The effect of maternal age at first birth on vocabulary and social and emotional outcomes for Aboriginal and Torres Strait Islander children

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Having a child as a teenager has been linked to poor outcomes for mothers and their children for a range of, often interrelated, health, social and demographic characteristics (Maynard 1997). But what do we know about the outcomes for children of young Indigenous mothers? Are they different from older Indigenous mothers? This research examines whether the age of the mother at the time of the birth of the oldest child is associated with vocabulary and social and emotional outcomes for Indigenous children.

In many countries, mothers who give birth as teenagers are more likely than older mothers to have low educational achievement and suffer from depression; their children generally do less well at school and are more likely to become involved in crime and drugs and become teenage mothers themselves (UNICEF 2001). Kamerman et al. (2003) note that families headed by teenage mothers, single parents and large families are at increased risk of disadvantage and dysfunction, with racial minority families in the United States, Canada, New Zealand and Australia of particular concern.

The Australian Institute of Health and Welfare (AIHW) includes teenage births in its 2011 headline indicators for children's health, development and wellbeing (AIHW 2011) due to health and social problems for children and mothers, including child behaviour problems. The 'Overcoming Indigenous Disadvantage' report devotes a subsection to the Indigenous teenage birth rate and concerns about child and maternal outcomes (SCRGSP 2011).

Bradbury (2011), in examining child outcomes in the Longitudinal Study of Australian Children (LSAC), found that children of older mothers had significantly better learning and social and emotional scores (using the Strengths and Difficulties Questionnaire or SDQ)[1] than those of younger mothers, until other characteristics were accounted for. Once child and family characteristics (including Indigenous status and maternal smoking) were controlled for there were no longer significant differences at the 0.05 level in children's learning scores, a result Bradbury attributes largely to mothers' education. Controlling for maternal age at first birth reduced the relationship even further. However, social and emotional scores remained slightly but significantly poorer for the children of younger mothers, despite controlling for other characteristics.

Evans (2007) found teenage motherhood arises from social disadvantage rather than necessarily being the cause of further disadvantage. Levine, Pollack and Comfort (2001) found that the relationship between young mothers and children's academic and behavioural test scores was entirely explained by pre-birth characteristics, arguing that teenage motherhood is a 'marker' for poorer child outcomes, not a cause. Levine, Pollack and Comfort also note they found an indirect relationship between teenage births and lowered children's scores via increased family size. Kalb, Le and Leung (2014), however, use propensity score matching to compare women with similar characteristics in the Household, Income and Labour Dynamics in Australia (HILDA) and LSAC studies and find that although selection bias accounts for a large proportion of teenage mothers' poorer outcomes, becoming a mother as a teenager leads to

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[1] Refer to Appendix B for information about this scale.

further disadvantage. Women who had a child as a teenager had poorer education and labour market outcomes and poorer health than similar women who were older mothers (Kalb, Le & Leung 2014).

According to Larkins (2007), young Indigenous mothers in Townsville were often on the path to not completing school before becoming pregnant, and parenthood offered a chance to get their life on track. The teenagers with adequate social support in Larkins' study felt motherhood was at last something they were good at.

Indigenous teenagers are five times more likely than Australian teenagers in general to become teenage mothers (AIHW 2009). Additionally, young people who live in remote Australia are more likely to give birth in their teens than those in urban areas.

Biddle and Yap (2010) used the 2006 census to examine the life course for Indigenous Australians—including the timing of life events such as education and childbirth—in comparison with non-Indigenous Australians. They note that Indigenous women generally have children earlier in their lives than non-Indigenous women and have more children over the life course.

Bradbury (2007), in comparing outcomes for children of Australian mothers in LSAC above and below age 23, controls for Indigeneity in his models and for age at first birth but does not examine outcomes separately for the children of Indigenous mothers. A composite research paper that examines a variety of outcomes in LSAC (Wake et al. 2008) finds that Indigenous 4 and 5 year-old children have much poorer social and emotional outcomes and slightly poorer learning outcomes than the non-Indigenous children, despite few differences in infancy.

It is widely known that Aboriginal and Torres Strait Islander children as a group do not achieve as well as non-Indigenous Australians at school (Zubrick et al. 2006). The achievement 'gap' between Indigenous and non-Indigenous children appears before children start school (Leigh & Gong 2008), upon entry to school (Centre for Community Health & Telethon Institute 2009) and widens as children move through the primary school years (Zubrick et al. 2006). What about within the Indigenous population? Do the children whose mothers had their first child as a teenager have poorer outcomes than the children whose mothers were older when they had their first child? Or are other variables that are associated with improved child outcomes more important?

There are a number of key characteristics that are often found to be related to children's vocabulary, development and social, emotional and behavioural difficulties. Parent education is often cited as a good predictor of child outcomes; however, Christian, Morrison and Bryant (1998) found that families who had low education levels but promoted literacy through daily reading, visits to the library and monitoring television viewing had children with higher receptive vocabulary scores than families with more highly educated mothers who did not actively promote literacy. The LSAC outcomes index paper (Wake et al. 2008) showed child learning outcomes increased with family literacy activities, attending a pre-year 1 education program, being read to by a family member and by sex, with girls doing better than boys. Speaking a language other than English, increased time spent watching television and family disadvantage also reduced scores.

Zubrick et al. (2004) found higher than usual social and emotional difficulty scores (SDQ) for Aboriginal children in Western Australia, with 26.3 per cent of children aged 4 to 11 years at high risk of clinically significant emotional or behavioural difficulties compared to 16.9 per cent of non-Aboriginal children. Scores were higher for boys, lower in extremely isolated areas and higher, though not significantly so, for the children of teenage mothers. Similar proportions of

children in *Footprints in Time* (22.5 per cent) are considered at high risk of clinically significant emotional and behavioural difficulties (FaHCSIA 2012).

Using *Footprints in Time* data, it is possible to examine whether the relationships between teenage motherhood and children's reduced vocabulary scores and increased social and emotional difficulties persist once other factors in the children's lives are taken into account.

It is hypothesised that the children of mothers who had a child as a teenager will have lower vocabulary scores and higher social and emotional difficulties scores but that once other factors in the children's lives are taken into account, the relationship to maternal age at first birth will not be a strong predictor of child outcomes.

Methodology

Sample

Data for the analyses included both Indigenous and non-Indigenous mothers of Aboriginal and Torres Strait Islander children (in Wave 3 for example, 16.6 per cent of mothers were non-Indigenous). As a control, the analysis was repeated with non-Indigenous mothers excluded, but this made very little difference to the overall results, so these results will not be reported separately.

Of the 1267 mothers in the Wave 3 responding sample, only 12.9 per cent gave birth to the study child when aged less than 20 years. However, 506 (39.9 per cent) mothers had a son or daughter in the household born when the mother was a teenager and 761 (59.4 per cent) did not. The median age of mothers at the birth of the oldest child in the household was 20 years, with mothers' ages ranging from 13 to 44 years for this 'first' birth. More than three-quarters of the mothers (81.9 per cent) had their first child by age 25. The median age of these mothers at the time of responding to Wave 3 of the survey was 30, with a range of 18 to 48 years. As respondents were not asked about children ever born or their first birth, some mothers in the sample may have had a child as a teenager who is no longer living in their household.

Outcomes: child social and emotional wellbeing

Children's social and emotional wellbeing is measured using the Strengths and Difficulties Questionnaire (SDQ)[2] (Goodman 2012) administered as part of the primary carer interview.

The final sample for this analysis includes 909 children from Wave 3 with social and emotional difficulties scores ranging from 0 to 31, with a mean of 12.2. Children's ages ranged from 36-96 months. The maximum difficulties score possible is 40. Explanatory variables are either time invariant or collected at Wave 3.

Outcomes: expressive vocabulary

Analysis relating to expressive vocabulary scores has been drawn from five waves of *Footprints in Time* as vocabulary was assessed using the Renfrew Word Finding Vocabulary Test (Renfrew 1995)[3] for the older cohort in Waves 1 to 3 and the younger cohort in Waves 4 and 5 (and in Wave 6, which is yet to be released).

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[2] Refer to Appendix B for information about this scale.
[3] Refer to Appendix B for information about this scale.

The final sample uses 2,157 test scores from five waves of data, comprising 1,150 children, with between 1 and 3 observations each. The score comprises total words named in English as very few children used words from another language to describe the pictures. Scores ranged from 0 to 50 with mean scores for the older cohort of 19.3 in Wave 1, 24.6 in Wave 2, and 31.3 in Wave 3 and means for the younger cohort at equivalent ages, were 19.4 in Wave 4 and 25.25 in Wave 5.

Secondary explanatory variables

Study child's characteristics included:

- age in months
- sex (male coded as 0/female coded as 1)
- global health (poor, fair, good/very good and excellent)
- parent concerned child has difficulty speaking or understanding what is said (no/yes)
- attended pre-school (Year 1 minus 2) at a pre-school, childcare centre with a preschool program, mobile preschool or Multifunctional Aboriginal Childcare Centre (no/yes)
- watches television 3 hours or more on week days (no/yes),
- family member read to child last week (no/yes).

Parent characteristics include:

- age at birth of the mother's oldest child in the household
- parent education (<Year 12/≥Year 12)
- English not always spoken at home (no/yes)
- seven or more major life events in that year (no/yes)
- parent has low social and emotional wellbeing (no/yes)[4]
- parent undertaking further study (no/yes)
- number of children in the household (<4/≥4)
- smokes (no/yes).

Deciles from the Index of Relative Indigenous Socioeconomic outcomes (IRISEO, Biddle 2009) have been coded for each child in the dataset. IRISEO rates the geographic area based on the socioeconomic wellbeing of Indigenous people who live there. This provides a more Indigenous-specific community level measure than Socioeconomic Indexes for Areas (SEIFA). A score of 1 indicates greater poverty and a score of 10 indicates greater wealth in that area.

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[4] This is based on the Social and Emotional Wellbeing scale divided at the median. However, in the multivariate analysis the measure has been used as a continuous scale. Refer to Appendix B for more information about this scale.

Statistical analyses

Bivariate relationships between having been a teenage mother when the oldest child in the household was born and study child outcome variables were explored using chi-squared tests. Multivariate analysis with the social and emotional difficulties score as the dependent variable was conducted using OLS regression. A longitudinal mixed effects multilevel regression model was used to examine vocabulary scores across five waves of data. The model controls for geographical clustering in the sample and tracks changes in individual children's vocabulary over time as well as differences between children.

Independent variables were included in the models if bivariate relationships were found to be significant at the 5 per cent level with difficulties and vocabulary scores, irrespective of finding relationships between ever and never having been a teenage mother. Two additional variables not showing significant bivariate relationships at the 5 per cent level, sex and television watching, were included in the final multivariate model as they have been shown to affect vocabulary and social and emotional difficulties scores (Christian, Morrison & Bryant 1998; Wake et al. 2008). Boys in the current analyses had slightly but not significantly lower vocabulary scores than girls and watching television for 3 or more hours on weekdays was actually related to an increase in vocabulary scores by 0.8 points, as well as increasing social and emotional difficulties scores by 1.0 points, both significant at the 5 per cent level. Boys did have significantly higher difficulties scores.

The sample is spread across all deciles of IRISEO, with some clustering around the sixth decile. As IRISEO and remoteness are moderately to strongly correlated for this sample (– 0.609), remoteness was not included separately as an explanatory variable. A t-test showed a significant difference in the mean IRISEO scores of ever and never teenage mothers ($p<0.001$) with mothers who had not had a child as a teenager tending to live in more advantaged areas.

Results

The model[5] shows that *Footprints in Time* children's vocabulary scores were on average lower if their mother was younger when she had her first child, even after controlling for other variables. Bivariate analysis shows that mothers who had their first child when older are more likely to have a higher education, fewer children and more stable lives (fewer major stress events). However, maternal age at first birth is still highly significant in predicting vocabulary scores (at the 1 per cent level), suggesting that waiting until you are older before starting a family has more far-reaching benefits.

Modelling[6] using Wave 3 data shows that *Footprints in Time* children also have significantly lower social and emotional difficulties scores if their mothers had their first child when they were older. Each increase of one year in maternal age at first birth ($p<0.01$) was associated with a 0.1 decrease in difficulties scores.

Figure 15 shows the characteristics of study children by whether their mother was ever or never a teenage mother. Chi-squared tests showed that several child characteristics at age 4 were related to having a mother who had given birth as a teenager. Children born to teen mothers were significantly less likely to report having very good or excellent health at age 4, less likely to have ever attended preschool and less likely to have been read to in the last week by a family member.

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[5] Mixed effects longitudinal regression.
[6] Multivariate OLS regression.

**Figure 15: Characteristics of children aged 4 by whether their mother had a child when aged 19 or younger (n=1255).**
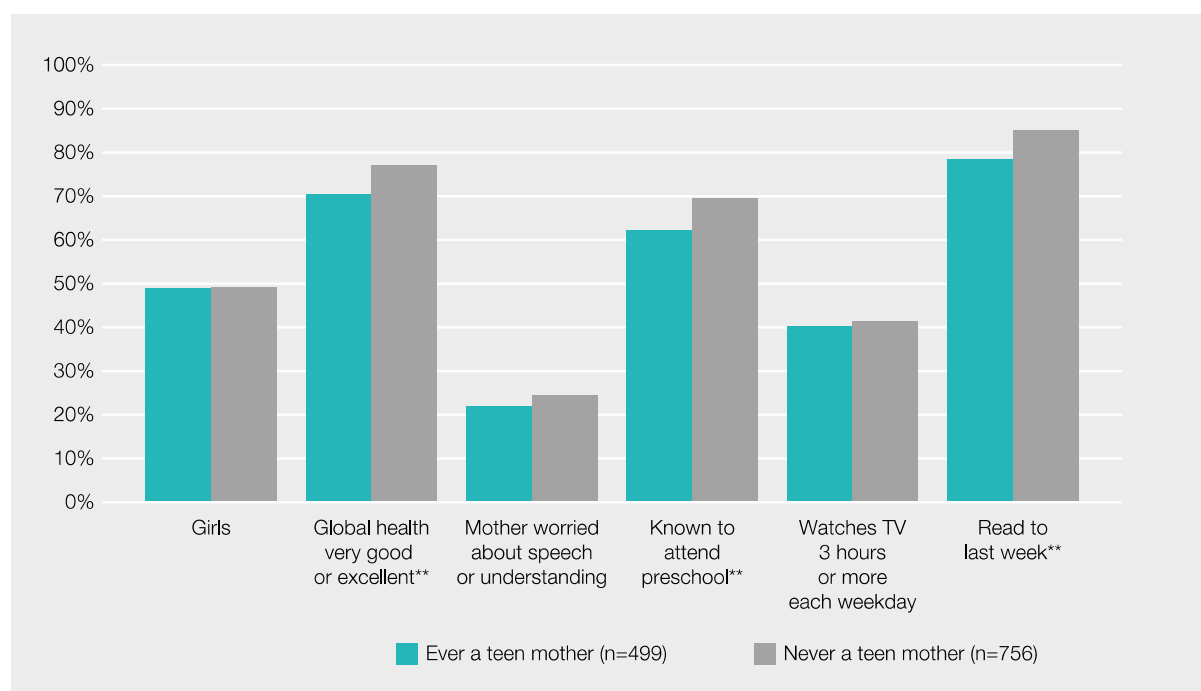
Pearson's chi-squared difference significance <0.01**, <0.05*.

Tabular version of figure 15

Child characteristic	Ever a teenage mum (n=499)	Never a teenage mum (n=756)
Girls	49.3	48.9
Global health very good or excellent **	70.7	77.0
Mother worried about speech or understanding	22.0	24.4
Known to attend preschool **	62.3	69.6
Watches TV 3 hours or more each weekday	40.0	41.3
Read to last week **	78.6	85.6

Figure 16 shows the proportion of parents with selected characteristics depending on whether or not they had ever been a teenage mother. Chi-squared tests showed significant relationships between having been a teenage mother and years of education, languages other than English being spoken at home, number of children in the household, smoking, and likelihood of having experienced 7 or more major life events.

Figure 16: Proportion of Indigenous mothers with selected parent characteristics in Wave 3 by whether they ever or never had a child when aged 19 or younger (n=1267).
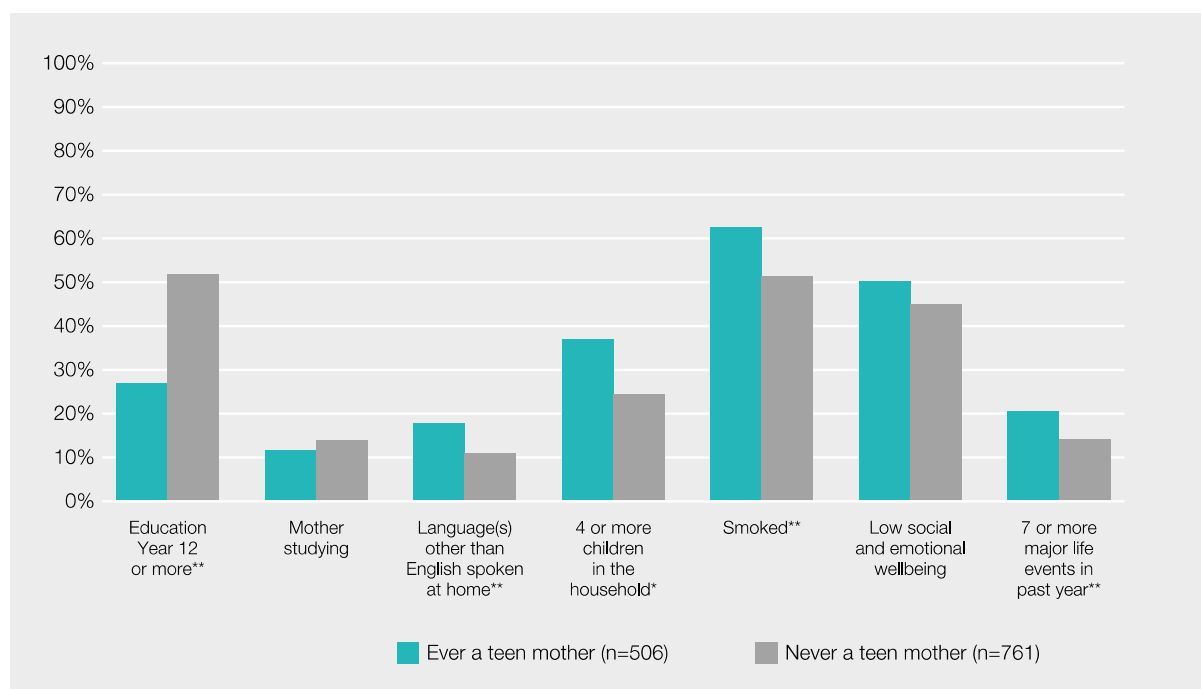

Pearson's chi-squared difference significance <0.01**, <0.05*.

Tabular version of figure 16

Parent characteristic	Ever a teenage mum (n=499)	Never a teenage mum (n=756)
Education Year 12 or more **	27.4	51.8
Mother studying	11.7	13.8
Language(s) other than English spoken at home**	18.2	11.6
4 or more children in the household**	37.6	24.7
Smoked**	62.6	51.5
Low social and emotional wellbeing	50.1	45.0
7 or more major life events in past year **	20.4	14.5

Multiple classification analysis (MCA) allows the prediction of mean values while controlling for other predictors in the model. Figure 17 uses MCA to compare child and parent characteristics in the model. Higher vocabulary scores are associated with children having been to preschool, being read to in the previous week and watching television for 3 hours or more on a weekday. Children's vocabulary scores also tend to be higher when mothers are studying and have completed Year 12 or further education. Although not shown in Figure 17, scores also improved with children's age and if the study child lived in a more advantaged area. Child health and being female did not make a significant difference to vocabulary scores in the mixed effects model, nor did mothers' social and emotional wellbeing, smoking, or experience of major life events. Vocabulary scores tended to be lower when languages other than English were spoken at home, when mothers had concerns about study children's speech or understanding and with the presence of four or more children in the household.

**Figure 17: Estimated vocabulary scores by different mother and child characteristics (longitudinal analysis).**
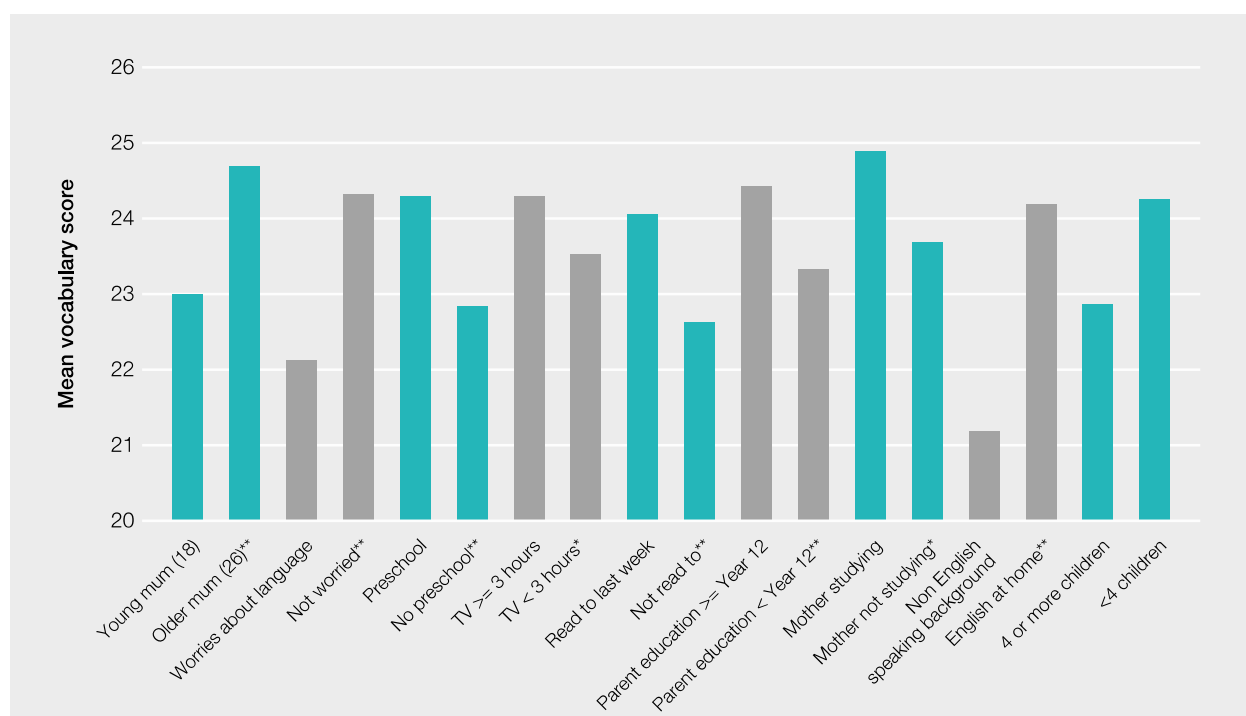
**p<0.01; *p<0.05.

Tabular version of figure 17

Mother and child characteristic	Estimate vocabulary score
Young mum (18)	23.0
Older mum (26) **	24.7
Worries about language	22.1
Not worried about language **	24.4
Preschool	24.3
No preschool **	22.9
TV three hours or less	24.3
TV more than 3 hours **	23.6
Read to last week	24.1
Not read to last week **	22.7
Parent education Year 12 or greater	24.5
Parent education less than Year 12 **	23.3
Mother studying	24.9
Mother not studying *	23.7
Non English speaking background	21.2
English at home **	24.2
4 or more children	22.9
Fewer than 4 children**	24.3

Figure 18 shows how the same factors affecting vocabulary scores affect the children's social and emotional difficulties scores at Wave 3. Social and emotional difficulties scores decrease with increasing maternal age at first birth. Reduced scores are related to children being in good health and maternal education at Year 12 or higher (at the 10 per cent level). Reduced scores are also associated with being older and being a girl (not shown in Figure 18). Major life events did not change scores significantly in the model.

Figure 18: Estimated difficulties scores by selected mother and child characteristics (Wave 3 data).
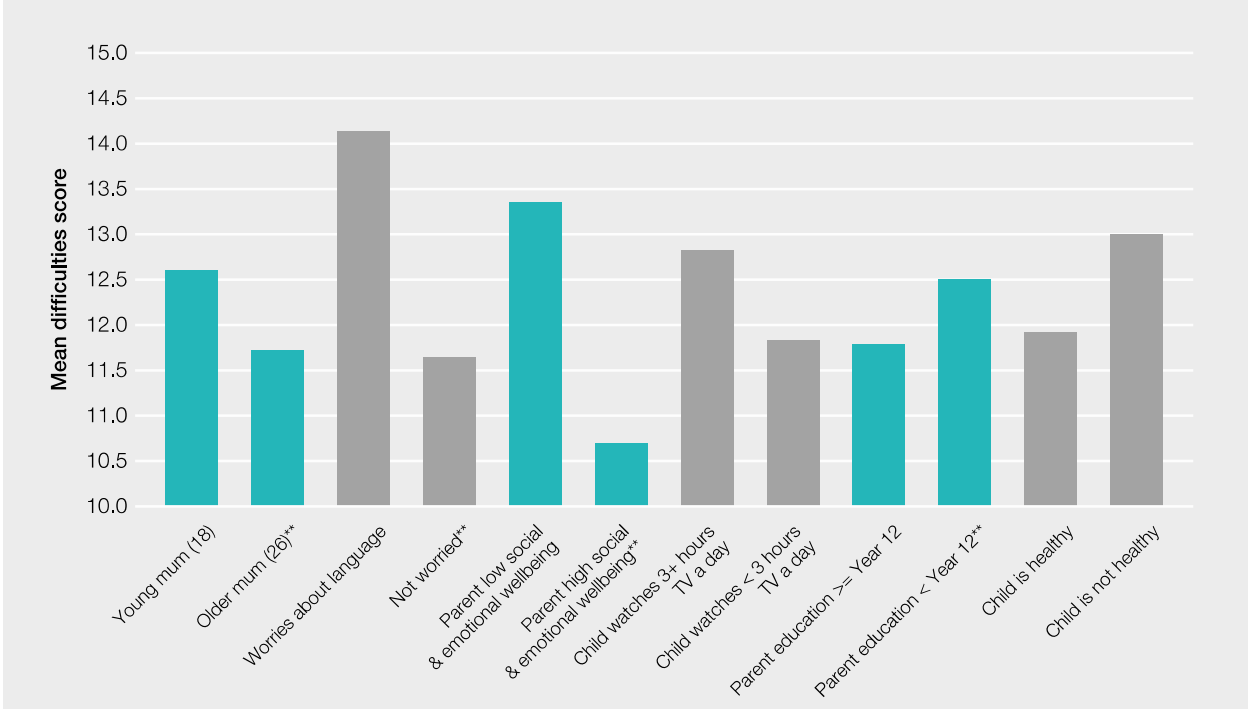
**p<0.01; *p<0.05

Tabular version of figure 18

Mother and child characteristic	Estimate difficulties score
Young mum (18)	12.6
Older mum (26) **	11.7
Worries about language	14.1
Not worried about language **	11.6
Parent low social and emotional wellbeing	13.4
Parent high social and emotional wellbeing **	10.7
Child watches TV three hours or less a day	12.8
Child watches TV more than 3 hours a day	11.9
Parent education Year 12 or greater	11.8
Parent education less than Year 12 **	12.5
Child is healthy	11.9
Child is not very healthy	13.0

Children whose mothers had low social and emotional wellbeing or were concerned about their child's speech or understanding had higher social and emotional difficulties scores. Scores were also higher if children watched three or more hours of television a day.

Discussion

It was hypothesised that the children of mothers who had their first child when they were a teenager would have lower vocabulary scores and increased social and emotional difficulties scores, and this was found to be the case. It was also hypothesised that once other characteristics were taken into consideration, maternal age at first birth would not have a strong relationship with vocabulary and social and emotional difficulties scores. In fact the relationship between the outcome variables and maternal age at first birth was still significant in the multivariate and mixed effects models.

It seems that maternal age at first birth is related to vocabulary as well as social and emotional difficulties for the children in *Footprints in Time*. The study children's outcomes generally improve with each year that mothers delay having their first child. As the *Footprints in Time* sample is not random these results should not be generalised to all Indigenous children and mothers. Nevertheless *Footprints in Time* does provide an opportunity to explore variation within a sizeable sample of Indigenous children and their mothers.

It is encouraging that anyone in the family reading to the study child provided one of the largest increases in vocabulary scores. This supports the literature (Levine, Pollack & Comfort 2001; Wake et al. 2006) suggesting that what parents and carers do and the experiences their children have, such as attending preschool, can be more important than the parents' life circumstances. Biddle and Yap (2010) suggest that many Aboriginal and Torres Strait Islander families can draw on considerable family and social resources. Larkins (2007) found that young Indigenous women were confident their families would support them if they were to become pregnant. So mothers with extended family support may have parents, grandparents, aunties and siblings that all assist in improving their child's vocabulary.

Gregson (2009) found that teenage mothers were quite competitive, wanting to demonstrate that they were good parents and made considerable efforts to encourage their child's development. The competitive nature of many teenage mothers and the desire of many Indigenous parents for their children to do well (Larkins 2007) suggests that young mothers who know that reading to children and attending preschool improves vocabulary will endeavour to ensure that their children are given these advantages.

Larkins (2007) found that young Indigenous mothers were concerned their children would be negatively affected by them returning to study. The number of mothers in this analysis who are studying is fairly small (n = 164 or 13.1 per cent of mothers of four year olds), but the relationship to improved vocabulary scores is a useful finding. This may be an important message for young mothers as Biddle and Yap, while noting many Indigenous women return to study later in the life course, found no evidence of an education 'catch-up' for the women who had children when young.

Indigenous mothers in *Footprints in Time* want their children to do well, get a good education, a good job and lead a good life (Robertson et al. 2011). However the best intentions can be thwarted by life circumstances. Zubrick et al. (2005) found a fivefold increase in the risk of clinically significant emotional and behavioural problems for the children in families dealing with seven or more life stress events. Although major life events did not change scores significantly in either model, mothers' mental health did affect children's social and emotional difficulties

scores. This suggests that there is a need for culturally safe and supportive services, particularly for young Indigenous mothers who do not have families to support them and are likely to be facing large numbers of stressful life events.

Further research is needed to investigate the ways young Indigenous mothers with different social circumstances best receive social support; for example, supporting extended families as well as the mother herself. As the AIHW note:

> While not all teenage births result in negative outcomes for mother and child the circumstances that often contribute to teenage birth mean that many young mothers do not receive the support they need during and after the birth. (AIHW 2011)

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