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Australian children's physical activity and screen time while in grandparental care

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Abstract

Objective: The objective of this study was to explore Australian children's engagement in physical activity and screen time while being cared for by their grandparents.

Method: Grandparents (N = 1,190) providing ≥3 hours of weekly care to a grandchild aged 3–14 years completed an online survey assessing their grandchildren's movement behaviours while in their care. Descriptive statistics were computed for frequency of engagement in unstructured and structured physical activities, minutes spent playing outdoors, and minutes spent engaged in screen time. Regression analyses were conducted to assess socio-demographic predictors of movement behaviours.

Results: Playing in the yard was the most common form of physical activity in which grandchildren reportedly participated (77% 'usually' or 'always'), followed by playing with toys/equipment (62%). Few (14–36%) frequently engaged in active transport. Children spent an average of 181 minutes per week engaged in screen-based activities.

Conclusions: There is an opportunity to improve children's movement behaviours while in grandparental care. Communicating to grandparents their importance in supporting an active lifestyle is warranted.

Implications for Public Health: Findings highlight the importance of creating environments that facilitate play-based, outdoor activities. Ensuring children have access to play equipment while in the care of grandparents and improving access to and quality of neighbourhood parks may assist with activity promotion.

Key words: grandparents, grandchild, children, physical activity, screen time, caregiving

Recent decades have seen worldwide increases in grandparents' involvement as secondary care providers to their grandchildren; increases that can be attributed to higher levels of maternal participation in the workforce and reductions in the affordability, availability, and flexibility of formal childcare.[1–3] In Australia, which is the context of the present study, around one-fifth of children are cared for by a grandparent when both their parents are working.[4] Among Australian grandparents who report providing childcare at least monthly, almost half provide 10+ hours of care per week, and one-fifth provide 20+ hours per week.[5]

The high frequency and volume of care being provided by grandparents means they are likely playing an important role in children's lifestyle behaviours, including those related to physical activity and screen time.[6] Despite this, research investigating the role of grandparents in supporting their grandchildren's movement behaviours is limited, with just two studies conducted to date. One study, conducted in the US, interviewed parents and grandparents of pre-schoolers to explore their perspectives on young children's feeding and physical activity.[7] Almost all care providers reported that their (grand)children engaged in physical activity as part of spending time with them, with children's engagement in physical activity—both the extent and range—reflecting the activity levels of their care providers and their access to spaces in which activity could take place. Where care providers engaged in limited to no physical activity (e.g. due to health

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reasons), unstructured play was the main form of activity these providers attempted to facilitate in their (grand)children. Access to areas where this play could take place, such as parks and indoor play centres, was considered important, especially in situations where the home environment was not conducive to such activity (e.g. small living areas, absence of a yard). Several interviewees noted that children engaged in more sedentary behaviour while with their grandparents, but this finding was not consistently observed across the sample. The other study, conducted in China, found that children cared for by their grandparents participated in less physical activity and watched more television than children who do not have grandparental care.[8] However, this study did not appear to control for co-residence, which is a social norm in this country.[8]

Further research exploring children's levels of engagement in movement behaviours while in grandparental care is warranted. This is especially important in Australia where grandparents are the biggest providers of informal childcare[4] and 77% and 68% of Australian children do not meet recommended daily guidelines for physical activity (≥60 minutes of moderate to vigorous physical activity) and screen-based activity (≤2 hours of recreational screen time), respectively.[9] Accordingly, the present study aimed to assess Australian children's engagement in physical activity and screen time while in the care of their grandparents. A range of physical activities and screen time behaviour was explored to obtain a more comprehensive account of children's movement behaviours than that of prior work. A secondary aim of this study was to explore potential socio-demographic predictors of grandchildren's engagement in physical activity and screen time while in grandparental care.

Method

Recruitment and sample

An ISO-accredited web-panel provider (Pureprofile) was used to recruit a national sample of Australian grandparents to participate in an online survey. Pureprofile's panel of ≈550,000 Australians with diverse geographic and socioeconomic backgrounds has been established using multiple recruitment strategies, including referrals and online advertising. Potential respondents could access the survey from Pureprofile's website or via an email distributed to panel members. Respondents were eligible to participate if they reported providing regular childcare to at least one grandchild aged 3 to 14 years. Regular childcare was defined to respondents as providing childcare for at least three hours every week while the grandchild's parents are working, studying, or undertaking other activities (as per Jongenelis et al.[10]).

Given females are more likely to be providers of childcare than males,[11] a 60/40 gender quota was enforced. This quota reflects the figures obtained in analyses of a nationally representative survey of Australian grandparents.[12] The resulting sample of 1,190 grandparents is presented in the online supplementary material. All respondents provided informed consent, and the study was approved by a university human research ethics committee.

Measures

Demographics

Respondents were asked to report their gender, age, postcode, and highest level of education. Postcode was used to calculate (i) socio-economic status (SES) as per the 2021 Australian Bureau of Statistics' Index of Relative Socio-economic Advantage and Disadvantage and (ii) location (metropolitan area or regional). Respondents were also asked to indicate the gender and age of the grandchild aged 3 to 14 years for whom they provide the most childcare. If they provided equal amounts of childcare to two or more grandchildren in this age range, they were asked to provide this information for the child whose birthday month is closest to their own.

Provision of care

Respondents were asked to describe how frequently they provide care to their grandchild (response options: 1 = *once a week* to 4 = *6–7 times per week*) and how many hours a week this care is provided on average (open response).

Engagement in physical activity

Respondents were asked to indicate how often (1 = *never* to 5 = *always*; 6 = *not applicable*) their grandchild engages in unstructured physical activities during a typical week while in grandparental care (e.g. walk to school, ride a bike/scooter for fun, play with the dog; adapted from Hinkley et al.[13]). Respondents were also asked to report how often their grandchild participates in structured physical activity such as swimming, soccer, gymnastics, netball, tennis, or basketball during a typical week while in grandparental care (adapted from Hinkley et al.[13]; response options: 1 = *never* to 5 = *always*). Finally, respondents indicated the duration (in minutes) their grandchild plays outdoors during a typical week while in grandparental care (adapted from Burdette et al.[14]). Location of outdoor play (in the back or front yard; on the street; in the local park or playground) was also assessed.

Engagement in screen time

Respondents were asked to report the duration (in minutes) over the last 7 days their grandchild spent engaging in various forms of screen time while in grandparental care (e.g. watching TV, movies, or internet videos; adapted from Hinkley et al.[13]). Respondents were asked to exclude time spent doing homework.

Analysis

Descriptive statistics were computed for all variables of interest. Hierarchical linear regression analyses were then conducted to identify the socio-demographic factors associated with the following: frequency of engagement in unstructured physical activity, frequency of engagement in structured physical activity, minutes spent playing outdoors, and minutes spent engaging in screen time. Scores on these dependent variables were examined for outliers prior to analysis, with univariate outliers ($z > 3.29$) on each of the dependent variables recoded to have the same value as the next highest score (as per Warner et al.[15]). Hours of childcare provided per week was controlled for in Step 1, and grandparent gender (1 = men, 2 = women), age, SES, and location (1 = metropolitan, 2 = regional) were entered in Step 2. Grandchild gender (1 = boy, 2 = girl) and age were also entered in Step 2. Secondary analyses (presented in the online supplementary material) were conducted substituting the independent variable of level of education for SES.

Results

Provision of care

For care frequency, 39% of respondents reported providing care once a week, while 45% provided care 2–3 times per week, 10% provided care 4–5 times per week, and 6% provided care 6–7 times per week. The average number of hours of care provided per week was 11.78 (standard deviation = 11.26; range = 3–120).

Grandchildren's engagement in physical activity while in grandparental care

Grandparents' reports of the frequency with which their grandchild engages in unstructured physical activity while in their care are presented in Table 1. Playing in the back or front yard was most common, with just over three-quarters (77%) of respondents reporting that their grandchild engages in this form of activity 'usually' or 'always' in a typical week. Playing with toys/equipment (62%) and playing with the dog (57%) were next most common. Grandchildren reportedly played outdoors 154 minutes per week, although there was a high degree of variation on this variable (standard deviation = 251 minutes; range = 0–4320). The vast majority of grandparents (91%) reported that this outdoor play occurred in the back or front yard, 47% reported that play occurred in the local park or playground, and 6% reported that play occurred in the street. In terms of structured physical activity, just over one-quarter of grandparents reported that their grandchild engages in this form of physical activity 'usually' or 'always'.

Grandchildren's engagement in screen-based activities while in grandparental care

Grandparents' reports of their grandchild's screen-based activities are presented in Table 2. Watching TV, movies, or internet videos was most common, with grandparents reporting that their grandchild engages in this activity on average 90 minutes per week. In total, children were engaged in screen time for an average of 181 minutes per week. Nearly two-thirds (64%) of all grandparents reported grandchild engagement in screen time in excess of 60 minutes per week while in their care, while 40% reported engagement in screen time in excess of 120 minutes per week.

Table 1: Grandchildren's engagement in physical activity while in grandparental care.

Activity	Mean (*SD*)	Usually/Always n (%)
Play in the back yard or front yard	4.14 (0.92)	912 (77)
Play with toys/equipment, such as bats and balls	3.80 (0.98)	730 (62)
Play with the dog	3.46 (1.39)	530 (57)
Walk for exercise, fun, or pleasure	3.50 (1.02)	575 (49)
Ride a bike/scooter for fun	3.24 (1.17)	465 (42)
Swim in a pool	3.24 (1.13)	408 (37)
Walk to other destinations	3.20 (1.02)	405 (36)
Walk the dog	2.74 (1.35)	275 (30)
Participate in structured physical activity	2.69 (1.28)	323 (27)
Walk to school	2.37 (1.46)	230 (26)
Ride a bike/scooter to other destinations	2.63 (1.17)	216 (20)
Ride a bike/scooter to school	2.03 (1.24)	127 (14)

Responses made on a scale of 1 (*never*) to 5 (*always*). 'Not applicable' responses treated listwise.

Abbreviation: SD = standard deviation.

Table 2: Grandchildren's engagement in screen time while in grandparental care (in minutes per week).

Sedentary behaviour	Mean (*SD*)	Range
Watching TV, movies, or internet videos	90.91 (137.72)	0–1680
Using the internet or social media and emailing	48.02 (117.71)	0–1680
Playing video/computer/phone games	42.23 (101.25)	0–1500
Total	181.17 (286.47)	-

Socio-demographic determinants of movement behaviours

Results of the regression analyses assessing the socio-demographic predictors of movement behaviours are presented in Table 3. Grandparent gender and location were significantly associated with unstructured physical activity: compared to men and those living in a metropolitan area, women and those living regionally reported that their grandchild engaged in this activity at a greater frequency. Location was also found to be associated with structured physical activity, with those living regionally reporting greater engagement than those living in a metropolitan area. For the other socio-demographics, grandparent age was found to be negatively associated with engagement in screen-based activities, and grandparent SES was positively associated with structured physical activity but negatively associated with outdoor play. Results substituting level of education for SES are presented in the online supplementary material (Table S2). Overall findings remained consistent with those found using SES, with the exception of location no longer being a significant predictor of structured physical activity.

With respect to grandchild demographics, only child age emerged as significant. Compared to older grandchildren, younger grandchildren engaged more frequently in unstructured physical activity and outdoor play but less frequently in structured physical activity. Older grandchildren engaged in more screen-based activity than younger grandchildren.

Discussion

In light of the increasingly important role grandparents are playing in the care of their grandchildren,[1–3] this study sought to assess children's engagement in physical activity and screen time while being cared for by their grandparents. Play-based physical activity was most common: just over three-quarters of respondents reported that their grandchildren 'usually' or 'always' played in the back or front yard, and children reportedly spent approximately 2.5 hours per week playing outdoors while in grandparental care. These results highlight the importance of creating environments that facilitate this form of activity. For example, ensuring children have access to play equipment while in the care of grandparents may enable greater activity levels, with previous research finding the presence of portable play equipment (e.g. balls, frisbees, bikes, and scooters) in the family home to be associated with more outdoor play and physical activity.[16–18] Improving access to and quality of neighbourhood parks may assist with facilitating outdoor play.[19]

Just over half of those surveyed reported that their grandchild played with the dog, and around one-third noted that their grandchild walked the dog. In both adults and children, dog ownership has been

Table 3: Regression analyses of demographic factors associated with grandchildren's movement behaviours.

	Unstructured physical activity				
	$F(7, 1171) = 6.59, p < 0.001, R^2 = 0.04, \Delta R^2 = 0.04$				
Predictor	B	SE	β	*p*	95% CI for B
Hours per week	0.00	0.00	-0.00	0.919	-0.00, 0.00
Grandparent gender	**0.15**	**0.04**	**0.11**	**<0.001**	**0.07, 0.24**
Grandparent age	-0.00	0.00	-0.02	0.498	-0.01, 0.00
Grandparent SES	0.00	0.00	0.02	0.621	0.00, 0.00
Grandparent location	**0.10**	**0.05**	**0.06**	**0.037**	**0.01, 0.19**
Grandchild gender	-0.07	0.04	-0.05	0.081	-0.16, 0.01
Grandchild age	**-0.03**	**0.01**	**-0.14**	**<0.001**	**-0.04, -0.02**
	Structured physical activity				
	$F(7, 1171) = 10.40, p < 0.001, R^2 = 0.06, \Delta R^2 = 0.06$				
	B	SE	β	*p*	95% CI for B
Hours per week	**0.01**	**0.00**	**0.08**	**0.004**	**0.00, 0.02**
Grandparent gender	0.02	0.08	0.01	0.799	-0.13, 0.17
Grandparent age	-0.00	0.01	-0.02	0.450	-0.01, 0.01
Grandparent SES	**0.00**	**0.00**	**0.10**	**<0.001**	**0.00, 0.00**
Grandparent location	**0.18**	**0.08**	**0.07**	**0.028**	**0.02, 0.34**
Grandchild gender	-0.10	0.07	-0.04	0.173	-0.25, 0.05
Grandchild age	**0.09**	**0.01**	**0.21**	**<0.001**	**0.06, 0.11**
	Outdoor play				
	$F(7, 1171) = 27.78, p < 0.001, R^2 = 0.15, \Delta R^2 = 0.03$				
	B	SE	β	*p*	95% CI for B
Hours per week	**4.66**	**0.39**	**0.33**	**<0.001**	**3.89, 5.42**
Grandparent gender	-7.20	9.23	-0.02	0.435	-25.32, 10.91
Grandparent age	-0.69	0.54	-0.04	0.203	-1.75, 0.37
Grandparent SES	**-0.21**	**0.06**	**-0.10**	**<0.001**	**-0.34, -0.09**
Grandparent location	8.96	9.73	0.03	0.357	-10.13, 28.06
Grandchild gender	-12.74	8.88	-0.04	0.151	-30.16, 4.68
Grandchild age	**-6.15**	**1.43**	**-0.12**	**<0.001**	**-8.96, -3.35**
	Screen time				
	$F(7, 1171) = 39.72, p < 0.001, R^2 = 0.19, \Delta R^2 = 0.02$				
	B	SE	β	*p*	95% CI for B
Hours per week	**7.52**	**0.49**	**0.41**	**<0.001**	**6.56, 8.47**
Grandparent gender	-17.80	11.54	-0.04	0.123	-40.45, 4.85
Grandparent age	**-1.96**	**0.68**	**-0.08**	**0.004**	**-3.29, -0.63**
Grandparent SES	-0.03	0.08	-0.01	0.730	-0.18, 0.13
Grandparent location	4.84	12.17	0.01	0.691	-19.04, 28.72
Grandchild gender	-4.05	11.10	-0.01	0.715	-25.84, 17.73
Grandchild age	**9.18**	**1.79**	**0.14**	**<0.001**	**5.67, 12.68**

Grandparent gender: 1 = man, 2 = woman; Grandparent location: 1 = metropolitan, 2 = regional; Grandchild gender: 1 = boy, 2 = girl. Step 1 not shown. Significant results presented in bold.

Abbreviations: CI = confidence interval; SES = socio-economic status; SE = standard error.

found to be associated with (i) higher levels of physical activity and (ii) greater likelihood of meeting physical activity recommendations.[20–23] Encouraging grandparents with dogs to go on dog walks with their grandchildren may thus constitute a potential means of increasing physical activity levels in both grandparents and the grandchildren for whom they provide care. Less than half of the grandparents surveyed reported that their grandchild engaged in active transport (e.g. walking or riding a bike/scooter to school or other destinations) while in their care. There thus appears to be considerable opportunity to encourage grandparents to promote children's engagement in daily active transport through walking, cycling, and scooting to and from school. Research that determines the reasons for low levels of active transport among grandparents (e.g. neighbourhood constraints, unfavourable perceptions of active transport) may assist with informing efforts to encourage this form of unstructured physical activity.

Respondents reported that their grandchildren spent an average of 3 hours every week engaged in screen-based activities while in grandparental care. When taken as a proportion of total time spent in grandparental care, this equates to one-quarter of childcare hours. Watching TV, movies, or internet videos was most common, with grandparents reporting that the grandchild for whom they provide care engages in this activity on average 1.5 hours per week. There is a clear need to address these high levels of sedentariness, with efforts

directed at replacing sedentary behaviours with physical activity. Where this is not always possible (e.g. due to grandcarers' mobility issues), supporting engagement in light intensity physical activity or more adaptive forms of sedentary behaviour, such as reading or educational screen time, may be justified.

Results from the regression analyses assessing the socio-demographic predictors of movement behaviours suggest that men, younger grandparents, and those living in metropolitan areas may need greater support to promote physical activity and reduce screen time. Results relating to grandparent SES warrant further investigation, with this demographic characteristic positively associated with structured physical activity but negatively associated with outdoor play. This may reflect the cost of participating in structured activity, especially competitive sport, with research on parents finding that those in lower SES areas cite financial issues as a constraint on their children's access to a range of activities.[24] Further research is needed that explains the observed findings, with in-depth qualitative work likely to be particularly helpful in understanding the mechanisms via which grandparents' socio-demographic characteristics, such as SES, may impact grandchildren's movement behaviours.

In terms of grandchild demographics, grandparents reported that (i) relative to older grandchildren, younger grandchildren engaged more frequently in unstructured physical activity and outdoor play but less frequently in structured physical activity and (ii) relative to younger grandchildren, older grandchildren engaged in more screen-based activity. Findings relating to the former likely reflect the physical development of children, with some structured activities (e.g. competitive sports) more appropriate for older children than younger.[25] The finding relating to screen-based activity may reflect the greater autonomy of older children relative to younger and the acquiescence of grandparents to persistent requests from older children to engage in this activity.

With grandparents in the present study providing their grandchildren with an average of nearly 12 hours of care per week, their role as facilitators of positive-movement behaviours should not be overlooked. Further research is needed that (i) seeks to understand the factors associated with children's engagement in physical activity and screen-based activities while being cared for by their grandparents and (ii) explores grandparents' perceptions of the barriers to increasing their grandchildren's engagement in physical activity and reducing their engagement in screen-based activities. For example, prior work indicates that children's physical activity is influenced by parents' and grandparents' own engagement in physical activity.[7] Given age-related changes in mobility, the health of grandparent carers is likely to be an important determinant of children's physical activity that is worthy of further exploration.

Investigating how to best support grandparents and families is also critical. Such work has the potential to assist in informing the development of interventions designed to improve children's movement behaviours. At a minimum, interventions should communicate to grandparents their importance in supporting and modelling an active lifestyle. They should also provide grandparents with appropriate strategies and resources that assist them in promoting physical activity and reducing screen time. Intervention outcomes are likely to be enhanced if program developers adopt an intergenerational approach to education as this increases the likelihood of children receiving consistent messages from both parents and grandparents.[6]

Limitations

This study was limited by the use of an online panel to recruit respondents. The non-probability-based nature of recruitment may have impacted the representativeness of the sample, impeding generalisation of the findings beyond the grandparents surveyed. In addition, the online nature of the survey is likely to have attracted computer-literate grandparents, which may have implications for the extent to which they allow their grandchildren to engage in screen-based activities. Second, only grandparents providing regular care were surveyed. Results may differ for those providing ad-hoc care. Third, grandchildren's participation in physical activity was based on self-report and was not objectively measured. Future work could use tools such as accelerometers to examine the overall intensity and duration of movement behaviours. Fourth, given the primarily descriptive nature of this study, a limited range of predictors was explored as part of the secondary aim. Accordingly, other variables that may be important (e.g. grandparents' dwelling type, grandparents' mobility and health status, grandparents' perceptions of the importance of physical activity) were not included. Future exploration of the importance of these variables is warranted. Finally, social desirability bias may have resulted in respondents overestimating the frequency with which their grandchildren engage in physical activities and underestimating frequency of engagement in screen-based activities. The anonymous nature of the survey is likely to have mitigated this bias to a certain extent.

Conclusion

Results suggest that there is an opportunity to improve children's activity-related behaviours while in grandparental care. Providing access to portable play equipment and encouraging dog walks and active transport constitute potential means of facilitating engagement in play-based activity and increasing overall activity levels. Supporting grandparents to reduce their grandchildren's engagement in screen-based activities is warranted.

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Ethical statement

This study was approved by The University of Melbourne's Human Research Ethics Committee (#25254). The study was conducted in accordance with the Declaration of Helsinki.

Conflicts of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.anzjph.2024.100146.