

How four year-olds spend their days

Insights into the caring contexts of young children

The ways children spend their time both reflect and contribute to developmental changes and to developmental differences between children at a given time. In this paper Dr Baxter and Professor Hayes focus on the time children spend on a range of activities, analysing data collected in the first wave (2004) of *Growing up in Australia: the Longitudinal Study of Australian Children (LSAC)*, for children in the 4-5 year-old cohort.



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Development from infancy to middle childhood and beyond is marked by many physical, intellectual, social and emotional changes. Insight into the ways in which children's social and physical contexts influence their everyday lives can be gained from studying their activities during typical days (Crouter & McHale, 2005). The ways children spend their time both reflect and contribute to developmental changes and to developmental differences between children at a given time. In turn, the environments that parents provide for their children set the scene for children's time use.

In this paper we focus on the time children spend on a range of activities, analysing data collected in the first wave (2004) of *Growing up in Australia: the Longitudinal Study of Australian Children (LSAC)*, for children in the 4-5 year-old cohort. As well as aiming to describe the overall activity patterns of children, we

seek to determine whether their time use varies according to the characteristics of their parents, including employment patterns and education levels. These parental characteristics may relate to differences in values or beliefs, and the home environments and developmental contexts they create for children. Specific activities, for example, may reflect the priority parents place on playing with children, reading to them or providing care, and the time they make available for these activities. Accordingly, involvement in the paid workforce may alter the ways in which children spend their days.

Other characteristics that may determine differences in children's time use include the age and sex of the child and the family form (single versus couple family) and size (number of siblings). We also explore the relationships between children's time use and their developmental outcomes.

Children's time use

Children's days are considerably different from those of adults. A large-scale 1997 US survey showed that, in addition to school or child care, children aged 3 to 5 years spend a large amount of time over the week in play, television watching, sport, visits beyond the home, eating, personal care, accompanying parents undertaking household work, including shopping and, of course, sleeping (Hofferth & Sandberg, 2001). Similar patterns of time use were observed for children in this age group in earlier, smaller-scale US studies.¹

Children's activity patterns also vary according to their personal and family characteristics. Structured activities, such as involvement in early childhood education and care, are associated with the demands of parental employment, and frame the time children have for unstructured activities. Time use is also likely to be affected by children's preferences for certain activities and, in turn, preferences may reflect differences in gender and age. Boys, for example, watch more television (Bianchi & Robinson, 1997; Hofferth & Sandberg, 2001), and television-watching for both boys and girls increases with age, typically peaking around early adolescence (Bianchi & Robinson, 1997; Hofferth & Sandberg, 2001; Timmer, Eccles, & O'Brien, 1985).

It seems likely that the way children spend their days varies according to who is available to share those days. Children from larger families may have different patterns of time use because they have more potential playmates at home and the amount of parental input to their day may be lower than that in single-child families. Further, living with only one parent (or only one adult) may change the nature of the children's activities. Children of single parents may, for example, spend more time in child care if the non-resident parent is not available to help. Such parents may also allow the television to occupy more of children's time, using television as an informal babysitter (Hofferth & Sandberg, 2001).

Parental education has also been associated with children's time use. In particular, children of parents with higher levels of education spend less time watching television (Bianchi & Robinson, 1997; Hofferth & Sandberg, 2001; Timmer, Eccles, & O'Brien, 1985) and more time reading (Bianchi & Robinson, 1997; Timmer, Eccles, & O'Brien, 1985). Such relationships may reflect differences in parental attitudes and values. These relationships may also reflect genetic differences such that children of more highly educated parents have a greater inherent propensity to master and enjoy reading. The extent to which parents structure their children's days, either directly, or by providing different opportunities for their children, in or outside the home, may also vary with parents' education, employment, beliefs, attitudes and values.

Some small effects of parental employment on children's specific activities have been found, but the major difference is related to the time they spend in child

care or school, which is positively related to maternal employment (Bianchi & Robinson, 1997).

In this paper we use the time use data from LSAC to explore the nature of children's days. Variations in time use are examined with reference to children's characteristics (gender and age), family characteristics (couple versus single parent and number of siblings), parental education (for both parents in couple families) and parental hours worked (for both parents in couple families).

Time use and outcomes

Perhaps the most compelling reason for studying children's time use is to further our understanding of how their activities relate to developmental outcomes (Crouter & McHale, 2005). A significant body of research suggests a link between time use and developmental outcomes. For example, clear links have been established between time spent reading and academic achievement (Hofferth & Sandberg, 2001). Likewise, some studies report that more time spent watching television is associated with lower academic achievement scores, although this finding is not reported consistently (see the discussion in Larson & Verma, 1999).

Data and method

The Longitudinal Study of Australian Children

This paper presents analyses of data from *Growing up in Australia: the Longitudinal Study of Australian Children* (LSAC). Initiated and funded by the Australian Government Department of Families, Community Services and Indigenous Affairs, LSAC is a representative sample of two cohorts of Australian children. At the time of the first survey (2004), the two cohorts of children were aged 3 to 19 months and 4 to 5 years old (4 years 3 months to 5 years 7 months). The present analysis focuses exclusively on the elder of these two cohorts. The study generates extensive information about the children, their families and environments. For a detailed description of the design of LSAC see Soloff, Lawrence, and Johnstone (2005).

The Time Use Diary

As part of the LSAC data collection, parents completed a Time Use Diary (TUD) for two randomly-assigned days, one weekday and one day on the weekend. The diaries divided the 24-hour day into 96 15-minute time intervals and parents were asked to provide details of what the children were doing, who they were with and where they were. Children's activities were recorded by indicating, for each time period, whether they were doing any one or more of 26 activities listed. Children can be engaged in more than one activity at any one time, and the TUD analysis can accommodate this. All parents were given the same instructions on how to complete these diaries, but there may have been systematic differences in the ways in which different parents reported their child's activities.

This paper uses information from the 26 activity categories from the TUD, along with information on child care and/or playgroup participation. These activity details were grouped into a broader classification for use throughout this analysis (Table 1, see p. 36). There is a certain degree of subjectivity with regard to how some of these categories

Activity category	Activity
Personal care	Bathe, dress, hair care, health care. Eating, drinking, being fed. Held, cuddled, comforted, soothed. Crying, upset, tantrum. Being reprimanded, corrected. Destroy things, create mess.
Play	
Television-watching	Watching television, video, DVD, movie.
Achievement-oriented	Colour, look at book, educational game. Read a story, talk/sing, talked to/sung to. Being taught to do chores or read.
Exercise	Walk for travel or fun. Ride bike, trike, etc, for travel or fun. Other exercise – swim, dance, run about.
Other play	Listening to tapes, CDs, radio, music. Use computer. Other play/ other activities.
Social and organised activities	Visiting people, special event, party. Organised lessons/ activities. Day care centre/playgroup.
Travel and taken places	Taken places with adult, taken out in a pusher or bicycle seat, travel in a car or on public transport.
Sleeping/resting	Sleeping, napping. Awake in bed. Do nothing, bored/ restless.

were developed, just as there may have been some subjectivity in parents' reporting of children's activities. The category 'play', for example, includes watching television, which, while it is a leisure activity, may not always be thought of as 'play'. Other studies were consulted in developing this classification (for example, Yeung, Sandberg, Davis-Kean, & Hofferth, 2001), but close comparability to other studies was not possible, given differences in the underlying framework of how data were collected.

These data were not straightforward to analyse. Several initial edits were applied to address some data quality issues, and, more importantly, records were excluded when there were more than five hours of missing information. For most activities, 2,285 weekday diaries and 3,217 weekend diaries were retained. Parents often did not provide specific details of what the child did when the child was being cared for by someone else, so activity details were more often missing for children who spent longer in non-parental care. This means that the analysed sample under-represents such children. For analyses of social and organised activities, which were derived from information on where the child was as well as the activity data, it was not necessary to apply

such strict rules regarding missing activity data. Records were only excluded when activity data were missing for more than 12 hours, resulting in a sample of 3,518 weekday and 3,457 weekend diaries.²

Child outcome measures

We were also interested in exploring the relationships between children's time use and their developmental outcomes. To do this, we made use of three standardised measures that were created on the bases of several LSAC data items. These relate to the domains of learning as well as socio-emotional and physical development. Scores were subdivided into the lowest 15%, the middle 70% and the highest 15% where low scores reflect relatively less well developed and high scores represent advanced development relative to other children. The measures are described further in Box 1.

Method

Two types of data are analysed in this paper: One is the proportion of children undertaking an activity (for example, sleeping, see Figure 1 on p. 38) according to the time of day; the second is the average number of minutes spent undertaking particular activities across a day. To calculate these average times, if an activity was recorded, it was assumed that the child spent the entire 15-minute period on the activity (although he or she may have spent less time than this), and averages were calculated over the whole sample, including those children who did not engage in the activity. Weekday and weekend time use patterns are considered separately throughout the analyses.

To identify relationships between family and child characteristics and the time spent in activities, Ordinary Least Squares (OLS) were used. These multivariate analyses control for child characteristics (sex and age of child and number of siblings) and family characteristics (parental education levels and hours worked and family form – couple or single parents).³

We present a selection of the multivariate analyses by using the estimations to calculate predicted minutes in different activities for some of the key variables. These predicted values are presented as the *adjusted* average number of minutes, where one characteristic is varied and the other values are set to the sample mean. The graphs also include the 95% confidence interval for these figures. Adjusted averages have not been presented for all significant results. Other results are

BOX 1 OUTCOME MEASURES

The learning outcome measure consists of children's knowledge of the meaning of spoken words and receptive vocabulary (measured through a short form of the Peabody Picture Vocabulary Test (Dunn & Dunn, 1997), and parent and teacher ratings of reading skills and teacher ratings of writing and numeracy skills.

The socio-emotional measure consists of elements of the Strengths and Difficulties Questionnaire (Goodman, 2001) – the Pro-social scale (child's propensity to be considerate and helpful to others), the Peer Problems scale (relationships with other children), the Emotional Symptoms scale (frequency of displaying emotional states such as anxiety and fear), the Conduct Problems scale (tendency to

display problem behaviours), and the Hyperactivity scale (fidgetiness, concentration span and impulsiveness).

The physical outcome measure consists of the child's body-mass index, the child's score on the physical scale of the Pediatric Quality of Life Inventory (Varni, Burwinkle, Seid, & Skarr, 2003), parental ratings of the child's overall health and whether the parent thought the child needed more health care than the average child.

This information was based on a summary by Edwards (2005). A comprehensive description of the outcome index is given in Sanson, Misson, Wake et al. (2005).

discussed in the text. The full results of the estimations are available from the authors.

As the LSAC data are, to date, cross-sectional (Wave 2 data will be available later in 2007) we cannot determine the direction of causality in the relationships between children's time use and their developmental outcome scores. We use these cross-sectional data to explore whether there are differences in children's time use according to their relative scores on the outcome measure, that is, to determine whether children with lower or higher outcome scores spend more or less of their day in certain activities.

Results

Sample description

At the time of completion of the TUD, the average age of children in the sample was 57 months (4 years 9 months). Just under half the children (49%) were girls. Only 11% of children had no siblings, 50% had one sibling and 39% two or more siblings. Almost all children spent some time in non-parental care or early education during the week, although they may not have done so on the diary day: 10% went to school, 67% to pre-school, 26% to child care and 7% to other formal care. Just 5% were in parental care or informal care only.

Most children (88%) were living in a couple family, with most fathers employed full-time – just 6% were not employed and 6% employed part-time. There was some variation in full-time hours worked, with 36% of fathers usually working 35 to 44 hours a week, 29% 45 to 54 hours and 24% 55 hours or more. Not surprisingly, mothers were more likely to be not employed (45%). Another 19% of mothers usually worked 1 to 15 hours a week, 22% worked 16 to 34 hours and 13% worked full-time hours, that is, 35 hours or more.

For mothers, 24% had not completed secondary education, 12% had completed secondary school, but had no additional qualification, 37% had a post-school qualification (but less than a bachelors degree); and 27% had a bachelors degree or higher. Within the couple parent families, 16% of fathers had not completed secondary education, 8% had completed secondary only, 47% had a certificate or diploma post-school qualification and 29% a bachelors degree or higher.

Children's activities on weekdays and weekends

Table 2 shows the average number of minutes children spent undertaking each activity during the day, and Figure 1 (see p. 38) shows the average timing of children's activities across weekdays and weekends. In the following sections, each group of activities is discussed in turn, in relation to the overall patterns of time use and the associations between these time use patterns and the selected child or family characteristics.

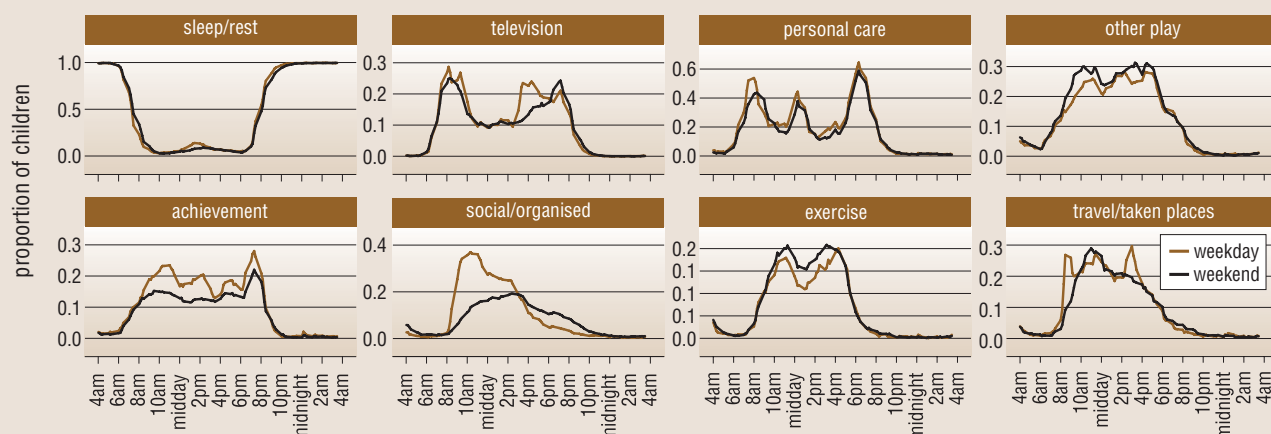
Sleep

Children slept for just over 11 hours a day on weekdays and weekends. In addition, they spent around 40 minutes (slightly more on weekdays) awake in bed, and a small amount of time (less than 10 minutes a day) doing nothing, being bored or restless.

Table 2 Children's activities over a 24-hour day

	Weekday			Weekend		
	% doing	Average mins	SD	% doing	Average mins	SD
Sleep	100	715	86	100	710	92
Sleeping or napping	100	672	91	100	672	95
Awake in bed	68	44	72	63	39	63
Nothing, bored, restless	21	9	28	18	8	29
Personal care	100	263	111	100	243	111
Eating, drinking, being fed	100	147	70	100	137	66
Bathe, dress, hair, health	97	66	37	95	59	35
Held, cuddled	67	50	72	59	44	66
Crying, upset	31	13	38	26	10	32
Destroy things, create mess	20	10	33	15	8	30
Being reprimanded, corrected	36	16	36	30	12	28
Total play	100	458	164	100	470	170
Watching television, movie	93	138	98	90	130	99
Achievement	91	142	136	83	115	129
Read a story, talked or sung to	78	78	116	64	62	114
Colour, look at book, educational game	67	56	72	55	43	61
Taught to do chores or read	42	23	44	34	19	37
Exercise	74	87	90	73	100	106
Walk for fun or travel	28	18	42	21	15	42
Ride bike	31	20	44	32	24	49
Other exercise	55	56	77	55	67	94
Other play	88	165	138	87	190	149
Listening to radio, music	32	23	58	27	21	55
Use computer	29	20	47	29	20	45
Other play, other activities	77	129	129	78	153	143
Social and organised activities	72	213	196	56	113	160
Visiting people, special event, party	32	45	101	48	100	156
Organised lessons, activities	31	24	61	13	8	30
Day care centre, playgroup	43	128	178	4	4	35
Travel and taken places	88	123	113	79	123	123
Taken places with adult	53	62	93	50	66	100
Travel in a car	78	68	72	70	63	72
Travel on public transport	13	6	26	9	5	25
Taken in a pusher or bike seat	12	5	22	9	4	21
Missing	57	73	90	38	32	59
Total time		1,440			1,440	

Figure 1 Children's activity patterns by time of day



Note: The charts use different scales.

Figure 2 focuses just on sleep and shows the differences between weekdays and weekends regarding waking up and going to sleep times. On weekends and weekdays, most children were still asleep at 6am. By around 7.15am on weekdays and slightly later on weekends (7.30am), more than half of the children had woken up. By 9am the vast majority were awake. In the evenings, only around 5% were asleep by 7pm. About half of the children were asleep by 8.15pm on weekdays, and on weekends children went to bed slightly later – 44% were asleep by 8.15pm on weekends.

On weekdays, the various child and family characteristics included in the multivariate analyses did not have significant relationships with the amount of sleep or rest. On weekends, younger children and girls slept or rested for slightly longer than older children and boys (12 minutes more for girls).

Personal care

Just over four hours a day were spent on personal care activities on weekdays and weekends. The most time-consuming activity within this category involved eating, drinking or being fed. It is not surprising then that personal care was concentrated around usual meal times. It increased in mornings and evenings by the occurrence of bathing and dressing at these times. On weekdays, children undertook personal care somewhat

earlier in the morning than on weekends and for a more defined time period. Apart from this difference, weekday and weekend patterns of personal care were similar.

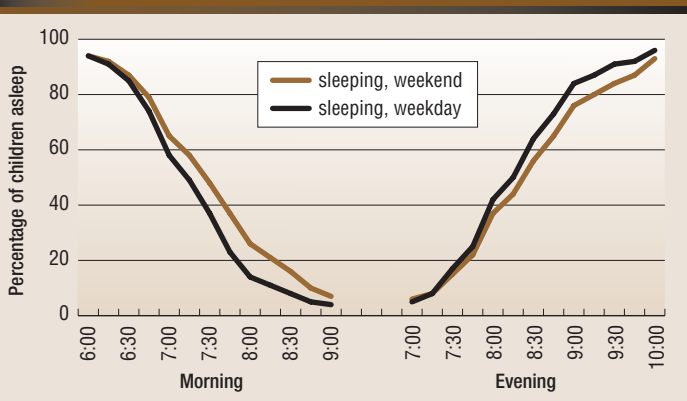
Personal care includes activities of being held or cuddled; being reprimanded or corrected; crying or being upset and destroying things or creating mess. Most of these activities were randomly distributed across the day, but being held or cuddled was somewhat more likely in the morning and evening.

Personal care time was not strongly differentiated by child or family characteristics. Mothers' hours of employment had some effect, with children with an employed mother spending less time (around 20 minutes less a day on a weekday or weekend) in personal care compared to those with a mother who was not employed.

There were some significant associations between child and family characteristics and children's time in the underlying activities of personal care. The diaries of children with an employed mother suggested that they spent less time eating and/or drinking, which may simply reflect a reduction in meal-time in these families. Smaller effects of maternal employment were also apparent. For example, on weekends, children of employed mothers spent less time crying or upset (4 minutes less) and being held or cuddled (about 7 minutes less).

On weekdays and weekends, girls spent longer than boys bathing and dressing (4 minutes more), but were reported to spend less time destroying things and creating mess (3 minutes less) and being reprimanded or corrected (2-4 minutes less). Children with siblings spent less time being held or cuddled than those without (around 15 minutes less), possibly reflecting parents' need to distribute their time across the children. On weekends, children with siblings also spent more time destroying things and creating mess (3 minutes more) and more time being reprimanded or corrected (5 minutes more). On weekdays, children spent more time creating mess or destroying things if their mother was a single parent (9 minutes more than children in couple families) or if their mother had not completed secondary education (6 minutes more than those whose mother had a bachelors degree or higher).

Figure 2 Children's sleeping patterns, morning and evening



Social and organised activities

On weekdays, between 9am and 2pm, around half of the children were in social or organised activities (including child care, preschool or school). On weekends, visiting people and participating in special events or parties was the main contributor to such activities.

Not surprisingly, the longer the mother worked, the more time children spent in social and organised care on weekdays. As seen in Figure 3, this relationship was very strong. Children with a mother who worked 35 hours or more a week, were likely to spend around 90 minutes more in social and organised activities compared to children with a mother who was not employed. The similarity of time spent in social and organised activities for those with a mother not employed and those with a mother working 1 to 15 hours a week suggests that employment for shorter hours is accommodated without the need for additional non-parental care.

Father's hours of employment were not related to the time the child was in social and organised activities.

8 hours on weekends. Of the different types of play identified, watching television or movies took up the most time, although much activity was recorded as 'other play or other activities' which was likely to include creative play and playing with toys. Each play-related activity group is discussed in detail below.

Watching television

At least nine in ten children spent some time watching television on a typical day, with average times watching television of 138 minutes (2.3 hours) on weekdays and 130 minutes (2.2 hours) on weekends. Children were most likely to be watching television in the early morning, late afternoon and early evening, with an earlier start to afternoon television-watching on weekdays possibly related to the timing of children's programs on television.

There were several factors associated with significantly different amounts of time watching television. Consistent with international research, we find child gender differences and parental education differences. Girls watched less television than boys (8 minutes on weekdays,



Children spent more than two hours, on average, watching television but higher levels of parents' education were associated with less time watching television.

Children with no siblings spent more time (about 40 minutes more) in social and organised activities on weekdays than those with siblings. Older children also spent more time in social and organised activities, on weekdays and weekends (4 minutes more for each month older).

Child care and play group attendance was included in this activity group, which also included 'other organised activities'. It is likely that 'other organised activities' captured some school or preschool attendance, as well as activities such as swimming and music lessons. Children of single mothers spent more time than those with partnered mothers in 'other organised activities' as did older children compared with younger children. Time spent in 'other organised activities' did not vary according to the hours of maternal employment, but time spent in child care or playgroup was greater among children whose mother worked longer hours. The effect of children's age was not significant for time in child care and playgroup.

The category 'social and organised activities' also included 'visiting people, at a special event or party'. On weekdays, children with no siblings spent somewhat more time than those with siblings visiting people, at a special event or party (around 18 minutes more), but very little else was significant in explaining variations in the time spent engaged in this activity. On weekends, when this activity was more common, older children spent more time visiting compared with younger children.

Children's play and television time

Children spent a great deal of their day playing, as defined by this classification – about 7.5 hours on weekdays and

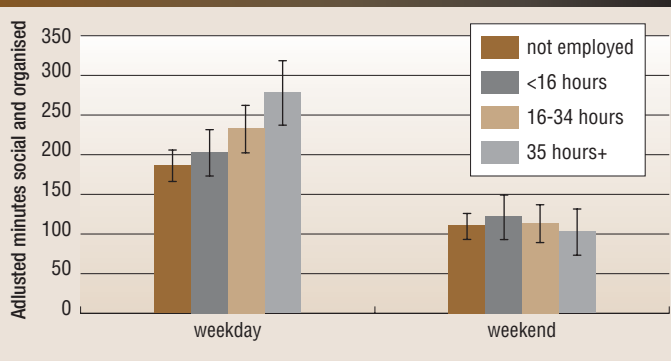
10 minutes on weekends), though the weekday difference was not statistically significant. Higher levels of both parents' education were associated with less time watching television (see Figure 4 on p. 40). These differences were evident on weekdays and weekends.

Children watched more television on weekdays if their mother was not employed (9-15 minutes more). On weekends, children in single mother families watched an average of 28 minutes more television than those in two-parent families.

Achievement-related

These four-year olds spent just over two hours on a weekday in activities defined as 'achievement-related', spending slightly less time on these on the weekend. These activities include having a story read to them,

Figure 3 Social and organised activities, adjusted average daily minutes by mother's hours of employment



talking or singing, colouring or looking at books or playing educational games and being taught to do chores or to read. They were spread over the day, although less than 20% of children were doing them at any point in time, except for evenings, when the proportion increased slightly. Achievement-activities occurred a little more often in the evenings of weekdays compared to weekends. The evening peak in this category was related to more story reading, talking and singing at this time.

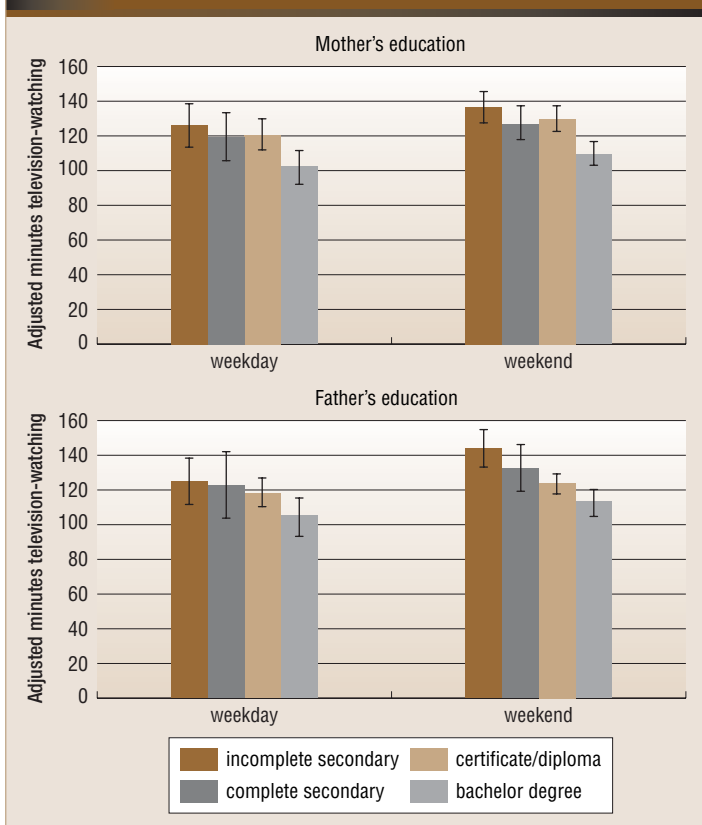
Consistent with studies elsewhere, girls spent more time doing achievement-oriented activities (18-20 minutes more), as did children with more highly educated mothers or fathers (see Figure 5).

Children with mothers who were not employed spent longer engaged in achievement-related activities compared with children with an employed mother, especially on weekends (around 20 more minutes on weekends).

On weekends, children with two or more siblings spent less time on achievement-related activities compared to single-child families (23 minutes). Having a father in the home did not make a significant difference to the amount of time spent on achievement-related activities.

It is interesting to examine these relationships in more detail, looking at the differences in the component activities. Of these activities, parental education was most strongly associated with reading stories. The difference between boys and girls, however, was only significant in relation to the amount of time spent colouring in, looking at books or playing educational games.

Figure 4 Watching television, adjusted average daily minutes by parental education



Exercise

Children spent less time doing exercise than in other defined play activities, although about three-quarters of children were involved in this activity at some time during the day. This category includes 'walk for fun or travel', 'ride a bike' and 'other exercise – swim/dance/run about', of which 'other exercise' was the largest category. Exercise was less likely on weekdays, occurred throughout the day and decreased around lunch-time.

Girls spent less time than boys engaged in exercise on weekdays (9 minutes less) as well as weekends (12 minutes less). On weekends, children without siblings spent the least amount of time doing exercise (23 minutes less than children with 2 or more siblings). These differences were most marked for riding a bike, which was more likely for children with siblings, and less likely for girls. On weekends, children with siblings were more likely than those without siblings to be reported doing 'other exercise'.

Other play

'Other play' is a broad category, incorporating 'other play, other activities' as well as listening to music, using the computer and playing computer games. It occurred across the day, with less distinct times than other activities, which is not surprising given the generality of 'other play, other activities' which is the most-time consuming of activities in this category. Compared to boys, girls were more likely to listen to music (5-6 minutes) and less likely to use a computer or playing computer games (9-10 minutes).

Travel or being taken places

Much of the travel or being taken places was recorded as travel in a car and 'taken places with adults'. On weekdays, this activity showed peaks in the morning and afternoon, associated with travel to or from parents' work, or to school, preschool or child care. Travel by car peaked in the morning and afternoon of weekdays and being taken places with adults dominated the remainder of the time. On weekends, there was a less defined distribution in this category, with children undertaking this activity throughout the day.

The child and family characteristics explained very little of the differences in time spent travelling or being taken places. Children with siblings spent longer travelling in the car than those without siblings (16 minutes). On weekends, children in couple families spent more time travelling or being taken places than those with a single mother (26 minutes). In families with higher educated fathers, children spent more time travelling or being taken places (22 minutes more for fathers with a certificate or diploma or higher, relative to those with incomplete secondary).

Time use and outcomes

To examine relationships between child outcomes and time use, we now focus on a selection of the activities – time spent in personal care, watching television, doing achievement-related activities, exercise and social and organised activities.⁴ The results presented are the associations between the outcome score and the time

in an activity, after controlling for associations with other child and family characteristics such as parental education, and also the other outcome measures.

We consider each of the outcome measures in turn, first considering the learning outcome score (Figure 6).

As might be expected, a higher learning domain score was associated with more time spent on achievement-related activities, with a significant difference of around 30 minutes between those with low and high learning domain scores. This association was significant for all the activities that made up the achievement-related activity group.

There was also an inverse relationship with watching television, with a lower score related to more time watching television (those with a low outcome score spent 24 minutes more watching television than those with a high learning outcome score).

For the socio-emotional domain (Figure 7, see p. 42), the strongest associations were with personal care time (lower socio-emotional outcome scores being related to more personal care time), social and organised activities (higher socio-emotional outcome scores being related to more social and organised time) and watching television (lower socio-emotional outcome scores related to more television-watching). See Figure 7 for details.

On closer inspection of the personal care relationship, we find that a lower socio-emotional outcome score was associated with more time crying or upset, destroying things or creating mess and being reprimanded or corrected. Again, these relationships might be expected, given that the socio-emotional measure included the extent to which children displayed emotional difficulties and conduct problems (see Box 1 on p. 36). On weekdays, a lower socio-emotional score was also associated with more time eating or drinking.

The positive relationship between the socio-emotional score and social and organised activities was largely a factor of the contribution of visiting to this category, rather than child care or other organised activities. Children who had higher socio-emotional outcomes spent more time visiting than children with lower socio-emotional outcomes, and this applied to weekdays and weekends (differences of 10 minutes on weekdays and 23 minutes on weekends).

On the physical domain score, there were fewer significant relationships. There was some indication that children's exercise time was positively related to their physical outcome measure, but this effect was not significant at the 0.05 level (see Figure 8 on p. 42).

Children with lower physical outcome scores had more personal care time, although the difference was only significant for weekdays. This related, in particular, to children in the low physical outcome group spending more time destroying things or creating mess. Children in the high physical outcome group spent less time crying or upset. These effects were not as strong on weekends although the relationships between time crying or being upset and destroying or creating mess and physical outcome scores persisted.

Figure 5 Achievement-related activities, adjusted average daily minutes by parental education

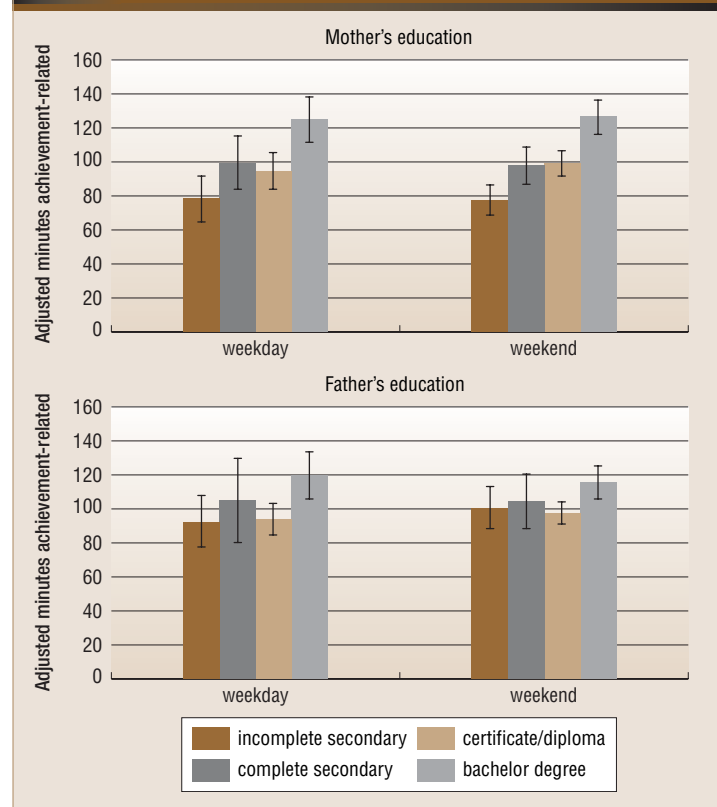


Figure 6 Learning domain score differences in adjusted average daily activity times

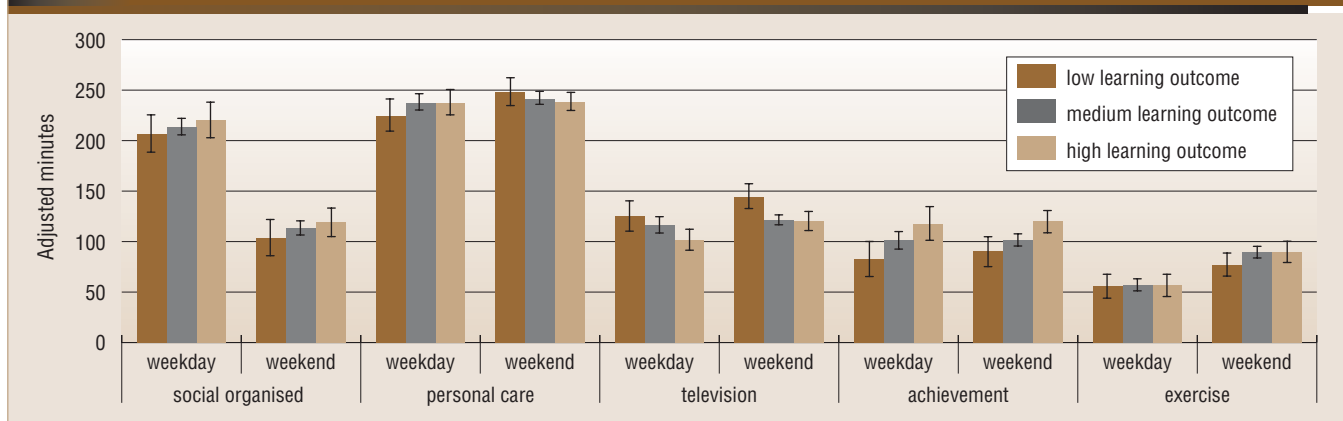
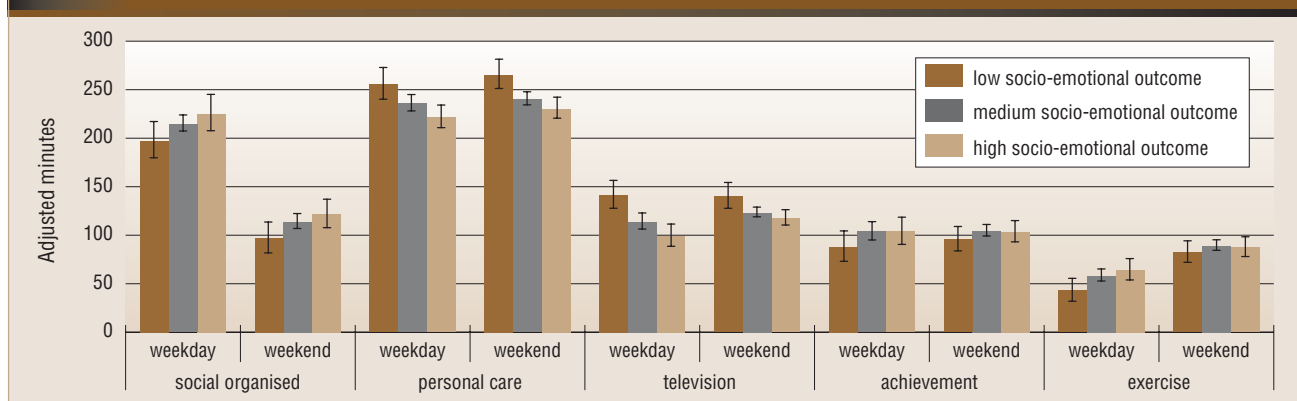


Figure 7 Socio-emotional domain score differences in adjusted average daily activity times



Summary and discussion

The time use patterns of these 4-5 year olds are consistent with those in the US studies reviewed above, showing that children spend much of their day playing, in personal care and in social and organised activities. Weekday and weekend time use patterns are similar, except that children are more likely to be in social and organised activities on weekdays.

Much of children’s days is spent playing, with watching television and other play the dominant categories. Play activities also have a temporal pattern. This was most marked for time spent watching television, which is most likely to occur in the early morning, late afternoon and early evening. Exercise and other play occur throughout the day, as do achievement-oriented activities, but to a lesser extent. Achievement-oriented activities are more likely in the evening, especially on weekdays.

Children’s time use patterns relate to several child and family characteristics. There are gender differences in children’s play-time which appear to be related to girls’ and boys’ preferences for certain types of play. The age of the child also makes a difference in that older children do more social and organised activities (more participation in other organised activities on weekdays and more visiting on weekends). On weekends, older children sleep for less time.

Family size

The number of siblings also has a significant relationship with time use, which is to be expected, given that children

with siblings are likely to spend some time playing with them, or to have their day managed in some way to fit around their brothers’ and sisters’ requirements. Further, parents may be less available to devote time to each child, individually.

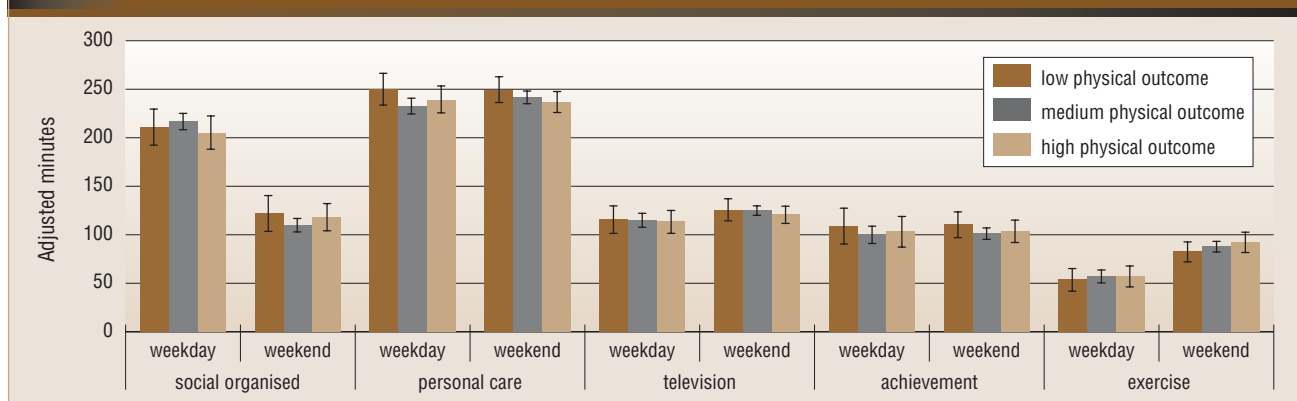
Family form

There are not many strong differences in the time use patterns of children in single versus couple parent families. We found, for example, that on weekdays, children in single parent families spent a little more time in other organised activities and on weekends more time watching television. Children’s time use is also largely unaffected by the employment arrangements of resident fathers.

Parental employment

More hours of maternal employment are associated with more time spent in social and organised activities, specifically, more time in child care. Not surprisingly, this effect is large. The effects of maternal employment on other activities are much smaller. Some of the maternal employment effects are evident on weekends. These might relate either to being employed on weekends or different patterns of family time when the mother is employed, even if she does not work on weekends. Parents are required to schedule a variety of tasks for weekends (for example, household work, social events or other leisure or sporting activities) that might be able to be done during the week in families with a mother who is not employed.

Figure 8 Physical domain score differences in adjusted average daily activity times



Parental education

Parental education has strong associations with children's time use, the strongest being with time spent watching television and undertaking achievement-related activities. These educational differences may reflect inherent differences in children's own preferences for types of play, or they may reflect differences in parental views regarding how children should spend their time and the degree to which they involve themselves in their child's activities. They may also reflect differences in access to alternate activities (such as having access to books at home, or being taken to activities outside the home) during the usual television-watching times.

Children's development outcomes

In addition, children's time use patterns differ according to how children are doing on measures of learning and socio-emotional outcomes (and to a much less extent, physical outcomes). These results do not, however, permit inferences about the direction of effects. For example, we find that children with higher learning scores engage

use data use tobit estimation, but more recently, time use analysts have asserted that tobit is not an appropriate method for the analysis of time use data, preferring OLS or other methods (Brown & Dunn, 2006; Gershuny & Egerton, 2006; Stewart, 2006). Sampling weights were applied throughout and the multivariate analysis takes into account the initial selection probabilities.

- 4 Sleep-time was also explored, but the only significant relationships were for weekends: relative to medium outcome scores, those with low learning outcome scores slept more (14 minutes) as did those with high socio-emotional outcome scores (11 minutes).

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Children's time use patterns differ according to how children are doing on measures of learning and socio-emotional outcomes.

in more achievement-related activities and watch less television compared to children with lower learning scores. This may be because higher-achieving children select to spend more time in achievement-related activities and less time watching television. An alternative is that engaging in achievement-related activities and spending less time watching television is conducive to improvements in learning. Or another possibility is that other factors, beyond those explored in this analysis, are associated with both time use and child outcomes.

While the present analyses are based on a single wave of data, with longitudinal data it will be possible to explore these relationships more fully. The wealth of data on children's context that are available in LSAC will also enable examination of key questions such as whether parenting style mediates some of these relationships and to what extent. The TUD also provides opportunities for analyses of children's contexts, relating their activities and outcomes to parental presence or absence and to locations (home versus outside home). These preliminary results illustrate the richness of LSAC as a window on the development of Australia's children.

Endnotes

- 1 For details refer to studies and figures cited in Robinson and Godbey (1999, pp. 211,339) and Timmer (1985).
- 2 See Baxter (forthcoming) for a detailed examination of these issues. Also, the TUD has a somewhat biased response (with a response rate of 80% of those interviewed), towards more highly educated parents and couple families, compared to the whole of the LSAC sample (Baxter, forthcoming).
- 3 As well as those variables listed, the number of minutes of missing data was included as an explanatory variable, to control for the extent of possible activity level under-reporting. Regarding the choice of multivariate technique, many published analyses of time

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