage female work force participation (Craig & Mullan, 2010; Gornick & Meyers, 2003; Lewis 2018). Welfare regime categories are essentially heuristic and are neither exclusive nor immutable. Because no country conforms exactly to type, Table 1 summarizes some of the multiple contextual features likely to influence travel patterns and how they fall by gender.

The literature above indicated that the gender division of paid and unpaid work has flow-on effects on gendered daily mobility (Kim et al., 2012; McQuaid & Chen, 2012). Of the four countries, Finland has highest female employment rates, lowest female part-time employment and the lowest percentage of men working over 40 hours per week (see Table 1). Together with the fact that half of the Finnish couples with children are dual-full time earners (the most egalitarian family type) this indicates that men's and women's employment time is most similar in that country. Although Spain has the next-highest proportion of dual-fulltime-earner families, it also has the highest percentage of employed men working over 40 hours a week. Long male work hours generally widen the gender division of labour, especially when children are young (Goldin, 2014). Also, despite having the lowest proportions of both employed men and women. it has the highest percentage of traditonal male breadwinner families, the least egalitarian family type (Crompton, 2006). Australia and the UK have the highest female part-time employment rates and, as a result, the highest percentage of one and a half earner families, in which women fit short hours work around family responsibilities (Craig & Mullan, 2009). These household work-family arrangements are broadly reflected in national attitudes about the use of non-parental childcare, with agreement with the statement "when mothers work, children suffer" highest among Spaniards and lowest among of Finns and middling in Australia and the UK (see Table 1).

The national household work-family patterns also seem consistent with national differences in parenting norms. Drawing on a large psychological literature that identifies three dominant approaches (authoritarian, authoritative and permissive), Doepke and Zilibotti (2017) found permissive parenting is most prevalent in countries including Finland with low national income inequality, generous redistributive policies and low economic returns to education. In countries such as Spain with high income inequality but lower returns to education, parenting style tends to be authoritian (Doepke & Zilibotti, 2017). In countries with wide income inequality, low redistribution and high returns to education (including the UK and Australia), parents are more likely to adopt an interventionist 'helicopter parenting' approach, consistent with the authoritative style (Doepke & Zilibotti, 2017; Ishizuka, 2018). This view is supported by research showing that the idea children need 'concerted cultivation' through parent-arranged enrichment activities is strong in Anglo countries (Collins, 2019; Faircloth & Murray, 2015; Lareau, 2003; Sevilla & Borra, 2020). Helicopter parenting increases parental car use (Fyhri et al., 2011). Also potentially affecting children's independent mobility are levels of social trust, which are very low in Spain, comparatively low in the UK, higher in Australia and highest in Finland (see Table 1). Likely not

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coincidentally, income inequality (shown in Table 1 by the ratio of the average income of the 20% richest to the 20% poorest) also follows this sequence.

More practically, options for modes of transport differ across the countries. Australia stands out in ownership of private cars, with over 300 cars per 1000 inhabitants more than in any of the other countries, and the highest car usage per capita (see Table 1). This may be because Australia, by far the largest country studied, has less extensive and pervasive public transport infrastructure than the European countries (Mees, O'Connell, & Stone, 2007). Notwithtsanding, all the countries have comparable clustering of the 15-65 year old population around big cities and/or highly urbanized areas (OECD, 2011). Generally, urbanization increases the need to accompany children on trips (Kyttä, 2004). However,consistent with the differences in parenting norms and social trust noted above, prior research shows children's independent mobility is higher in Scandinavia than in Anglo or Mediterranian countries (Fyhri et al., 2011; more research cited in Kyttä, 2004).

Table 1. Institutional context by country

	Spain	Australia	United Kingdom	Finland
Employment				
Male employment rate (%)[1]	68.0	78.5	78.9	73.8
Men who usually work >40hr/week (%)[1]	81.1	61.8	62.5	57.8
Female employment rate (%)[1]	57.1	69.4	70.1	70.3
Female part-time employment (%)[1]	22.1	38.0	37.0	17.4
Employment patterns couples with children[2,a]				
Both fulltime	38.3	18.9	26.8	50.2
One partner fulltime, one partner part-time	12.9	38.3	32.0	7.7
One partner fulltime, one partner not working	32.2	30.6	25.8	31.0
Both partners not working	8.2	6.0	6.2	3.8
Income equality, trust and attitudes gender/ childcare				
Ratio of the average income of the 20% richest to the 20% poorest[1]	6.5	5.5	6.0	3.7
Social trust: "would you say that most people can be trusted or that you need to be very careful in dealing with people?"[3]				
Most people can be trusted (%)	20.0	46.1	30.5	58.9
Need to be very careful (%)	80.0	53.9	69.5	41.1
Attitude to childcare: "when a woman works children suffer" (% strongly agree/agree)[4,b]	52.7	31.1	30.6	21.1
Transport				
Passenger car ownership (cars per 1000 inhabitants)[5]	481	789	485	484
Passenger car transport (kilometres per capita per year)[6]	6832	12286	9797	10389

[1]OECD database, latest data available. [2]OECD Family database, latest data available. [3]World Value Survey (WVS), latest data available. [4]International Social Survey Programme (ISSP), latest data available. [5]OECD International Transport Forum Database 2009. [5]Statista, latest data available. [6]EUROSTAT Transportation database for Spain, the UK and Finland, latest data available; Australian Transport Statistics Yearbook 2009 for Australia.

[a]Categories do not sum to 100% because OECD uses a residual category of other household employment statusses. [b]Spain uses 4-point Likert schale (strongly agree/agree/disagree/strongly disagree) whereas all other countries use a 5-point Likert scale including a neutral category.

2.5 Research focus

In summary, the four countries chosen for analysis represent three types of welfare state: familialistic Mediterranean, liberal Anglo, and non-familiastic social democratic, and have varying patterns in the gender division of employment and unpaid household labour, social norms regarding gender, parenting and social trust. We use time use data to compare by gender overall amount of

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time spent in daily travel, and how it is divided by purpose, mode and company (who people are with when they make trips). Then, using new composite measures derived from the data of matched couples, we examine how travel with and for children is shared by mothers and fathers within households. The literature leads us to expect gender gaps in all countries studied, but that differences in mode, purpose and company will be smallest in Finland, where there is most gender-similarity in workforce participation and hours worked, higher social trust and a permissive parenting style reduces parents' need to accompany their children. We expect them to be larger in the UK and Australia, which both have a high incidence of female part time work and helicopter parenting, and largest in Spain, which has the highest proportion of male-breadinner families and the lowest levels of social trust. We are interested to see if gendered responsibility for child-serving travel is consistent cross-nationally despite the contextual differences noted above. At the household level, we expect shares of child-related travel to be influenced by respondents' own work hours and commuting times, and by their spouses' work hours and commuting times. We expect that the cross-spousal influence will be strongest on women, because previous research has shown that women's behaviour is more sensitive to partners' and household characteristics than is men's (Bianchi & Milkie, 2010; Levine et al., 2014; Offer, 2014).

Our specific questions are

1. do gender patterns in amount, mode, purpose, or company of daily travel differ by country?
2. what is the daily scheduling of child-related travel, and how is this divided by gender in each country?
3. do work hours and commute time of each partner affect intra-household shares of child-related travel, and do any associations differ by country?

3 Data & Method

3.1 Data

We use data from nationally representative time-use surveys of Australia (2006), the UK (2014), Spain (2009) and Finland (2009), in which respondents recorded all their activities over the course of the day using time-diaries. All the dairies were two-day; a randomly assigned weekday and weekend day in the UK, Spain and Finland, and two consecutive days with a randomly assigned starting day in Australia. Activity-recording intervals were 10 minutes in the UK, Spain and Finland, and five minutes in Australia. Fieldwork periods ran for at least one year. When recording travel time, respondents also provided contextual information, including the purpose, the mode of transport, and the presence or absence of others, which we draw on for our analyses. We restricted our sample to those aged 24-54 years, prime working age (Australia n=2399, the UK n=3837, Spain n=6179, Finland n=1761 respondents). The surveys collect data from all adults in respondent households, which in couple-headed households allows us to simultaneously examine the time use of both partners. To examine how mothers and fathers share child-related travel, we further limited the sample to heterosexual two-parent families with at least one child under the age of 10 years (Australia n=354, the UK n=405, Spain n=715, Finland n=169 families). LGBTQ couples with children under 10 were too few to be analysed as a separate group so are not retained in the sample. We also exclude weekend days from our analyses, because the temporal rigidity of paid work, domestic work and childcare is tightest on weekdays.

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3.2 Measures

*Total travel time***.** Travel is recorded as a discrete activity in time-diaries. In an examination of time use survey validity, Minnen, Glorieux, and van Tienoven (2015) found no evidence for systematic underreporting of short trips when using activity-recording intervals of 10 minutes. We are interested here in regular daily mobility, so exclude travel for day trips or holidays, and travel as part of employment (e.g. driving a truck, bus or delivery van). We sum daily travel time net of these exclusions for each respondent. We break down this *total individual travel time* along the three dimensions of purpose, mode, and company.

For purpose, we subdivide travel into *travel for work* (commuting), *household-serving travel* (household care, shopping and use of services, help to adult family members, and childcare), *travel for leisure and social life,* and, for completeness, *other travel* (including for personal care, study, and other unspecified purposes). For mode, we distinguish between *public transport* (including train, bus, tram, underground, ferry and taxi), *private car* (as driver or passenger), and *other travel modes* (including bike, walking, plane, motorcycles). Mode was unspecified for less than 6.1% of all travel activities. These instances are included under 'other' travel modes. To capture company (the presence or absence of others) we distinguish between travel *alone*, *with others excluding children*, and *with others including children*. Countries slightly vary by the upper age limit for registering the presence of children, so to maximise compatibility we include only children under 10 years old in this measure.

A separate variable captures *total daily travel time with and for children* (a term which for brevity we use interchangeably with *child-related travel*). This includes all travel with at least one child under the age of 10 present, including time spent collecting children from school or day care and ferrying them to and from places, and time travelling without them, but for child-related purposes such as parent-teacher meetings. We create this variable to include information the surveys provide on both purpose and company. For the analyses of how couples share responsibility for this activity we limit the sample as described above and disaggregate *total daily travel time with and for children* into three categories: time during which child-related travel is done by fathers only, time during which child-related travel is done by mothers only, and time during which both partners are travelling with or for children. We call this last category *joint, shared* or *simultaneous couple travel with or for children* (or *joint, shared* or *simultaneous couple child-related travel)*. Note it includes both taking the same journey together, and time during which parents are travelling separately, but each is doing so with or for one or more of their children. For multivariate analyses we divide the time spent in these categories by *total travel time with and for children* to create three ratio measures (which sum to one), capturing respectively father's share, mother's share and the share that is done by both partners simultaneously.

3.3 Analysis plan

First, using the main sample from each country, we investigate gender differences in travel amount, and in how it is subdivided by purpose, mode and company. Using Student's t-test we compare mean travel time between men and women within each country. We use ANOVA and post hoc pairwise comparisons to compare means in travel time of men and women across countries. We also present the proportion of total travel time spent in each subcategory by men and women in each country.

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Second, using the sample restricted to heterosexual two-parent families with at least one child under 10 years old we examine when, over the course of a weekday, child-related travel is performed, and by whom. Separately by country, we present tempograms showing the proportion of couples travelling with or for children at each time point of the day, distinguishing the relative contribution of each partner and of couples' simultaneous child-related travel. The tempograms illustrate how amount and timing of child-related travel differs across the four countries, showing when and where most of this activity occurs, and when and where the largest within-household variability in how it is shared occurs.

Third, we pool the two-parent family samples and use multivariate regression analysis to test whether there are significant country differences in the proportion of total household travel with and for children that is done by fathers, by mothers or by both partners at the same time. Together these three proportional measures show how a household's total travel with and for children is shared between parents. Across the models, the intercept row sums to one, and an increase in coefficients in one model implies decreases in others in the same row. This means that the multivariate analyses can be interpreted by reading coefficients and models together as well as separately.

The main variable of interest is *country*, with Australia the reference category. The other key explanatory variables are *working hours* (measured as weekly working hours for main and second job), and *travel time to work* (commuting for main and second job, measured in 10-minute intervals). We interacted each of these with *country*, to examine whether their effects differed cross-nationally. The models control for individual and family characteristics that may influence child-related travel time: both partners' *age group* (24-34 years, 35-44 years, 45-55 years (omitted)), *tertiary degree* (yes = 1, no = 0); *number of children* (1 (omitted), 2, 3+), *household equivalised income* (measured in deciles), and to ensure relative shares are net of absolute time differences, *total daily household travel with and for children*.

We use OLS to estimate our models. Using OLS to model a dependent variable that takes values between 0 and 1 is potentially problematic, because it might predict values outside of this range. The Fractional Logit (FL) model is an alternative (Ramalho, Ramalho, & Murteira, 2011). We estimated the OLS model (using SPSS version 25) and the FL model (using frm package in R). Results show little substantive difference, so for ease of interpretation, we report the OLS results (results from FL are available on request).

4 Results

4.1 Travel by purpose, mode and company

Total individual daily travel time is quite similar (about an hour and 10-20 minutes daily) across countries and by gender (see Table 2). The exception is the UK, in which men's average weekday travel totals nearly two hours per day, substantially more than both the average of men in the other countries, and of women in the UK. The bulk of the time difference is in travel for work, indicating that men's average commuting times are longer in the UK than elsewhere.

Gender differences in travel purpose are evident in all the countries. Confirming that overall time equivalence can mask gender inequalities, women travel longer than men for household-serving purposes and men spend longer than women commuting to paid work. However, the magnitude of the gender difference varied. In the UK and Australia, the proportion of total travel time that is accounted for by commuting is around twice as high for men as for women. Conversely,

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in those countries, the proportion of total travel time spent in household-serving travel is double for women than for men. In Spain, men spend nearly half their travel time commuting, and 22 percent in household-serving travel. The proportions for Spanish women's commuting and household-serving travel are respectively 33.8 and 37.5 percent. In Finland there was almost no gender difference in the proportion of individual total travel that is for paid work, and the gender gap in the proportion of individual total travel devoted to household-serving trips was only nine percentage points, substantially narrower than elsewhere (see Table 2). This is consistent with our expectation, because of the four countries, Finland is most gender-egalitarian.

In Australia, there were no gender differences in travel time by mode of transport, and car journeys accounted for about 75 percent of the total travel of both men and women, likely because that country's infrastructure favours private road travel over public options (Mees et al., 2007). In the other countries, public transport use was higher and 'other' forms of transport (including bicycling and walking) constituted between 20 and 40 percent of total individual journey time. Car journeys constituted about 57 percent of travel time for both genders in the UK. In Spain and Finland, the proportion of men's journey time that took place by car was higher than women's, by about 15 percentage points in Spain and about eight percentage points in Finland. In the UK, public transport accounted for 16.4 percent of men's travel time compared to 13.1 percent for women. This suggests UK men's longer commutes, noted above, include those on public transport. In Spain and Finland, the opposite gender pattern pertained. In those countries, women's public transport time, and the proportion of total travel it comprised, was higher than men's.

There were also significant gender differences in travel alone and with others. In all four countries, over 55 percent of men's journeys were made alone; women spent a much higher proportion of their travel time together with young children. The latter gaps were largest in Australia (23.2 percent for women vs 7.6 percent for men) and smallest in Finland (12.7 percent for women vs 5.5 percent for men).

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Table 2. Temporal characteristics of travel behaviour of men and women (24-55 years) on weekdays by *mode*, *purpose* and *company* in Spain, Australia, the UK and Finland

	Spain					Australia				
	Men (n=1859)		Women (n=2180)			Men (n=1673)		Women (n=2086)		
	mean (h:mm)	*%*	*mean (h:mm)*	*%*	*Sig.*	*mean (h:mm)*	*%*	*mean (h:mm)*	*%*	*Sig.*
Total travel	1:22[a]	100%	1:20[a]	100%		1:19[a,c]	100%	1:22[a]	100%	
Purpose										
Paid work	0:40[a]	48.8%	0:27[a]	33.8%	***	0:45[b]	57.0%	0:24[b]	29.3%	***
Household-serving	0:18[a]	22.0%	0:30[a,c]	37.5%	***	0:21[b]	26.6%	0:42[b]	51.2%	***
Leisure & social life	0:17[a]	20.7%	0:15[a]	18.8%	**	0:11[b]	13.9%	0:14[a]	17.1%	**
Other	0:06[a]	7.3%	0:06[a,c]	7.5%		0:00[b]	0.0%	0:01[b]	1.2%	
Mode										
Public[†]	0:07[a]	8.5%	0:10[a]	12.5%	***	0:06 [a]	7.6%	0:06[b]	7.3%	
Private car[‡]	0:50[a]	61.0%	0:37[a]	46.3%	***	1:00 [b]	75.9%	1:02[b]	75.6%	
Other[¶]	0:24[a]	29.3%	0:32[a]	40.0%	***	0:12 [b]	15.2%	0:13[b]	15.9%	
Company										
Alone	0:50[a]	61.0%	0:41[a]	51.3%	***	0:49 [a]	62.0%	0:35[b]	42.7%	***
Others (excl. child)	0:23[a]	28.0%	0:24[a]	30.0%		0:23 [a]	29.1%	0:26[a]	31.7%	*
Others (incl. child)	0:08[a]	9.8%	0:15[a]	18.8%	***	0:06 [b]	7.6%	0:19[b]	23.2%	***

	UK					Finland				
	Men (n=2831)		Women (n=3238)		*Sig.*	Men (n=822)		Women (n=903)		
	mean (h:mm)	*%*	*mean (h:mm)*	*%*	*Sig.*	*mean (h:mm)*	*%*	*mean (h:mm)*	*%*	*Sig.*
Total travel	1:50[b]	100%	1:24[a]	100%	***	1:13[c]	100%	1:11[a]	100%	
Purpose										
Paid work	1:07[c]	60.9%	0:29[a]	34.5%	***	0:30[d]	41.1%	0:26[a,b]	36.6%	*
Household-serving	0:17[a]	15.5%	0:29[c]	34.5%	***	0:16[a]	21.9%	0:22[d]	31.0%	***
Leisure & social life	0:21[c]	19.1%	0:20[b]	23.8%		0:17[a,c]	23.3%	0:14[a]	19.7%	
Other	0:04[c]	2.7%	0:04[c]	4.8%		0:09[a]	12.3%	0:08[a,b]	11.3%	
Mode										
Public[†]	0:18[b]	16.4%	0:11[a]	13.1%	***	0:03[a]	4.1%	0:07[b]	9.9%	**
Private car [‡]	1:03[b]	57.3%	0:49[c]	58.3%	***	0:52[a]	71.2%	0:45[c]	63.4%	*
Other[¶]	0:28[c]	25.5%	0:24[c]	28.6%	*	0:17[b]	23.3%	0:19[d]	26.8%	
Company										
Alone	1:02[b]	56.4%	0:35[b]	41.7%	***	0:42[c]	57.5%	0:37[b]	52.1%	*
Others (excl. child)	0:42[b]	38.2%	0:33[b]	39.3%	**	0:26[a]	35.6%	0:25[a,b]	35.2%	
Others (incl. child)	0:05[b]	4.5%	0:14[a]	16.7%	***	0:04[b]	5.5%	0:09[c]	12.7%	***

[†]Train, bus, tram, underground, ferry, taxi. [‡]Driver or passenger. [¶]Bike, walking, plane, motorcycle.
Levels of significance: ***p≤0.001, **p≤0.01, *p≤0.05. Within gender, means sharing a letter in their subscript are not significantly different at α=0.05 according to pairwise comparison with Bonferroni correction.

In summary, the descriptive results show that notwithstanding similar total travel time, women are more likely than men to travel with children, to travel for household-serving purposes and (in Spain and Finland) to be doing so without using a car. There were country differences in the size of the gender gaps, however, and we now examine whether there is similar variation in intra-household shares of child-related travel specifically.

4.2 Scheduling of travel with and for children

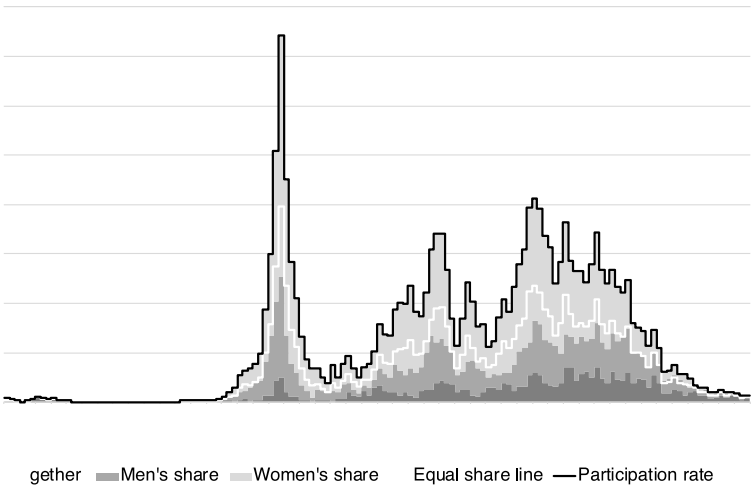
Figure 1 shows tempograms illustrating how dual-parent couples with at least one child aged 10 or below participate in and share travel time with and for children on a weekday in each country. The top line shows the percentage of couples engaged in child-related travel at each time point over the course of the day. The grey fields break down the total combined child-related travel time of the couples into the percentage done by both partners simultaneously (dark grey), the proportion done

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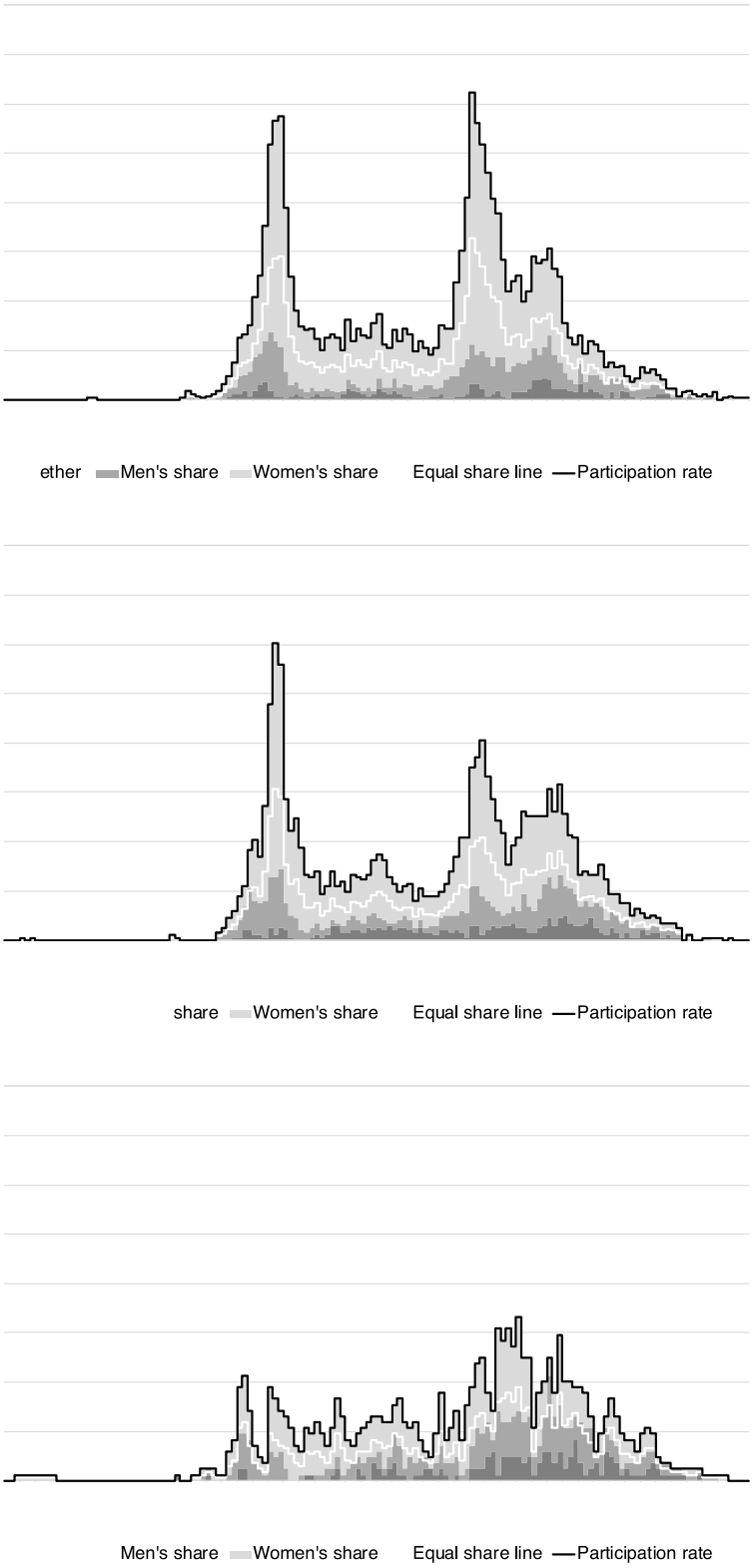
by fathers only (medium grey), and the percentage done by mothers only (light grey) at each time point. The white line is a hypothetical: it indicates the point at which fathers and mothers would equally share travel with and for children, taking into account the percentage done by both parents at the same time. The purpose of this line is to indicate the degree of gender disparity in travel with or for children in each country, and how much either fathers or mothers would need to change their contribution to make it equal.

The gender difference in shares of child-related travel is largest in Australia, followed by the UK and Spain. Finland has both the lowest participation levels and the most equitable distribution of this activity. The low participation may reflect a higher incidence of children travelling independently of their parents due to more permissive parenting and greater social trust, and/or that schools and services are closer to home and require less travel time than elsewhere. There are also gender differences in when child-related travel occurs. Australia, the UK and Spain have high female participation peaks in the morning, suggesting that school and day care drop-off is a task for mothers in these countries. There is another peak in the afternoon, combined in the latter two countries with troughs between 10am and 3pm. This suggests that school and day care pick-up and drop-off exercise a time constraint upon mothers, particularly in Australia, which stands out as having the highest afternoon participation. There is little evidence of couples sharing the pick-up and ferrying duties at the end of the day, and across the board simultaneous or shared travel is relatively low. Spain is a partial exception in the evenings, perhaps due to that country's pattern of eating and socialising into the later evening as a result of its prevalent split-shift working schedule and long midday work break (Gracia & Kalmijn, 2016).

Figure 1. Tempograms of how fathers and mothers share travelling with and for children aged 10 years or under over weekdays in Spain, Australia, the UK and Finland.



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Note: equal share line represents the points throughout at which both partners would equally share chauffeuring their child(ren) taking into account the shared chauffeuring.

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4.3 Multivariate analyses of shares of travel with and for children

We ran multiple regression analyses to determine whether there are country differences in how child-related travel is shared within households in relative terms, and what factors influence divisions of this household responsibility. The reference group in all models are Australian couple-headed families in which both spouses are aged 44-55 years, neither has a tertiary degree and there is one child aged 10 years or under. In these households, fathers are estimated to perform 27.2 percent, and mothers to perform 61.7 percent, of total household travel with and for children. The remaining 11.1 percent of total household child-related travel is done by both parents simultaneously.

The main effects of country show that, all else equal, how child-related travel is shared in relative terms within households is similar in each nation except the UK. Compared to Australia, the share performed by both partners simultaneously was significantly lower in the UK, but not in Spain and Finland. The lower UK joint couple share transferred to mothers. As a result, mothers' share was estimated to be 16.5 percent more of total household child-related travel in the UK than elsewhere, indicating that in the UK mothers perform 78.2 percent of the household total of this activity (see Table 3).

A one-hour increase in fathers' weekly working hours is associated with a reduction of 0.4 percentage points in their share of the household's child-related travel, and with a 0.2 percentage point reduction in the share of this activity that both partners do at the same time. This amounts to 0.6 percentage points, which is allocated to mothers. That is, mothers' share of child-related travel increases by 0.6 points for every weekly hour her partner works. Interaction terms show that these associations between fathers working hours and shares of child-related travel are not consistent cross nationally. They were largest in Australia and Spain, marginal in the UK, and absent in Finland. Mothers' working hours predict that they will do 0.2 points less of the total household travel for children, and that simultaneous couple child-related travel reduces by 0.1 point for every hour worked. Results suggest these relative reductions are transferred to fathers, whose share is estimated to go up 0.3 points for every hour their partner works. Again, the interaction terms revealed cross-national differences, specifically that the association did not pertain in Finland.

For both fathers and mothers in reference category Australia, their own commute to work predicts they do a lower share, and their partner does a higher share, of total couple travel with and for children. For every ten minutes of fathers' commute time, their share reduces by 1.2 percentage points, and mothers' increases by 1.5 percentage points. Finnish results were not significantly different to Australia, but the effect is partially countered in the UK (where, compared to Australia, 0.8 percent of shares is redistributed back between mothers and fathers). The effect of fathers' commuting time on mothers is amplified in Spain, where, compared to Australia, for every ten minutes their spouse commutes, mothers do one percentage point more of the household child-related travel. The difference results from a lower proportion of the travel time being performed by both partners simultaneously. It is not driven by Spanish fathers' own share, which is not significantly different from that of Australian fathers.

Mothers' travel time to work engenders larger effects on how couples share responsibility for child-related travel than fathers' travel time to work. For every ten minutes she commutes, a mother's share of child-related travel goes down by 4.4 percentage points, which is transferred to fathers. The interaction terms show associations are attenuated in countries other than Australia. In

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the UK, the effect of mothers' commute on fathers' travel with and for children is estimated to be 3.4 points less than in Australia. In Spain it is 1.9 percentage points less for fathers, and shared couple travel is also lower (1 point), with these shares assigned to mothers. In Finland, similarly, the effect of mothers' commute time on fathers' share and joint couple share of child-related travel is lower, and mothers' own share of child-related travel correspondingly higher, than in Australia.

The assocations of partner's work hours and commuting time and country differences on child-related travel are net of differences in age groups, number of children, educational attainment, household income, and total child-related travel time (see Table 3). We tested country interactions with all the control variables, but none were significant, meaning they had the same implications for how child-related travel was shared across all four countries.

Table 3. Coefficients (B) and standard errors (SD) from OLS regression models predicting fathers' and mothers' share of travelling with and for children aged 10 years or under on weekdays (n=1643 families)

	Fathers' share		**Mothers' share**		**Joint couple share**	
	B (SD)	Sig.	B (SD)	Sig.	B (SD)	Sig.
Constant	.272 (.056)	***	.617 (.064)	***	.111 (.042)	**
Country *(ref. Australia)*						
United Kingdom	-.091 (.060)		.165 (.067)	*	-.074 (.043)	†
Spain	.004 (.057)		-.040 (.065)		.036 (.042)	
Finland	-.066 (.059)		.064 (.067)		.002 (.044)	
Men's working hours p/w	-.004 (.001)	***	.006 (.001)	***	-.002 (.001)	**
Men's working hours p/w by country *(ref. men's working hours in Australia)*						
Men's working hours in the UK	.003 (.001)	*	-.005 (.001)	***	.003 (.001)	**
Men's working hours in Spain	.001 (.001)		-.002 (.001)		.001 (.001)	
Men's working hours in Finland	.004 (.001)	***	-.006 (.001)	***	.002 (.001)	**
Women's working hours p/w	.003 (.001)	***	-.002 (.001)	*	-.001 (.001)	
Women's working hours p/w by country *(ref. women's working hours in Australia)*						
Women's working hours in the UK	.000 (.001)		-.001 (.001)		.001 (.001)	
Women's working hours in Spain	.000 (.001)		-.002 (.001)		.002 (.001)	*
Women's working hours in Finland	-.003 (.001)	***	.002 (.001)	*	.001 (.001)	
Men's total travel time to work[¶]	-.012 (.003)	***	.015 (.003)	***	-.003 (.002)	
Men's total travel time to work[¶] **by country** *(ref. men's total travel time for work in Australia)*						
Men's total travel time for work in the UK	.008 (.003)	**	-.007 (.003)	*	-.001 (.002)	
Men's total travel time for work in Spain	-.002 (.004)		.010 (.004)	**	-.008 (.003)	**
Men's total travel time for work in Finland	-.016 (.058)		.031 (.066)		-.015 (.004)	
Women's total travel time to work[¶]	.044 (.005)	***	-.044 (.005)	***	.001 (.003)	
Women's total travel time to work[¶] **by country** *(ref. women's total travel time for work in Australia)*						
Women's total travel time for work in the UK	-.034 (.005)	***	.036 (.006)	***	-.003 (.004)	
Women's total travel time for work in Spain	-.019 (.006)	**	.029 (.007)	***	-.010 (.005)	*
Women's total travel time for work in Finland	-.013 (.008)		.024 (.009)	**	-.011 (.006)	†
Control variables						

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Men's age *(ref. 45-55 years)*						
24-34 years	-.043 (.027)		.002 (.031)		.041 (.020)	*
35-44 years	-.001 (.021)		-.009 (.024)		.011 (.015)	
Women's age *(ref. 45-55 years)*						
24-34 years	.034 (.036)		-.060 (.041)		.026 (.026)	
35-44 years	.014 (.032)		-.045 (.037)		.031 (.024)	
Men's tertiary degree *(ref. no)*						
Yes	-.035 (.016)	*	.034 (.019)	†	.001 (.012)	
Women's tertiary degree *(ref. no)*						
Yes	.018 (.016)		-.017 (.018)		-.001 (.012)	
Number of children *(ref. 1 child)*						
2 children	.015 (.016)		.023 (.019)		-.037 (.012)	**
3+ children	.065 (.022)	**	-.021 (.025)		-.044 (.016)	*
Household equivalised income (deciles)	.005 (.003)		-.008 (.004)	*	.003 (.003)	
Total household travel with and for children[1]	.000 (.001)		-.004 (.001)	**	.004 (.001)	***
Adjusted R^2	.216		.227		.073	

Levels of significance: ***p≤0.001, **p≤0.010, *p≤0.05, †p≤0.10.

5 Discussion and conclusion

We used nationally-representative time use data to compare gendered mobility on multiple dimensions in four countries. Overall amount of men's and women's travel time both within and between countries was similar, in line with a body of prior research arguing that over time and space there is broad consistency in the amount of time people devote to daily travel (see Ahmed & Stopher, 2014 for an overview). Despite this, there were substantial gender differences in how that travel was comprised (Dobbs, 2007; Hanson, 2010). The extent and nature of these gendered mobility gaps varied cross-nationally, reflecting country characteristics including women's average workforce participation and social norms relating to parenting and gender.

Although in all the countries women were more likely than men to travel for household-serving purposes, and to have children with them on trips, it was the two liberal Anglo countries, the UK and Australia, which had the widest gender gaps in these aspects of travel. This is consistent with their high incidence of female part time work, social norms that encourage 'helicopter parenting', and relatively low levels of social trust mitigating against children travelling unsupervised (Table 1). Particularly in these countries, most travel with and for children coincided with the beginning and end of standard school hours, reflecting that many Anglo mothers' fit their work hours within the temporal bounds of their children's daily schedules. Policy initiatives including more flexible school schedules or expanded after-school care might ameliorate this constraint on women's employment. It is also worth noting that in contrast to the widest gender gap in travel purpose and company, the gender gap in travel mode was the smallest in the UK and absent in Australia. Australia also has high overall car usage and car ownership, which is likely due to infrastructure and transport policies that generate greater reliance on private vehicles in Australia than in the European countries (Mees et al., 2007). However, findings in both Anglo countries indicate that overall equity in car use does not mean greater equity in household responsibilities (Schwanen, 2011).

Gender differences by travel purpose and company were smallest in Finland, a non-familialistic social democratic welfare state. Its country profile suggests it has the most permissive parenting norms, the highest levels of social trust and the most gender-equal work-family arrangements (Table 1). Our results suggest that in combination these factors lessen time devoted to

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child-serving travel and minimize gendered mobility gaps. Gender differences in mode of travel were widest in familialistic Spain, which has the most gender-conservative attitude to non-parental childcare, lowest level of social trust, widest income disparity and the largest percentage of male breadwinner families (Table 1). That Spanish women were much less likely than men to travel by car, and conversely much more likely to use 'other' travel modes including walking, suggests many keep close to home in that environment.

These results suggest gendered travel cannot be fully understood without reference to both institional context and to family life within it. Yet prior transport literature has provided little detail of the consequences of linked lives on daily travel patterns, notwithstanding that the time demands on each partner in couple families shape not only their own but also their spouses' mobility options. Thus, at the household level, we found as expected that relative shares of child-related travel were influenced both by respondents' and their spouses' work hours and commuting times. More surprisingly, the inter-spousal influence of *women's* commuting was strongest, inconsistent with prior research showing that men's work hours and conditions have more influence on women than vice versa (Bianchi & Milkie, 2010; Offer, 2014). This was particularly so in Australia, and the result may be because it is more unusual for fathers than mothers to have a spouse who commutes, especially for a substantial time each day, such that the associated increase in child-related travel makes their participation quite different from that of other fathers.

It is notable, however, that gender shares of child-related travel were particularly unequal in the UK, where men travel longest for work, suggesting gender gaps can be further exacerbated by distant separation of work and home (Titheridge & Hall, 2006). Indeed, the UK was a partial exception to the finding above that daily travel time budgets are generally similar, in that UK men's commuting time was substantially higher than both men's elsewhere and their female compatriots'. This suggests that location-specific factors, such as housing located far from work, as is increasingly the case in parts of England (Titheridge & Hall, 2006), can over-ride the historical tendency for daily travel time budgets to be limited to '70 minutes plus or minus 10' (Ahmed & Stopher, 2014). It further suggests that while the broad social and cultural resemblance of the two Anglo countries engenders some similarity in gendered mobility patterns, particular characteristics of urban and transport planning are also influential. Specifically, the findings imply that long commutes are inimical to gender equality, as has been previously found to be the case for long work hours (Goldin, 2014).

Interestingly, other than in the UK, how travel with and for children is shared in relative terms within households was similar in all the other countries. This was notwithstanding that Finnish households had lower levels of participation in this activity, perhaps because more children travel independently of their parents because schools are closer to home and/or public transport is more child-friendly. It also likely again reflects the high levels of social trust and more permissive parenting norms in that country (Doepke & Zilibotti, 2017). However, the lower overall burden of child-related travel in Finland did not mean that it was *shared* more equally between mothers and fathers than the higher amounts performed in Australia and Spain. This suggests that contextual factors which lower time demands upon families do not necessarily engender more spousal equality in relative terms. That within-household disparities persist in a non-familialistic country context widely regarded as 'women-friendly' (Arts & Gelissen, 2010) underlines the stubbornness of gender norms that assign responsibility for household and family care to women (Ferree, 2010; West & Zimmerman, 2009). This implies both that improving public opportunities for women is insufficient

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to ensure equity in the private sphere, and that to eradicate gender mobility differences, transport policies would need to be supplemented with measures addressing roles and status in the family.

The findings in this paper are subject to a number of limitations. It analyses travel time at the country level and not at the level of specific cities and suburbs. We would have liked direct information on children's travel, but the national time-use surveys we rely on do not supply this, and we rely on parents' reports of time devoted to travel with and for children. Also, some potentially pertinent household characteristics, including the number of cars in a household, and the degree of urbanization of the area in which the household is located, were not available across all time-use surveys.We therefore could not control for these factors. Future research could better probe intra-household decision-making and parents' motivations regarding child-related travel by incorporating qualitative methods, or by future national data collections including more contextual questions in time-diaries.

Notwithstanding these drawbacks, we have shown that the extent of gender gaps in the purpose, mode and company of daily travel varies cross-nationally, shaped by multiple factors including national work-family patterns, parenting norms and levels of social trust, as well as the practical constraints arising from transport options and average commuting times. Our enquiry also looked within families nested within country context. It showed that relative gaps in parents' travel with and for children were universal, attesting to the ubiquity of gendered mobility constraints in households with children, and confirming that, cross-nationally, the family remains a primary site for the perpetuation of gendered behaviours and inequities.

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