

The impact of parents' fear of strangers and perceptions of informal social control on children's independent mobility

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Abstract

Declines in children's independent mobility are commonly attributed to parents' fear of strangers, yet few empirical studies have investigated this relationship. We examined: (1) the impact of parents' fear of strangers on children's independent mobility; and (2) whether informal social control (i.e., parents' confidence that other residents would look out for local children) mitigated any association. Gender stratified logistic regression models tested these associations for 10-12 year-olds and their parents (n=1231) in Perth, Australia. For girls, parental fear of strangers was associated with lower odds of independent mobility (OR=0.71, $p=0.002$), and informal social control and other social and built environment variables had little attenuating influence. This pattern was consistent for boys; however odds ratios were lower and statistical significance weaker. Initiatives that target parental fears combined with interventions that normalise children's walking may help increase independent mobility.

Introduction

Children's freedom to move about and play within their local neighbourhoods brings with it a raft of developmental, health and social benefits (Badland and Oliver, 2012). Numerous studies suggest that allowing children the freedom to roam the neighbourhood without adult supervision (i.e., independent mobility) can increase physical activity levels (Davis and Jones, 1996; Guldborg, 2009; Page et al., 2009; Page et al., 2010; Schoeppe et al., 2013), facilitate the development of motor skills and cognitive development (Kytta, 2004; Rissotto and Tonucci, 2002), help children acquire a sense of identity (Hillman et al., 1990; Malone, 2007; Rissotto and Giuliana, 2006), and enhance spatial awareness (Herman et al., 1987; Joshi et al., 1999; O'Brien et al., 2000; Rissotto and Tonucci, 2002). Moreover, independent mobility can augment social interactions with local children and adults (Prezza and Pacilli, 2007; Spilsbury, 2005; Tranter and Whitelegg, 1994), and help build confidence, self-esteem and social skills (Hillman et al., 1990; Joshi et al., 1999).

Despite the benefits of independent mobility for child health and wellbeing, it is widely acknowledged that independent mobility has declined over recent generations in many developed countries (Fyhri et al., 2011; McMillan, 2005, 2007; Pooley et al., 2005). For instance, 80% of 7-8 year-old children in the UK were permitted to travel home from school on their own in 1971 compared with just 9% in 1990 (Hillman et al., 1990) and 6% in 2010 (Shaw et al., 2013). Similar trends have been observed in both the US (Dellinger, 2002; McDonald et al., 2011) and Australia (Harten and Olds, 2004; Merom et al., 2006; Salmon et al., 2005; van der Ploeg et al., 2008). Paired with increases in private vehicle use (Hillman et al., 1990; Mackett, 2002), many children in developed countries now primarily experience their neighbourhood through a car window, as parents habitually chauffeur them to and from school and other destinations (Carver et al., 2013; Fyhri et al., 2011; McKee et al., 2007; Tudor-Locke, 2001; van der Ploeg et al., 2008).

Declines in children's independent mobility are commonly attributed to heightened parental concerns about neighbourhood safety, both in terms of traffic and strangers (Carver et al., 2008b).

Traffic accidents are the leading cause of death from injury for children in developed countries (UNICEF, 2001), validating parental concerns about traffic safety. In contrast, the threats posed by strangers are largely grounded in fear. Child abductions by the stereotypical stranger are 'extraordinarily rare' (Shutt et al., 2004, p.132), and where abductions do occur, they are more likely to be at the hands of a family member (e.g., estranged parent) or acquaintance (Finkelhor and Ormrod, 2000; Shutt et al., 2004). Nonetheless, news of child abductions are broadcast by the media globally and prolifically, and parents have become overly attuned to the extreme examples of child abduction and harm (Miller et al., 2008; Shutt et al., 2004).

While a broad range of factors might influence the relationship between parental fear and children's independent mobility, it is important to consider the role of the neighbourhood setting. Evidence suggests that the influence of perceptions, social norms and the neighbourhood environment are somewhat intertwined. For example, social norms about what constitutes 'good parenting' have evolved to emphasise the constant supervision of children (Furedi, 2008; Lorenc et al., 2008; Valentine, 1997), where chauffeuring children is considered socially responsible, primarily because it ensures their safety (Lorenc et al., 2008; Sutterby, 2009). One implication of these changes is that they may contribute to less natural surveillance, or 'eyes on the street' (Jacobs, 1961), with fewer people walking along local streets, or monitoring the streets from their homes. This in turn can both aggravate safety concerns (Foster et al., 2010) and impact children's independent mobility, as parents shy away from the idea of children being out and about on deserted streets (Mullens 2003). Indeed, there is some evidence to suggest that natural surveillance may factor in children's active transport (McMillan, 2007; Villanueva, 2011). For example, in school catchments where more houses had windows facing the street; younger children were more likely to walk to school (McMillan, 2007).

Also related to the broader neighbourhood context is the perceived erosion of social connectedness and trust in many communities (Putnam, 1995) that has mirrored declines in children's independent

mobility in recent decades. Studies indicate that social constructs, such as trust and social capital, help protect against both real and perceived insecurity (De Jesus et al., 2010; Kawachi et al., 1999; Mullan, 2003; Riger et al., 1981), and reduce the negative impacts of fear of crime (Hale, 1996). Notably, parents with larger social networks and greater social integration into their local community tend to allow their children more independent mobility (Johansson, 2006; Prezza et al., 2005; Prezza and Pacilli, 2007). Indeed, the concept of collective efficacy - a form of social capital that reflects the belief that other residents will intervene for the community's benefit - may be particularly relevant. Collective efficacy combines 'informal social control' and 'social cohesion and trust' (Sampson et al., 1997). Measures of informal social control typically focus on mechanisms that ensure the maintenance of social order in order to achieve a desired community goal, such as to live in a safe, orderly environment (e.g., a willingness to assist or reprimand children) (Sampson et al., 1997). However, residents' willingness to intervene is largely contingent on community levels of trust and solidarity (Sampson et al., 1997). Collective efficacy has been associated with a range of positive outcomes, including less violence (Sampson et al., 2002; Sampson et al., 1997), less fear of crime (Foster et al., 2010) and better health outcomes (Ahern and Galea, 2011; Cohen et al., 2006). Furthermore, higher levels of independent mobility exist where there is a culture of adults 'guiding' the behaviour of children (Hillman et al., 1990). Furedi (2008) refers to this process as 'adult solidarity', whereby adults (often strangers), take collective responsibility for children, reprimanding or aiding them as required. He suggests this practice is increasingly rare in today's societies, with adults less willing to intervene for fear that their actions will be misconstrued, and parents equally convinced that others should not interfere, as they 'regard other people, not as allies, but as potential predators of their young ones' (Furedi, 2008, p.30).

Despite pervasive parental fears about strangers (Glassner, 2009), empirical studies investigating the relationship between stranger danger and children's physical activity (including active transport to school) have produced mixed findings (Carver et al., 2005; Carver et al., 2008a; Ding et al., 2012; Molnar, 2004; Timperio et al., 2006; Timperio et al., 2004). Moreover, comparatively few studies

have specifically examined the impact of parents' concerns about stranger danger and children's independent mobility to a variety of other destinations, outside the trip to school (Hillman et al., 1990; Mammen et al., 2012; Santos et al., 2013; Shaw et al., 2013). Children's opportunities to travel independently to other destinations may be more susceptible to parents' fears, as these trips often occur outside peak school travel times when there can be less natural surveillance from other children and adults commuting to school and work (Foster et al., 2011). Furthermore, to our knowledge, no studies have examined the interplay between parental fear of strangers, collective efficacy and children's independent mobility.

The aim of this study was to examine the impact of parental fear of strangers and informal social control (i.e., the dimension of collective efficacy focusing on parents' confidence that local adults will take collective responsibility for children) on children's independent mobility within the local neighbourhood. We hypothesised that: (1) more fearful parents would prevent their child from engaging in any independent mobility; (2) this association would be stronger for girls than for boys; and (3) higher parental perceptions of informal social control would lessen the impact of fear on their child's independent mobility. We examined whether associations between parents fear of stranger danger, informal social control and independent mobility persisted after accounting for other individual, social and built environment factors, that have been documented elsewhere as important correlates of independent mobility for this study's sample (Villanueva et al., 2013).

Methods

This study was part of the TRavel Environment and Kids (TREK) project, a cross-sectional study exploring the impact of the built environment on 10-12 year-old children's active transport to school. This age range was selected because, from the age of 10, most children have acquired the cognitive and perceptual abilities to negotiate complex traffic situations (Joshi et al., 1999) and the capability to assess and deal with other challenges that might arise (Alparone and Pacilli, 2012; Prezza

et al., 2005), and are therefore more likely to have *some* independence to explore the neighbourhood (Hillman et al., 1990; Jago et al., 2009).

The TREK study design is detailed elsewhere (Giles-Corti et al., 2011). Briefly, in 2007, students and parents were randomly sampled from government primary schools in low and high walkable school areas across metropolitan Perth, Western Australia. A school-specific walkability index was developed using Geographic Information Systems (GIS) software, and was used to select schools (Giles-Corti et al., 2011). Schools were ranked by their walkability, with the most and the least walkable schools from within three area-level socio-economic strata (i.e., low, medium, high) invited to participate in a survey (n=36). For each participating school (n=25; 69.4% response rate), one class from each 5, 6 and 7 year group in each school was randomly selected to participate until at least 30 children were recruited from each year (n=2617). Overall, 1480 children (56.5% response rate) and 1245 parents (89.6% response rate) consented and completed questionnaires (the final sample size was 1231 after eliminating participants with missing data on key variables). Ethics approval was obtained from The University of Western Australia's Human Research Ethics Committee.

Data collection

Between July–December 2007, children completed questionnaires in a 75-minute classroom session, and parents completed a questionnaire at home. All items had acceptable reliability (Wood et al., 2010). Principal components analysis (PCA) with varimax or oblimin rotation, depending on how correlated the items were (i.e., component correlation matrix ≤ 0.3 =varimax, >0.3 = oblimin (Pallant, 2007)) was used to reduce questionnaire items into common components.

Independent mobility was based on an established measure, developed and tested for the TREK study (Villanueva et al., 2012; Villanueva et al., 2013) that combined both child and parent report. Children provided a measure of their actual behaviour by indicating whether they walked or cycled to 15 activities or destinations in their neighbourhood in the week prior to the questionnaire (no,

sometimes, yes). Destinations or activities included: (1) a park, playground or playing field; (2) own friend's house; (3) family/family friend's house; (4) local shop; (5) other shops; (6) post-box; (7) public library; (8) cinema; (9) Sunday school/church; (10) playing a team sport; (11) swimming; (12) going to a club or youth group; (13) watching sport; (14) music lessons; and (15) catching a bus. Parents indicated whether their child was allowed to participate or visit each of these without an adult (no, yes). An independent mobility score (Villanueva et al., 2012) was computed by summing the activities/destinations that children travelled to *and* were allowed to visit independently. Possible scores could range from 0 (i.e., no independent mobility) to 15. However, due to limited variability in the children who had *some* independent mobility, scores were dichotomised into: (1) children with *no* independent mobility; and (2) children with *some* independent mobility (Villanueva et al., 2012).

Parental fear of strangers was created from three parent-report items, 'how fearful are you that if your child walked or cycled in your neighbourhood without an adult he or she may: (1) be approached on the street by a stranger; (2) be taken by a stranger; and (3) be hurt by a stranger (Cronbach's $\alpha=0.93$). Response options were provided on a five-point likert scale (not at all fearful to extremely fearful), and were averaged to create the continuous subscale.

Informal social control was created from four parent-report items assessing the likelihood that people in their neighbourhood would: (1) intervene if they noticed a child being bullied; (2) intervene if children were showing disrespect to an adult; (3) assist if they noticed a child in danger when crossing the road; and (4) intervene if they noticed a stranger approaching a child in the street (Cronbach's $\alpha=0.88$). Response options were provided on a five-point likert scale (very unlikely to very likely) and averaged to create the continuous subscale.

Adjustment variables

Associations between fear of strangers, informal social control and independent mobility progressively controlled for a range of individual, social and built environment factors that have been previously been associated with independent mobility in this study sample (Villanueva et al., 2012; Villanueva et al., 2013).

Individual factors: included socio-economic status of the school neighbourhood (low, medium, high), maternal education (less than secondary; secondary/trade/diploma; bachelor degree or higher) and child age (10, 11, 12 years). Indicators of socio-economic status are commonly controlled for in children's mobility studies (Fyhri and Hjorthol, 2009; Johansson, 2006; Page et al., 2010), and numerous studies have established that independent mobility increases with age (Brown et al., 2008; Carver et al., 2010; Fyhri and Hjorthol, 2009; Johansson, 2006; Joshi et al., 1999; Mackett et al., 2007; Mitchell et al., 2007; O'Brien et al., 2000; Prezza et al., 2001; Zwerts et al., 2010). We also controlled for parent gender, as women are typically more fearful than men (Hale, 1996) and this might impact parental licenses, and whether the child was sick in the week prior to the survey (no, yes).

In addition, a subscale assessing the child's confidence in travelling independently was created by averaging two items: (1) I am sure that I could walk to the shop closest to my home without an adult present; and (2) I am sure that I could ride a bike to the shop closest to my home without an adult present (Cronbach's $\alpha=0.86$). Parents also reported their confidence in their child's ability to actively travel to the closest shop (no, yes). Parent confidence has been associated with 2.5 times higher odds of independent mobility, and child confidence associated with 30% greater odds of independent mobility for both boys and girls in this sample (Villanueva et al., 2013).

Social environment factors: Parents were also asked four items relating to 'neighbourhood friendliness': (1) I often see adults walking in the neighbourhood; (2) I often see children walking in

the neighbourhood; (3) our neighbourhood is a nice place to walk around; (4) our neighbourhood is friendly (Cronbach's $\alpha=0.75$). Response options ranged from strongly disagree to strongly agree. Items were averaged to create the subscale. This scale was previously associated with higher odds of independent mobility for boys in this sample (OR=1.81, CI=1.07-3.04) (Villanueva et al., 2013). Children were also asked if they perceived lots of children their own age to hang out with in their area (no, yes). Others have highlighted the importance of local friends to children's physical activity (Hume et al., 2005) and active transport (Carver et al., 2005), therefore we controlled for this in our analyses.

Built environment factors: Neighbourhood walkability was assessed by the school-specific walkability index developed using GIS. The index summed two measures: (1) network connectivity assessed by a 'pedshed' measure (i.e., the walkable service area based on the formal pedestrian network up to 2km in any direction from the school, divided by the area within a 2km radius of the school (Chin et al., 2008)); and (2) road volume exposure (i.e., road function hierarchy detailing average vehicles/day, within 2km of each school using the road and formal pedestrian networks) (Giles-Corti et al., 2011). School-specific walkability was used as a proxy for the walkability of the child's neighbourhood. This school-specific walkability index has been previously associated with higher odds of independent mobility for girls in this sample (OR=2.32, CI=1.17-4.59)(Villanueva et al., 2013).

Finally, parental perceptions of traffic were derived from the questionnaire. Parents were asked about the location of their home, and responses were dichotomised into the variable 'home on a busy road' (no, yes). Consistent with other studies (Carver et al., 2008b; Fyhri and Hjorthol, 2009; Giles-Corti et al., 2011; Timperio et al., 2004; Zwerts et al., 2010), living in a higher traffic environment has been associated with lower odds of being independently mobile for both girls and boys in this sample (boys: OR=0.48, CI=0.24-0.96; girls OR=0.36, CI=0.15-0.87)(Villanueva et al., 2013).

Statistical analyses

Analysis was undertaken using SPSS v21 and Stata/IC 11.0. Unadjusted bivariate associations between independent factors and independent mobility were explored using independent t-tests, cross-tabulations and logistic regression models (data met the necessary assumptions for logistic regression). Logistic regression models were structured to examine the associations of interest (i.e., fear of stranger danger, informal social control and independent mobility), with further adjustment variables grouped in accordance with a social-ecological model (Stokols, 1992) and added in a proximal to distal manner similar to other work focused on fear and walking behaviour (Foster et al., 2013). Independent factors were sequentially entered to examine the association between parental fear and independent mobility (Model 1), with progressive adjustment for informal social control (Model 2), other social environment factors (i.e., parent neighbourhood friendliness scale, child perception there are lots of children their own age to hang out with in their area) (Model 3) and built environment factors (i.e., objectively measured neighbourhood walkability, parent perception of traffic) (Model 4). All multivariable models adjusted for individual factors (i.e., child age, parent gender, maternal education, school socio-economic status, whether the child was sick in previous week, parent confidence in child's ability to travel independently, and child confidence in their ability to travel independently). Robust standard errors for parameter estimates were obtained using the 'cluster by (school)' command (in Stata), which allows for intra-school correlation so observations are independent across schools. Due to well-documented gender variation in independent mobility (Mackett et al., 2007; O'Brien et al., 2000), analyses were stratified by gender.

Results

Overall, 70.6% of children had some independent mobility, and more boys (74.4%) than girls (67.1%) reported some independent mobility. There were few differences in boys' and girls' demographics (Table 1), although more boys (25.9%) than girls (19.7%) indicated that they were sick in the week prior to the survey ($p < 0.05$).

[Insert table 1 about here]

Table 2 shows the unadjusted bivariate associations between independent mobility and parental fear of strangers, informal social control and other social and built environment adjustment variables. Although not reported in the table, parents of children with some independent mobility had less fear of strangers than parents of those with no independent mobility (i.e., parents fear of strangers (mean) for boys with independent mobility=3.14 versus without=3.50; for girls with independent mobility=3.30 versus without=3.72). Moreover, parents of independently mobile children perceived more informal social control in their neighbourhood compared with parents of children with no independent mobility (i.e., perceptions of informal social control (mean) for boys with independent mobility=3.53 versus without=3.33; for girls with independent mobility=3.60 versus without=3.39). Prior to adjustment for individual factors, parental fear of strangers was significantly ($p < 0.05$) associated with less independent mobility among boys and girls (boys OR 0.66; girls OR 0.65), and parents of independently mobile children also perceived more informal social control in their neighbourhood (boys OR 1.31; girls OR 1.33).

[Insert table 2 about here]

The multivariable associations between parental fear, informal social control and girls' independent mobility are presented in Table 3. After controlling for individual factors, parental fear of strangers was associated with lower odds of girls' independent mobility (Model 1: OR=0.71, 95% CI=0.58-0.88, $p=0.002$). That is, for every increase in parents fear of strangers (range 1-5), the odds of having

some independent mobility reduced by 29%. Notably, the inclusion of informal social control had little attenuating influence on this association (Model 2: OR=0.73, 95% CI=0.59-0.91, $p=0.005$), nor did the addition of other social and built environment adjustment variables (Model 4: OR=0.76, 95% CI=0.60-0.96, $p=0.021$). However, parents perceptions of informal social control were independently associated with greater odds of girls' being independent mobile (Model 2: OR=1.29, 95% CI=1.04-1.60, $p=0.022$) and this association also remained relatively constant across the models (Model 4: OR=1.23, 95% CI=1.00-1.52, $p=0.053$).

This pattern was somewhat consistent for boys, however odds ratios were lower and statistical significance weaker (Table 4). After controlling for individual factors, parental fear was associated with lower odds of boys' being independently mobile (Model 1: OR=0.74, 95% CI=0.57-0.94, $p=0.016$), and the addition of informal social control had little attenuating influence on this association (Model 2: OR=0.76, 95% CI=0.60-0.96, $p=0.024$). With further adjustment (Models 3 and 4), the association between parental fear and independent mobility remained somewhat stable, although statistical significance attenuated (Model 4: OR=0.79, CI=0.62-1.01, $p=0.061$). In contrast to girls, informal social control had a weak association with boys' independent mobility (Model 2: OR=1.25, 95% CI=0.99-1.57, $p=0.058$), which further attenuated after adjustment for the social and built environment variables (Models 3 and 4).

[Insert tables 3 and 4 about here]

Discussion

This study appears among the first to empirically examine the association between parental fear of strangers, informal social control and children's independent mobility, whilst also accounting for both established and potential individual, social and built environment influences on independent mobility (Villanueva et al., 2013). As hypothesised, we observed that children with parents who

were more fearful about strangers had limited independent mobility, and this association was stronger for girls than boys. Parents may feel that boys are more capable of dealing with strangers, and accordingly grant them more independence, whereas in our sample, restrictions on girls' mobility appeared somewhat more rigid (i.e., there was almost no attenuation in the association despite the addition of numerous control variables).

Consistent with other studies (Carver et al., 2008a; Ding et al., 2012; Hillman et al., 1990), we found parents fear of strangers was higher for girls than boys. While our study focused on 'fear', this may nonetheless have some grounding in actual risk. For example, a US study set in South Carolina reported that, in the rare instances of child abduction by a non-family member, girls were more likely to be victimised than boys, and this gender skew was consistent for both acquaintance and stranger abductions (Miller et al., 2008). Regardless, our study suggests that concerns about strangers presents a major barrier to girls independent mobility and factors that distinguish parents who, despite their own fears, still allow their child independence, are worthy of further exploration.

While some studies have found no gender difference in independent mobility, (Johansson, 2003; Joshi et al., 1999), or suggest that the gender gap is narrowing (Shaw et al., 2013), numerous others highlight that boys have more independent mobility than girls (Brown et al., 2008; Carver et al., 2013; Fyhri and Hjorthol, 2009; Johansson, 2006; Joshi et al., 1999; Mackett et al., 2007; O'Brien et al., 2000; Page et al., 2009; Prezza et al., 2010; Prezza et al., 2001). The apparent gender difference may stem from early childhood, where boys are encouraged to be independent and take risks, and girls taught to be cautious (Morrongiello and Dawber, 1999). However, these patterns may be more nuanced. Hillman et al. (1990) found that girls had less freedom because of stranger danger and fear of molestation, but were seen as more sensible, responsible and able to manage their own safety. In contrast, boys were considered to be 'risk takers' and could easily be led by their peers into making irrational decisions. It is possible that inconsistencies in the evidence linking gender to independent mobility may be due to, for example, interactions between age, gender and safety concerns. Indeed,

Spilsbury (2005) cautions against making general assumptions based on gender (or age) alone, with research showing that violent neighbourhoods coupled with fear of female vulnerability led to a decrease (instead of an increase) in girls' mobility as they aged (Spilsbury, 2005).

We also hypothesised that parent perceptions of informal social control, in the sense that the broader community looks out for children, would lessen the impact of fear of strangers on independent mobility; however this was not supported by our analyses. This may reflect how entrenched these fears are - encouraged by parents insecurities (Furedi, 2008) and amplified by media coverage of horrific events involving children (Glassner, 2009; Tulloch, 2004). Indeed, the fact that informal social control did not mitigate the impact of fear of strangers on independent mobility is perhaps not surprising, given growing concerns and social commentary about the rising prominence of an 'over-protective' risk-averse parenting style (Valentine, 1997; Valentine and McKendrick, 1997), as reflected in the popular use of terms such as *helicopter parenting* and *bubble-wrapped children* (Martin and Wood, in press). Although well intentioned, this almost zero tolerance approach to risk unintentionally but adversely inhibits children's social, emotional and physical development (Valentine, 1997; Valentine and McKendrick, 1997). In addition to the repercussions for children's independent mobility, concerns have also been raised that too much emphasis on stranger danger can lead to 'mean world syndrome', where children raised to view all adults with suspicion may subsequently become disengaged from civic life as adults (Glassner, 2009).

Our measure of informal social control is akin to notions of 'adult solidarity', where the community takes collective responsibility for 'guiding' local children (Furedi, 2008). Although informal social control had little attenuating influence on the association between parental fear and independent mobility, it was positively associated with girls' independent mobility (albeit marginally significant at $p=0.053$). Thus, positive community perceptions of informal social control may be an important precursor to parents granting their children (particularly girls) greater freedoms. However, given observed societal declines in this behaviour (Furedi, 2008), it is also plausible that the level of

informal social control perceived by parents is not sufficient to alleviate other drivers of their fear. For example, in our study, just 4% of parents thought it was 'very likely' that people in the neighbourhood would intervene for the benefit of local children in *all* of the proposed scenarios. The possibility of a threshold effect for informal social control or other measures of community solidarity merits further investigation. Further, studies similar to Hillman et al. (1990) that compare these constructs between countries (i.e., with stronger and weaker cultures of adults' watching out for local children) may prove illuminating.

Our findings are comparable with a study examining fear of crime and adults walking behaviours, perhaps because adults' fears are at the core of both studies. As with fear of strangers, fear of crime is not generally comparable with the actual incidence of crime (Hale, 1996), but is an emotional response (Ferraro, 1995) influenced by numerous factors including media reports, victimisation, perceived vulnerability to crime, and environmental cues, such as physical incivilities and neighbourhood upkeep (Hale, 1996). Foster et al. (2013) found a significant negative association between fear of crime and walking for transport, which remained constant after controlling for previous victimisation, and social and built environment factors (including collective efficacy). Furthermore, effect sizes were similar to the current study, suggesting adults' altruistic fears (i.e., fear for others) and their fears for themselves may have an equivalent impact on active transport, regardless of whether it is their own or their child's. The similarities of these studies is somewhat unexpected, given the parent-child bond, in combination with the perceived vulnerability of their child, 'suggests that parents may undertake more extreme or determined measures to protect their offspring than they would to protect themselves' (Warr and Ellison, 2000, p.522). Future research might examine these themes in the one sample, and explore whether fearful adults restrict both their own physical activities and those of their children.

Parental fear of strangers remained negatively associated with independent mobility, particularly among girls, even after accounting for other established correlates of children's independent

mobility (Villanueva et al., 2012). In light of this, reducing the impact of parental fear of strangers on independent mobility may prove challenging and requires a multi-sectored approach. For instance, it is possible that community initiatives thought to minimise fear of crime may also have some impact on parental fear of strangers, as both fear of crime and parental concern for children may be symptomatic of a broader social unease (Lorenc et al., 2012; Prezza et al., 2005). Jackson (2006, p.261) suggests, fear 'may operate as a 'sponge', absorbing all sorts of anxieties about related issues of deteriorating moral fabric, from family to community to society' (Jackson, 2006). Similarly, parental fear of strangers may be indicative of a broader trend where parents are apprehensive about the world in which their children will grow up (Furedi, 2008; Zubrick et al., 2010). Consistent with this perspective, Prezza et al. (2005) propose that adults fear for their own, and their fear for their child's safety, may be related, and thus influenced by similar factors (Prezza et al., 2005). The literature suggests various strategies might help alleviate fear of crime, including eliminating negative visual cues (e.g., physical and social incivilities, poor upkeep) (Hale, 1996; Scarborough et al., 2010), increasing natural surveillance (e.g., improved lighting, neighbourhood designs that promote walking, buildings with 'soft edges' that encourage residents and proprietors to use and monitor the streets) (Foster et al., 2010, 2011; Jacobs, 1961), and improving social cohesion and networks (e.g., encouraging local clubs and community activities)(Ferguson, 2007; Scarborough et al., 2010). Given there are also links between these attributes and independent mobility (Carver et al., 2013; Johansson, 2006; McMillan, 2007; Prezza et al., 2005; Prezza and Pacilli, 2007; Villanueva, 2011), such strategies may help by targeting both parental fear and independent mobility. However, to better appreciate the impact of fear reduction strategies on parents fear of strangers, there needs to be a greater understanding of the social and built environment factors that alleviate or aggravate parents fears, as there is scant information on the factors that shape parental fear (Carver et al., 2008b; McMillan, 2007).

Others have suggested that initiatives promoting the health and social benefits of independent mobility, together with approaches that manage parental concerns are needed (Jago et al., 2009).

Strategies that help parents recognise fear and its unintended consequences are also advocated, but there is very little guidance from the literature about how to go about this effectively (Zubrick et al., 2010). Given the powerful contribution of media and collective societal fears to diminished child freedoms, one option may be to harness social marketing strategies to challenge social norms and educate parents and their children that the benefits of independent mobility may outweigh the inflated risks publicised in the media. However, such initiatives might be more effective if complemented by the supportive environmental cues and measures described above, as ultimately it may require a confluence of strategies to create a tipping point to alleviate parental fears and increase independent mobility.

This study has several limitations. First, our study focused on one specific aspect of safety - parents' fear of stranger danger. While we identified an independent association between this dimension of safety and independent mobility, we did not examine or account for other dimensions of perceived safety (e.g., concerns about traffic), which have documented associations with children's activity (Carver et al., 2008b). Second, we examined informal social control, which is one dimension of an established 'collective efficacy' construct. Collective efficacy commonly incorporates a second scale, 'social cohesion and trust', as residents are generally more willing to intervene if their community is trusting and open rather than fearful (Sampson et al., 1997). This scale was not available to the research team, however, had we been able to apply the full collective efficacy measure, we may have seen greater attenuation in the association between parental fear of strangers and independent mobility. Third, the cross-sectional study design means causality cannot be determined. Longitudinal studies that take a family approach and track parent and child fears with children's independent mobility over time are needed to identify causal relationships. Fourth, the walkability index of the school neighbourhood was used as a proxy for the child's neighbourhood walkability. While the majority of children's homes were located within 2km of their school (>80%), measurement error may have been introduced, particularly for those living on the edge of the school-neighbourhood boundary. Finally, we examined the association between parents' fear of

strangers and whether children were permitted *any* independent mobility. This binary outcome was necessitated by the limited variability in independent mobility (i.e., most participants had no or limited independent mobility, and very few had high levels of independent mobility).

The study also has a number of strengths. The fear of strangers scale comprised items that assessed parents' fears that their child might be approached, hurt or taken by a stranger. This scale adheres to recommendations that fear of crime scales refer explicitly to fear, specifically mention crime and are not hypothetical (Ferraro and LaGrange, 1987). Studies assessing the impact of parental fear of strangers using more specific scales have identified parental fear as a deterrent to children's independent mobility (Hillman et al., 1990; Mammen et al., 2012). In contrast, studies using composite safety scales (i.e., that combine crime perceptions, bullies, strangers and/or traffic safety) (Santos et al., 2013; Villanueva et al., 2013) or generic safety items (Fyhri and Hjorthol, 2009) have found little evidence of an association with independent mobility. The application of specific safety scales (i.e., focusing on fear of strangers, or traffic safety, or bullies) may be preferable to composite scales that pool a range of threats, as we know which dimension of safety is at the core of the problem, and subsequent interventions may be more targeted (Foster and Giles-Corti, 2008). Other strengths include the study design, in which participants were drawn from low, middle and high SES schools, and the adjustment for other perceived and objective correlates of independent mobility.

Conclusion

Parents undeniably face a difficult task, balancing their fears for their child's safety and social norms about what constitutes good parenting with an awareness of their child's growing need for autonomy (Tulloch, 2004; Valentine, 1997). This study suggests that the balance currently leans on the side of caution. Parental fear of strangers was associated with reduced odds of children having any independent mobility, irrespective of whether the social and built environment was supportive. Indeed, contrary to our hypothesis, the belief that other neighbours would look out for local children did little to attenuate the impact of parental fear on independent mobility. Given our findings,

interventions that reduce the impact of parental fear on independent mobility may prove challenging. Greater understanding of what aggravates or alleviates parental fears of strangers is integral to the development of effective interventions aimed at increasing children's independent mobility.

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References

- Ahern, J., Galea, S., 2011. Collective Efficacy and Major Depression in Urban Neighborhoods. *American journal of epidemiology* 173, 1453-1462.
- Alparone, F.R., Pacilli, M.G., 2012. On children's independent mobility: the interplay of demographic, environmental, and psychosocial factors. *Children's Geographies* 10, 109-122.
- Badland, H., Oliver, M., 2012. Making the case and understanding how the physical and social environments impact on the behaviour, in: Turunen, E., Koskinen, A. (Eds.), *Urbanization and the Global Environment*. NOVA Publishers, New York, pp. 51-79.
- Brown, B., Mackett, R., Gong, Y., Kitazawa, K., Paskins, J., 2008. Gender differences in children's pathways to independent mobility. *Children's Geographies* 6, 385-401.
- Carver, A., Salmon, J., Campbell, K., Baur, L., Garnett, S., Crawford, D., 2005. How do perceptions of local neighborhood relate to adolescents' walking and cycling? *American journal of health promotion* 20, 139-147.
- Carver, A., Timperio, A., Crawford, D., 2008a. Perceptions of neighbourhood safety and physical activity among youth: The CLAN study. *Journal of Physical Activity and Health* 5, 430-444.
- Carver, A., Timperio, A., Crawford, D., 2008b. Playing it safe: The influence of neighbourhood safety on children's physical activity: a review. *Health & Place* 14, 217-227.
- Carver, A., Timperio, A., Crawford, D., 2013. Parental chauffeurs: what drives their transport choice? *Journal of Transport Geography* 26, 72-77.
- Carver, A., Timperio, A., Hesketh, K., Crawford, D., 2010. Are children and adolescents less active if parents restrict their physical activity and active transport due to perceived risk? *Social Science & Medicine* 70, 1799-1805.
- Chin, G., Van Niel, K., Giles-Corti, B., Knuiman, M., 2008. Accessibility and connectivity in physical activity studies: The impact of missing pedestrian data. *Preventive Medicine* 46, 41-45.
- Cohen, D.A., Finch, B.K., Bower, A., Sastry, N., 2006. Collective efficacy and obesity: the potential influence of social factors on health. *Social Science & Medicine* 62, 769-778.
- Davis, A., Jones, L., 1996. Children in the urban environment: an issue for the new public health agenda. *Health & Place* 2, 107-113.
- De Jesus, M., Puleo, E., Shelton, R.C., Emmons, K.M., 2010. Associations between perceived social environment and neighborhood safety: Health implications. *Health & Place* 16, 1007-1013.
- Dellinger, A.M., 2002. From the Centers for Disease Control and Prevention. Barriers to children walking and biking to school--United States, 1999. *Journal of the American Medical Association* 288, 1343-1344.
- Ding, D., Bracy, N., Sallis, J., Saelens, B., Norman, G., Harris, S., Durant, N., Rosenberg, D., Kerr, J., 2012. Is fear of strangers related to physical activity among youth? *American journal of health promotion* 26, 189-195.
- Ferguson, K., 2007. Modeling fear of crime in Dallas neighborhoods: a test of social capital theory. *Crime & Delinquency* 53, 322-349.
- Ferraro, K.F., 1995. *Fear of Crime: Interpreting Victimization Risk*. State University of New York Press, New York.
- Ferraro, K.F., LaGrange, R.L., 1987. The measurement of fear of crime. *Sociological Inquiry* 57, 70-101.
- Finkelhor, D., Ormrod, R., 2000. Characteristics of crimes against juveniles, *Juvenile Justice Bulletin*. Office of Juvenile Justice and Delinquency Prevention, US Department of Justice, Washington, DC.
- Foster, S., Giles-Corti, B., 2008. The built environment, neighborhood crime and constrained physical activity: an exploration of inconsistent findings. *Preventive Medicine* 47, 241-251.
- Foster, S., Giles-Corti, B., Knuiman, M., 2010. Neighbourhood design and fear of crime: A social-ecological examination of the correlates of residents' fear in new suburban housing developments. *Health & Place* 16, 1156-1165.

- Foster, S., Giles-Corti, B., Knuiman, M., 2011. Creating safe walkable streetscapes: does house design and upkeep discourage incivilities in suburban neighbourhoods? *Journal of Environmental Psychology* 31, 79-88.
- Foster, S., Giles-Corti, B., Knuiman, M., 2013. Does Fear of Crime Discourage Walkers? A Social-Ecological Exploration of Fear As a Deterrent to Walking. *Environment and Behavior* DOI: 10.1177/0013916512465176.
- Furedi, F., 2008. *Paranoid Parenting: Why ignoring the experts may be best for your child.* Continuum, London.
- Fyhri, A., Hjorthol, R., 2009. Children's independent mobility to school, friends and leisure activities. *Journal of Transport Geography* 17, 377-384.
- Fyhri, A., Hjorthol, R., Mackett, R.L., Fotel, T.N., Kyttä, M., 2011. Children's active travel and independent mobility in four countries: Development, social contributing trends and measures. *Transport Policy* 18, 703-710.
- Giles-Corti, B., Wood, G., Pikora, T., Learnihan, V., Bulsara, M., Van Niel, K., Timperio, A., McCormack, G., Villanueva, K., 2011. School site and the potential to walk to school: The impact of street connectivity and traffic exposure in school neighborhoods. *Health & Place* 17, 545-550.
- Glassner, B., 2009. *The Culture of Fear.* Basic Books, New York.
- Guldborg, H., 2009. *Reclaiming Childhood : Freedom and Play in an Age of Fear.* Routledge, Oxon, UK.
- Hale, C., 1996. Fear of Crime: a review of the literature. *International Review of Victimology* 4, 79-150.
- Harten, N., Olds, T., 2004. Patterns of active transport in 11-12 year old Australian children. *Australian and New Zealand Journal of Public Health* 28, 167-172.
- Herman, J., Heins, J., Cohen, D., 1987. Children's spatial knowledge of their neighborhood environment. *Journal of Applied Developmental Psychology* 8, 1-15.
- Hillman, M., Adams, J., Whitelegg, J., 1990. *One False Move...A study of children's independent mobility.* Policy Studies Institute, London.
- Hume, C., Salmon, J., Ball, K., 2005. Children's perceptions of their home and neighborhood environments, and their association with objectively measured physical activity: a qualitative and quantitative study. *Health Education Research* 20, 1-13.
- Jackson, J., 2006. Introducing Fear of Crime to Risk Research. *Risk Analysis* 26, 253-264.
- Jacobs, J., 1961. *The Death and Life of Great American Cities.* Jonathon Cape, London.
- Jago, R., Thompson, J.L., Page, A.S., Brockman, R., Cartwright, K., Fox, K.R., 2009. Licence to be active: parental concerns and 10–11-year-old children's ability to be independently physically active. *Journal of Public Health* 31, 472-477.
- Johansson, M., 2003. Social Dangers as Constraints for Pro-Environmental Travel Modes - the Perception of Parents in England and Sweden. *Medio Ambiente y Comportamiento Humano* 4, 49-69.
- Johansson, M., 2006. Environment and parental factors as determinants of mode for children's leisure travel. *Journal of Environmental Psychology* 26, 156-169.
- Joshi, M., MacClean, M., Carter, W., 1999. Children's journey to school: Spatial skills, knowledge and perceptions of the environment. *British Journal of Developmental Psychology* 17, 125-139.
- Kawachi, I., Kennedy, B.P., Wilkinson, R.G., 1999. Crime: social disorganization and relative deprivation. *Social Science & Medicine* 48, 719-731.
- Kytta, M., 2004. The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments. *Journal of Environmental Psychology* 24, 179-198.
- Lorenc, T., Brunton, G., Oliver, S., Oliver, K., Oakley, A., 2008. Attitudes to walking and cycling among children, young people and parents: a systematic review. *Journal of Epidemiology and Community Health* 62, 852-857.

- Lorenc, T., Clayton, S., Neary, D., Whitehead, M., Petticrew, M., Thomson, H., Cummins, S., Sowden, A., Renton, A., 2012. Crime, fear of crime, environment, and mental health and wellbeing: Mapping review of theories and causal pathways. *Health & Place* 18, 757-765.
- Mackett, R., 2002. Increasing car dependency of children: should we be worried? *Municipal Engineer* 151(1), 29-38.
- Mackett, R., Brown, B., Gong, Y., Kitazawa, K., Paskins, J., 2007. Children's Independent Movement in the Local Environment. *Built Environment* 33, 454-468.
- Malone, K., 2007. The bubble-wrap generation: children growing up in walled gardens. *Environmental Education Research* 13, 513-527.
- Mammen, G., Faulkner, G., Buliung, R., Lay, J., 2012. Understanding the drive to escort: a cross-sectional analysis examining parental attitudes towards children's school travel and independent mobility. *BMC Public Health* 12, 862-873.
- Martin, K., Wood, L., in press. 'We live here too'.... What makes a child friendly neighbourhood?, in: Cooper, R., Wood, G., Burton, E. (Eds.), *Wellbeing: A Complete Reference Guide: Volume 2: Wellbeing and the Environment*. Wiley-Blackwell publishing.
- McDonald, N.C., Brown, A.L., Marchetti, L.M., Pedroso, M.S., 2011. U.S. School Travel, 2009: An Assessment of Trends. *American Journal of Preventive Medicine* 41, 146-151.
- McKee, R., Mutrie, N., Crawford, F., Green, B., 2007. Promoting walking to school: results of a quasi-experimental trial. *Journal of Epidemiology and Community Health* 61, 818-823.
- McMillan, T., 2005. Urban Form and a Child's Trip to School: The Current Literature and a Framework for Future Research *Journal of Planning Literature* 19, 440-456.
- McMillan, T., 2007. The relative influence of urban form on a child's travel mode to school. *Transportation Research Part A* 41, 69-79.
- Merom, D., Tudor-Locke, C., Bauman, A., Rissel, C., 2006. Active commuting to school among NSW primary school children: implications for public health. *Health & Place* 12, 678-687.
- Miller, J.M., Kurlycheck, M., Hansen, J.A., Wilson, K., 2008. Examining Child Abduction by Offender Type Patterns. *Justice Quarterly* 25, 523-543.
- Mitchell, H., Kearns, R., Collins, D., 2007. Nuances of neighbourhood: Children's perceptions of the space between home and school in Aucklands. *Geoforum* 38, 614-627.
- Molnar, 2004. Unsafe to Play? Neighborhood Disorder and Lack of Safety Predict Reduced Physical Activity Among Urban Children and Adolescents. *American journal of health promotion* 18, 378-386.
- Morrongiello, B.A., Dawber, T., 1999. Parental Influences on Toddlers' Injury-Risk Behaviors: Are Sons and Daughters Socialized Differently? *Journal of Applied Developmental Psychology* 20, 227-251.
- Mullan, E., 2003. Do you think that your local area is a good place for young people to grow up? The effects of traffic and car parking on young people's views. *Health & Place* 9, 351-360.
- O'Brien, M., Jones, D., Sloan, D., Rustin, M., 2000. Children's Independent Spatial Mobility in the Urban Public Realm. *Childhood* 7, 257-277.
- Page, A.S., Cooper, A.R., Griew, P., Davis, L., Hillsdon, M., 2009. Independent mobility in relation to weekday and weekend physical activity in children aged 10-11 years: The PEACH Project. *International Journal of Behavioral Nutrition and Physical Activity* 6, 2-11.
- Page, A.S., Cooper, A.R., Griew, P., Jago, R., 2010. Independent mobility, perceptions of the built environment and children's participation in play, active travel and structured exercise and sport: the PEACH Project. *International Journal of Behavioral Nutrition and Physical Activity* 7, 17-27.
- Pallant, J., 2007. *SPSS Survival Manual: A step by step guide to data analysis using SPSS*. Allen & Unwin, Sydney, NSW.
- Pooley, C.G., Turnbull, J., Adams, M., 2005. The journey to school in Britain since the 1940s: continuity and change. *Area* 37, 43-53.

- Prezza, M., Alparone, F., Renzi, D., Pietrobono, A., 2010. Social Participation and Independent Mobility in Children: The Effects of Two Implementations of "We Go to School Alone". *Journal of Prevention & Intervention in the Community* 38, 8-25.
- Prezza, M., Alparone, F.R., Cristallo, C., Luigi, S., 2005. Parental perception of social risk and of positive potentiality of outdoor autonomy for children: The development of two instruments. *Journal of Environmental Psychology* 25, 437-453.
- Prezza, M., Pacilli, M.G., 2007. Current fear of crime, sense of community, and loneliness in Italian adolescents: The role of autonomous mobility and play during childhood. *Journal of Community Psychology* 35, 151-170.
- Prezza, M., Pilloni, S., Morabito, C., Sersante, C., Alparone, F.R., Guiliani, M.V., 2001. The influence of psychosocial and environmental factors on children's independent mobility and relationship to peer frequentation. *Journal of Community and Applied Social Psychology* 11, 435-450.
- Putnam, R.D., 1995. Bowling alone: America's declining social capital. *Journal of Democracy* 6, 65-78.
- Riger, S., LeBailly, R.T., Gordon, M.T., 1981. Community ties and urbanites' fear of crime: an ecological investigation. *American Journal of Community Psychology* 9, 653-665.
- Rissotto, A., Giuliana, V., 2006. Learning neighbourhood environments: the loss of experience in a modern world, in: Spencer, C., Blades, M. (Eds.), *Children and their Environments: Learning, Using and Designing Spaces*. Cambridge University Press, Cambridge.
- Rissotto, A., Tonucci, F., 2002. Freedom of Movement and Environmental Knowledge in Elementary School Children. *Journal of Environmental Psychology* 22, 65-77.
- Salmon, J., Timperio, A., Cleland, V., Venn, A., 2005. Trends in children's physical activity and weight status in high and low socio-economic status areas of Melbourne, Victoria, 1985-2001. *Australian and New Zealand Journal of Public Health* 29, 337-342.
- Sampson, R.J., Morenoff, J.D., Gannon-Rowley, T., 2002. Assessing "neighborhood effects": Social processes and new directions in research. *Annual Review of Sociology* 28, 443.
- Sampson, R.J., Raudenbush, S.W., Earls, F., 1997. Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science* 277, 918-924.
- Santos, M., Pizarro, A., Mota, J., Marques, E., 2013. Parental physical activity, safety perceptions and children's independent mobility. *BMC Public Health* 13, 584.
- Scarborough, B.K., Like-Haislip, T.Z., Novak, K.J., Lucas, W.L., Alarid, L.F., 2010. Assessing the relationship between individual characteristics, neighborhood context, and fear of crime. *Journal of Criminal Justice* 38, 819-826.
- Schoeppe, S., Duncan, M.J., Badland, H., Oliver, M., Curtis, C., 2013. Associations of children's independent mobility and active travel with physical activity, sedentary behaviour and weight status: A systematic review. *Journal of Science and Medicine in Sport* 16, 312-319.
- Shaw, B., Watson, B., Frauendienst, B., Redecker, A., Jones, T., Hillman, M., 2013. Children's independent mobility: a comparative study in England and Germany (1971-2010). Policy Studies Institute, London.
- Shutt, J.E., Miller, J.M., Schreck, C.J., Brown, N.K., 2004. Reconsidering the Leading Myths of Stranger Child Abduction. *Criminal Justice Studies* 17, 127-134.
- Spilsbury, J.C., 2005. 'We don't really get to go out in the front yard'-children's home range and neighborhood violence. *Children's Geographies* 3, 79-99.
- Stokols, D., 1992. Establishing and maintaining health environments. *American Psychologist* 47, 6-22.
- Sutterby, J., 2009. What kids don't get to do anymore and why. *Childhood Education* 85, 289-292.
- Timperio, A., Ball, K., Salmon, J., Roberts, R., Giles-Corti, B., Simmons, D., Baur, L.A., Crawford, D., 2006. Personal, Family, Social, and Environmental Correlates of Active Commuting to School. *American Journal of Preventive Medicine* 30, 45-51.
- Timperio, A., Crawford, D., Telford, A., Salmon, J., 2004. Perceptions about the local neighborhood and walking and cycling among children. *Preventive Medicine* 38, 39-47.
- Tranter, P., Whitelegg, J., 1994. Children's travel behaviours in Canberra: car-dependent lifestyles in a low-density city. *Journal of Transport Geography* 2, 265-273.

- Tudor-Locke, 2001. Active Commuting to School; An Overlooked Source of Children's Physical Activity? *Sports Medicine* 31, 309-313.
- Tulloch, M.I., 2004. Parental fear of crime: A discursive analysis. *Journal of Sociology* 40, 362-377.
- UNICEF, 2001. A League Table of Child Deaths by Injury in Rich Nations. UNICEF Innocenti Research Centre, Florence.
- Valentine, G., 1997. "Oh Yes I Can." "Oh No You Can't": Children and Parents' Understandings of Kids' Competence to Negotiate Public Space Safely. *Antipode* 29, 65-89.
- Valentine, G., McKendrick, J., 1997. Children's outdoor play: Exploring parental concerns about children's safety and the changing nature of childhood. *Geoforum* 28, 219-235.
- van der Ploeg, H.P., Merom, D., Corpuz, G., Bauman, A.E., 2008. Trends in Australian children traveling to school 1971–2003: Burning petrol or carbohydrates? *Preventive Medicine* 46, 60-62.
- Villanueva, K., 2011. Exploring the Built Environment and Other Correlates of Children's Independent Mobility. The University of Western Australia.
- Villanueva, K., Giles-Corti, B., Bulsara, M., McCormack, G.R., Timperio, A., Middleton, N., Beesley, B., Trapp, G., 2012. How far do children travel from their homes? Exploring children's activity spaces in their neighborhood. *Health & Place* 18, 263-273.
- Villanueva, K., Giles-Corti, B., Bulsara, M., Timperio, A., McCormack, G., Beesley, B., Trapp, G., Middleton, N., 2013. Where Do Children Travel to and What Local Opportunities Are Available? The Relationship Between Neighborhood Destinations and Children's Independent Mobility. *Environment and Behavior* 45, 679-705.
- Warr, M., Ellison, C.G., 2000. Rethinking social reactions to crime: personal and altruistic fear in family households. *The American Journal of Sociology* 106, 551-578.
- Wood, G., Giles-Corti, B., Pikora, T., Bulsara, M., McCormack, G., Timperio, A., 2010. The TRavel, Environment and Kids Project: Preliminary Findings Report. Centre for the Built Environment and Health, School of Population Health, The University of Western Australia, Perth.
- Zubrick, S., Wood, L., Villanueva, K., Wood, G., Giles-Corti, B., Christian, H., 2010. Nothing but fear itself: Parental fear as a determinant of child physical activity and independent mobility. Victorian Health Promotion Foundation (VicHealth), Melbourne.
- Zwerts, E., Allaert, G., Janssens, D., Wets, G., Witlox, F., 2010. How children view their travel behaviour: a case study from Flanders (Belgium). *Journal of Transport Geography* 18, 702-710.

Table 1. Sample characteristics

Sample Characteristic (%)	Boys (n=598)	Girls (n=647)
Child's age		
10	32.9	30.9
11	36.1	38.5
12	30.9	30.6
Socio-economic status of school		
Low	22.9	27.2
Medium	36.5	33.5
High	40.6	39.3
School neighbourhood walkability		
Low	54.7	52.4
High	45.3	47.6
Child sick in the last week**		
No	74.1	80.3
Yes	25.9	19.7
Maternal education		
Less than secondary education	25.6	30.2
Secondary education/trade/diploma	57.3	53.2
Bachelor degree or higher	17.0	16.6
Parent gender		
Female	86.5	89.0
Male	13.5	11.0
Independent Mobility**		
No	25.6	32.9
Yes	74.4	67.1

** $p \leq 0.05$

Table 2. Unadjusted associations between independent mobility and parental fear of strangers, informal social control, and other adjustment variables

Factor	Boys (n=598)		Girls (n=647)	
	OR	<i>p</i>	OR	<i>p</i>
Parental fear of strangers ^a	0.66	0.000	0.65	0.000
Informal social control ^a	1.31	0.015	1.33	0.003
Parent perceives that their neighbourhood is friendly ^a	1.66	0.002	1.71	0.000
Child perceives lots of children the same age in their area	2.91	0.000	2.51	0.000
School neighbourhood walkability (high)	1.17	0.415	1.79	0.001
Parent perceives that they live on a busy road	0.63	0.088	0.56	0.025

^aContinuous variables

Table 3. Adjusted associations between parental fear of strangers, informal social control, and girls' independent mobility

Variables	Model 1 <i>Fear of strangers</i>			Model 2 <i>Model 1 + informal social control</i>			Model 3 <i>Model 2 + Social environment</i>			Model 4 <i>Model 3 + Built environment</i>		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Fear of strangers ^a	0.71	0.58-0.88	0.002**	0.73	0.59-0.91	0.005**	0.75	0.61-0.93	0.007**	0.76	0.60-0.96	0.021*
Informal social control ^a	-	-	-	1.29	1.04-1.60	0.022**	1.22	0.99-1.52	0.065*	1.23	1.00-1.52	0.053*

p*≤0.1 *p*≤0.05 ****p*≤0.01^aContinuous variables

Model 1: Child age (10, 11, 12 years), parent gender (female, male), maternal education (less than secondary education; secondary education/trade/diploma; bachelor degree or higher), school socio-economic status (low, medium, high), child sick in previous week (no, yes), parent confidence in child's ability to travel independently (no, yes), child confidence in their ability to travel independently (subscale), school clustering (n=25), and parental fear of strangers

Model 2: Model 1 + Informal social control

Model 3: Model 2 + Social environment (parent neighbourhood friendliness scale + child perception there are lots of children their own age to hang out with in their area)

Model 4: Model 3 + Built environment factors (objectively measured neighbourhood walkability + parent perception of traffic).

Table 4. Adjusted associations between parental fear of strangers, informal social control, and boys' independent mobility

Variables	Model 1 <i>Fear of strangers</i>			Model 2 <i>Model 1 + informal social control</i>			Model 3 <i>Model 2 + Social environment</i>			Model 4 <i>Model 3 + Built environment</i>		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Fear of strangers ^a	0.74	0.57-0.94	0.016**	0.76	0.60-0.96	0.024**	0.79	0.62-1.01	0.063*	0.79	0.62-1.01	0.061*
Informal social control ^a	-	-	-	1.25	0.99-1.57	0.058*	1.15	0.89-1.49	0.288	1.15	0.88-1.50	0.299

p*≤0.1 *p*≤0.05 ****p*≤0.01^aContinuous variables

Model 1: Child age (10, 11, 12 years), parent gender (female, male), maternal education (less than secondary education; secondary education/trade/diploma; bachelor degree or higher), school socio-economic status (low, medium, high), child sick in previous week (no, yes), parent confidence in child's ability to travel independently (no, yes), child confidence in their ability to travel independently (subscale), school clustering (n=25), and parental fear of strangers

Model 2: Model 1 + Informal social control

Model 3: Model 2 + Social environment (parent neighbourhood friendliness scale + child perception there are lots of children their own age to hang out with in their area)

Model 4: Model 3 + Built environment factors (objectively measured neighbourhood walkability + parent perception of traffic).

Highlights

Declines in children's independent mobility (IM) are often attributed to parents fear

We examined the association between parents' fear of strangers and children's IM

Parents fear appeared to inhibit IM, and the effect was most pronounced among girls

The inclusion of informal social control did little to alleviate this association

Initiatives that target parents' fears and normalise walking may best promote IM

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