In this issue

Children's rights and the new sociology of childhood

Indigenous inequities in preschools and universities

Workplace issues: Wages and staff wellbeing

Playful-learning environments: What matters to children

Involving parents: digital recordings, a numeracy project

and more …
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Contents

ii Editorial
Margaret Sims

1 Children's rights and early childhood education
Links to theory and advocacy
Anne B. Smith

9 Indigenous Australians and preschool education
Who is attending?
Nicholas Biddle

17 University-qualified Indigenous early childhood teachers
Voices of resilience*
Alma Fleet, Ros Kitson, Bevan Cassady and Rose Hughes

26 Children's services, wages and WorkChoices
A 'fairer' workplace relations system?
Michael Lyons and Meg Smith

33 The health and wellbeing of adults working in early
childhood education*
Belinda J. McGrath and Annette D. Huntington

39 From bogey mountains to funny houses
Children's desires for play environment*
Pirkko Hyvönen and Marjaana Kangas

48 Home-school partnership within mathematics
intervention*
Marguerite Maher

59 'I know how much this child has learned. I have proof!'
Employing digital technologies for documentation
processes in kindergarten*
Margot Boardman

* Denotes primary research articles
Indigenous Australians and preschool education
Who is attending?

Nicholas Biddle
Centre for Aboriginal Economic Policy Research, Australian National University

This paper discusses the individual, family, household and area level characteristics associated with preschool attendance for Indigenous and non-Indigenous Australians (aged three to five years who are not at school). Controlling for these factors explains all of the difference between Indigenous and non-Indigenous attendance rates for three-year-olds and much of the difference for four- and five-year-olds.

Households Indigenous children live in have lower incomes and education levels than those of non-Indigenous children. Both factors are associated with lower attendance in preschool. State and territory, as well as remoteness, are also important explanatory variables, although the effects are different for Indigenous and non-Indigenous children. Finally, having a preschool worker who identifies as being Indigenous working in the area significantly increases attendance for Indigenous children in that area. However, fewer than 30 per cent of Indigenous children live in such areas.

Introduction

Quality preschool education can have substantial positive effects for the children who attend, easing the transition to school and providing a boost to a child's self-esteem as well as their future scholastic ability (Barnett, 1995, 1998; Buckley, 1998; Ferson, 1997; Hendricks, Echols & Nelson, 1989; Magnuson, Ruhm & Waldogel, 2005; Masse & Barnett, 2002). In Australia, attendance at preschool is not compulsory and there is often a fee payable by the parent or guardian. This is likely to lead to variation in preschool attendance among eligible Australian children.

There is very little research in Australia on how attendance at preschool varies by the characteristics of the child. Furthermore, the information available is mainly descriptive and, to the author's knowledge at least, there is no research focusing on Indigenous children. The research that is available suggests that the socioeconomic characteristics of the family and household have a strong influence on preschool attendance. For example, in the US, Bainbridge et al. (2006) report lower enrolment in pre-primary education by race (Hispanic children had lower attendance than white non-Hispanic children, who in turn had lower attendance than black children), income and parental education. These differences were found in both descriptive and multivariate analyses.

Public policy also makes a difference. Capizzano, Adams and Sonenstein (2000) found differences in attendance rates by the state where the child lived. Furthermore, Magnuson, Ruhm and Waldogel (2005) looked at variation in increases in public funding of pre-primary education and found that such increases were the main reason for decreases in the gaps in enrolment between high- and low-income families.

Similar patterns by income and education were reported for Australia by the ABS (2004). That is, for all four-year-olds in 2001, attendance was higher for those who lived in a household in the higher income quintiles and also higher with increased parental education. Indigenous Australians were reported to be less likely to attend preschool; however, the extent of the difference varied by age and remoteness.

This paper discusses evidence on the factors associated with preschool attendance, with particular focus on Indigenous Australians. Indigenous children are less likely to attend preschool, and the Commonwealth Department of Education, Science and Training lists equal access to preschool education for Indigenous Australians as one of the 21 goals for Indigenous education (DEST, 2005a). More specific reasons for studying the factors are:
Some of the measured benefits to preschool education may be as a result of the type of student who attends. In the absence of longitudinal data, looking at the factors associated with attendance may enable a more thorough understanding of the effects of preschool attendance.

Under the assumption that preschool education does have an effect on individuals, variation in attendance at preschool will likely lead to variation in outcomes.

Indigenous Australians are likely to drop out of later secondary school before completion. Such drop-out rates may be reduced by a better start to their formal schooling through attendance at quality preschools responsive to their needs. By looking at how the factors associated with attendance vary with Indigenous status, information is gained on why Indigenous students are less likely to attend preschool.

For this paper, preschool is defined as 'educational and developmental programs for children in the year (or, in some jurisdictions, two years) before they begin full-time primary education'. Preschools generally cater to children aged three-five years and are usually open only during school terms between 9am and 3pm (ABS, 2003). In addition to preschool, many children experience other forms of formal or informal care prior to and concurrent with attendance at preschool. Some form of education is likely to occur during this care. Furthermore, although preschool is often thought of as primarily educational in nature, a number of parents or guardians are likely to use preschool at least in part as a form of care and supervision for their children. Because of data constraints, such care is not analysed in this paper. However, such an analysis would be quite useful were the data available.

**Preschool education in Australia**

**Current education policy and patterns of attendance**

In Australia, the responsibility for the early years of childhood education is spread across federal, state and local governments. The Commonwealth Government's role in preschool is mainly confined to specialist programs for Indigenous Australians. This funding occurs as part of the Indigenous Education Strategic Initiatives Programme (IESIP) and is largely outside the state government or Catholic systems. In 2003, an estimated $11.2m in supplementary funding was provided to education providers. This represented 7644 full-time equivalent preschool Indigenous enrolments (DEST, 2005b).

The following table looks at the participation in early childhood education by Indigenous status as of the 2001 Census of Population and Housing (henceforth the Census). Looking at the entire three-five-year-old population, the table breaks each age group down into those that reported attending preschool, those at infants or primary school, and those who were not attending any type of educational institution. Indigenous and non-Indigenous data are shown in separate columns, with the ratio between the two presented in the final column.

Table 1 shows that educational attendance increases with age. Not surprisingly, the proportion of children attending infants/primary school increases, but so too does the rate of attendance at preschool (for those not at school). Furthermore, the disparity between Indigenous and non-Indigenous attendance is greater the older the child. That is, the ratio of Indigenous to non-Indigenous Australians who are not attending any school increases from 1.04 at age three to 1.26 for those aged four and then 1.97 for those aged five.

<table>
<thead>
<tr>
<th>Age</th>
<th>Type of institution-attending</th>
<th>Indigenous</th>
<th>Non-Indigenous</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 years</td>
<td>Preschool</td>
<td>20.54</td>
<td>23.95</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>Infants/primary school</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Not attending any school</td>
<td>79.46</td>
<td>76.05</td>
<td>1.04</td>
</tr>
<tr>
<td>4 years</td>
<td>Preschool</td>
<td>46.06</td>
<td>57.12</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>Infants/primary school</td>
<td>6.83</td>
<td>5.36</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>Not attending any school</td>
<td>47.31</td>
<td>37.52</td>
<td>1.26</td>
</tr>
<tr>
<td>5 years</td>
<td>Preschool</td>
<td>31.91</td>
<td>33.97</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>Infants/primary school</td>
<td>52.40</td>
<td>58.08</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>Not attending any school</td>
<td>15.69</td>
<td>7.95</td>
<td>1.97</td>
</tr>
</tbody>
</table>

Source: 2001 Census (author's calculations)
Given the central role state and territory governments play in preschool policy, outcomes with regard to preschool education vary quite substantially across the different jurisdictions. ABS (2002) shows that the age of entry into preschool and then compulsory schooling varies quite substantially by state and territory. The fee structures also vary. In Tasmania and the Northern Territory, government preschool services are provided at no compulsory cost to parents. In Victoria, South Australia, Western Australia and the ACT the majority of families pay some fee, although this fee is not compulsory. In NSW and Queensland fees vary depending upon the provider of the service. NSW is the only state which does not have universal preschool provision for four-year-olds (Press & Hayes, 2000).

Effect of preschool

Partly because of the effect on later academic achievement, but also because of direct effects on social skills, maturity and self-confidence (Kronemann, 1998), children who attend preschool have been found to be better off in terms of self-esteem and later social and emotional maturity, as well as being less likely to engage in criminal and antisocial behaviour, teen pregnancy or drug abuse (Hull & Edsall, 2001).

With regard to health, attendance at preschool may expose a child to a greater number of potential infections and infectious diseases (Ferson, 1997). However, there are also likely to be a number of positive effects. Long-term health is likely to be improved through the effect preschool has on cognitive development and academic achievement (see Masse & Barnett, 2002, for a calculation of the effect on smoking). There are also likely to be direct, immediate effects on nutritional or general health knowledge (Hendricks, Ehols & Nelson, 1989).

The potential positive effects that preschool education might have on future academic achievement and broader cognitive development are also important. Preschool can improve a child’s school readiness and close some of the gap between ‘at-risk’ and other students in terms of cognitive development and school achievement. Most studies find that, in the short-term, there are large effects on both achievement and IQ scores (Barnett, 1995; Boocock, 1995). Heckman, Stixrud and Urzua (2006) identify early childhood education as having its greatest effect on non-cognitive ability (motivation, persistence and self-esteem) as opposed to cognitive ability. Furthermore, they identify non-cognitive ability as being ‘as important, if not more important’ (Heckman, Stixrud & Urzua, 2006, p. 27) than cognitive ability in explaining future outcomes such as school completion and wages.

Not all preschool education has the same effect on a child’s development. A quality preschool education is likely to be beneficial for a child; however, poor-quality preschool may in fact have a negative effect on outcomes (Magnuson, Ruhm & Waldfogel, 2005). There is debate about what constitutes quality preschool, but Raban (2000) identified several characteristics:

- More highly qualified staff.
- The involvement of outside experts.
- Lower child–staff ratios and smaller group sizes.
- Parents who are involved and included.
- Low staff turnover and stable arrangements so that children interact with just a few primary caregivers in a given day.

Raban (2000) reported on a study, ‘Cast, quality and child outcomes in childcare centres’ (CQO Study Team 1995, 1999), which demonstrated that those students who experience quality child care are found to be more likely to experience:

- better performance cognitively and socially through transition into school
- measureable impacts through the first year of schooling and for many into their third year
- especially large improvements for those students considered ‘at risk’
- later success in literacy and numeracy during the early years of schooling.

At a broad level, these measures of quality are likely to apply just as much to Indigenous as non-Indigenous children. Indeed, given that quality childhood education programs have been found to be of most benefit to ‘at risk’ students, it could be argued that quality is of particular relevance to Indigenous Australians. However, owing to differences in culture, language and learning style, the types of policy, curricula and method which may be relevant to children with an Anglo-Celtic origin may not be relevant to Indigenous children (Buckley, 1996; Butterworth & Candy, 1998).

Applying the dimensions of quality proposed by Munton, Mooney and Rowlands (1995), Butterworth and Candy (1998) outlined a number of aspects of quality early childhood practice for Aboriginal children. The authors identify involvement by Aboriginal people at all levels to be important, with flexible programs building on Aboriginal culture, experiences and skills. Furthermore, Glover (1994) identified the very young as particularly requiring an ‘Aboriginal’ environment, and Schwab and Sutherland (2003, p. 56) have outlined the potentially positive influence on attendance that Indigenous learning communities who incorporate Indigenous involvement in schools might have.

Data

This paper uses the 2001 Census as the main source of data. The Census is run every five years and aims to collect information on every person in Australia on...
census night (which in 2001 was 7 August). In addition
to collecting basic demographic, income and household
data, the Census also asks whether or not a person is
currently attending an educational institution, and, if so,
what type of institution. Included in this are preschools.

Because of the large sample, the Census provides
robust information at a highly disaggregated level.
Hence one is able to look at relatively small geographic
areas or subgroups of people that do not make up a
large proportion of the population. There are, however,
drawbacks to using the Census for analysis of Indigenous
preschool participation, mainly because of the use of
self-enumerated forms. The concept of preschool, and
to a lesser extent that of Indigenous status, is left mainly
up to respondents to define. The enumeration of a child
as attending preschool is therefore affected not only by
their actual status, but also by how the person in
the household responding on their behalf defines the term.

Factors associated with preschool attendance—method

To look at the factors associated with preschool attendance, the method used in this study is a regression style analysis. This technique allows the researcher to look at how a particular characteristic (for example, household income) is associated with the dependent variable (the probability of attending preschool) while controlling for or holding constant the other variables included in the model (for example, remoteness).

A more detailed explanation of the method and the table of results are provided in the Appendix to this paper. The remainder of this section looks at the independent variables that are on the Census and assumed to be associated with preschool attendance. As the variables are generally categorical (as opposed to continuous) for each variable there is a base category (for example, male) against which an alternate category (for example, female) is tested.

To select the explanatory variables, the unit of analysis is the individual, and individual characteristics are taken into account when analysing the decision about whether the child should go to preschool. As the effect of age on readiness and need for preschool is likely to be strong, a separate model is estimated for those aged three, four and five years. There is also a variable for whether the child is female, born overseas, has at least one parent born overseas (as opposed to both parents born in Australia).

The relationship between a child's Indigenous status and their probability of attending preschool is measured in two ways. First, a variable for whether a person is Indigenous (as opposed to the base case of being non-Indigenous) is included in the standard model. Results for this estimation are given in Table 2 in the Appendix. Second, a separate model is estimated for Indigenous and non-Indigenous Australians. This will show whether the relationship between the other explanatory variables and preschool attendance is different for Indigenous compared to non-Indigenous children (with results given in Table 3).

It is recognised in this paper that families make decisions taking into account their shared beliefs and constraints, where these beliefs and constraints are shaped by not only family characteristics but also the wider household and community setting. The family level variables used in this paper capture the variation in relative demand for preschool education at the family level. In selecting these variables, it is assumed that family level characteristics affect the desire to send preschool age children in the family to preschool because of the belief in the efficacy of preschool. The first set of variables used is the education level within the family. The base case being compared against is a family where at least one member has completed Year 12 but none has completed a university degree. Two variables are then set up for a) when no-one in the family has completed Year 12 (or a degree); and b) where at least one member of the family has a degree or higher.

The other family level variable used in the paper measures the presence of other children. For this variable, the base case is a family where there are no other children of five years or under not at infants or primary school. The alternate case is at least one other person in the family of that age not at school. This variable captures the possibility that having other children in the family who require some form of care (perhaps through preschool) may influence the desire for preschool through increasing the overall cost or burden for the family, albeit with the possibility of economies of scale.

The variable available on the Census that best captures access to economic resources is income. In this paper it is assumed that income and expenses are shared at the household level, and therefore household income is used. However, it is also assumed that there are significant yet not complete economies of scale, and therefore household income is equivalised using the ‘new’ OECD equivalence. (For a discussion on equivalence scales, including the validity of applying the same equivalence scale to Indigenous and non-Indigenous households, see Hunter, Kennedy & Biddle, 2004). By equivalising income, it is assumed that an extra person in the household requires some additional resources; however, less than the first person in the household. Income is classified into quintiles, with the middle (third) quintile set as the base case.

For the standard model, those who live in NSW are set up as the base case, with a separate variable used for the remaining seven states or territories. To capture geographic access to preschool, the remoteness of the area the child lives in is therefore used. Using the five-
point remoteness scale, areas are put into the following categories: major cities (the base case); inner regional; outer regional; remote; very remote.

Indigenous children are more likely to go to preschools which are sensitive to their unique needs. It would of course be preferable to have a variable that directly captures such Indigenous-specific programs. Unfortunately, such a variable is not available on the Census. The final community-level variable may, however, capture such an effect. This variable measures whether or not there is a preschool worker who reported that they worked in the child's area and who identified as being Indigenous. This variable is used in the Indigenous status-specific estimates only with 27.5 per cent of Indigenous children living in areas with an Indigenous preschool worker and 17.0 per cent of non-Indigenous children. Also included is a variable measuring whether or not there are any preschool workers in the area, to make sure the Indigenous preschool worker variable is capturing the Indigenous aspect only.

**Factors associated with preschool attendance—discussion of results**

The marginal effects for the factors associated with preschool attendance are given in the appendix to this paper in Table 2 (for Indigenous and non-Indigenous children together) and Table 3 (for Indigenous and non-Indigenous children separately). This section discusses the more important results.

In comparison to the bi-variate probabilities presented earlier, after controlling for all other variables, Indigenous three-year-olds are more likely to be attending preschool than are similar non-Indigenous Australians. For an Indigenous four- and five-year-old, on the other hand, the probability is significantly lower. In other words, for three-year-olds, the lower observed probability is caused by the distribution of other factors that are also likely to be related to preschool attendance. With four- and five-year-olds, however, it is not only the distribution of other factors that lead to a lower probability, but also something about being Indigenous in and of itself.

So how are these other factors associated with the probability of attending preschool? First, being female has a small but significant positive association with attending preschool for three- and four-year-olds, but no association for five-year-olds. Of the family level variables, the presence or absence of certain types of education has the strongest and most consistent association. Compared to other families, those which contain at least one person who has completed a degree are more likely to send their children to preschool. Compared to this, those families with both no degree and no-one who has completed Year 12 are less likely to send their children to preschool. Given the model controls for access to resources, this result implies that those who have completed Year 12 or obtained a degree are more likely to see formal education as a worthwhile endeavour, or alternatively are more likely to have had at least some positive experiences in education in the past. According to Schwab and Sutherland (2003), ‘As a result of unsuccessful past engagements with education, many parents are ill-equipped to provide assistance and direction in their children’s education.’

Access to resources also has a constant and significant association with preschool attendance. Higher income households (after equilibrising to take into account household size) are more likely to send their children to preschool than are lower income households.

Remoteness also has a significant, albeit varied, effect. For three-year-olds, those in major cities generally have the highest probability of attending preschool, whereas for four- and five-year-olds it is highest for those in regional areas. Apart from those children in very remote Australia, though, the magnitudes of the marginal effects are not large. Not only are the differences by state and territory within each age group large, the nature of the differences also vary by age. For three-year-olds, all the marginal effects are negative, showing that of the eight states and territories, children in NSW have the highest probability of attendance (South Australia and Victoria have the highest probabilities outside NSW).

For four-year-olds, those in NSW no longer have the highest probability of attending, with those in South Australia, Western Australia and the Northern Territory all having a higher probability, and Victoria, Queensland and Tasmania having the lowest. Finally, for five-year-olds, NSW now has the lowest probability of attending. Victoria, South Australia and the Northern Territory have a slightly higher probability, with the others all having a probability 0.100 higher than NSW (a probability of virtually one).

Table 3 in the Appendix presents results showing how the association between attendance and other explanatory variables is different for Indigenous and non-Indigenous four-five-year-olds. The majority of variables that are significant have the same sign for the Indigenous as the non-Indigenous population. However, the magnitudes of the marginal effects are generally higher for the Indigenous population. This is especially the case for those who live in ‘very remote’ Australia. Here the probability was estimated to be 0.067 points lower for the non-Indigenous population, but 0.166 points lower for the Indigenous population. Furthermore, the coefficient for those living in remote Australia is significant (and negative) for the Indigenous population, but insignificant for non-Indigenous four- and five-year-olds. In other words, the effect of remoteness is much greater for the Indigenous population. The effect of living in a household with low income is also greater for the Indigenous population, as is the effect of the education levels in the family.
Having an Indigenous preschool worker in the child's area has a positive and reasonably large association with attendance for the Indigenous population, but a virtually zero (albeit still significant) association for the non-Indigenous population. An Indigenous four- or five-year-old who lives in such an area (while setting the other characteristics equal to the base case) is predicted to have a probability of attendance almost exactly the same as a non-Indigenous Australian with the same characteristics.

Summary and conclusion

The aim of this paper was to look at the factors associated with the probability of an Indigenous child attending preschool. The main finding is that, after controlling for only a limited set of factors associated with preschool attendance, an Indigenous three-year-old is more likely to attend preschool than is a non-Indigenous child of the same age. Although Indigenous four- and five-year-olds are less likely to attend after controlling for the same factors, the marginal effect of being Indigenous is less than the raw probabilities would suggest.

The low attendance of Indigenous children is therefore as much to do with the relative distribution of other characteristics, the different effect these characteristics have, and other characteristics unique to Indigenous Australians.

The households Indigenous children live in are likely to have lower incomes than are the households of non-Indigenous children. The education levels in the household are also lower for Indigenous children. The most consistent finding on the factors associated with preschool attendance is that both are associated with lower attendance. What this paper has also shown is that the effect of these factors on Indigenous children is even greater than on the non-Indigenous population.

Most likely because of transport and other costs, children who live in remote and very remote areas are less likely to attend preschool. Indigenous children are doubly disadvantaged because they are much more likely to live in these areas and the effect of remoteness is greater for them.

The presence of a preschool worker who identifies as Indigenous and is working in the area where a child lives significantly increases attendance. There are likely to be other, similar factors not available on the dataset used, that show the 'cultural inclusiveness' of the preschool has an important effect. Importantly, Indigenous preschool workers had no adverse effects on attendance of non-Indigenous children.

Unfortunately, under 30 per cent of Indigenous Australians live in areas with Indigenous preschool workers. There are, of course, difficulties in recruiting Indigenous preschool workers; however, this study has shown the potential benefit of doing so. In particular, the association with preschool attendance of Indigenous preschool workers and education levels in the family supports the call by Schwab and Sutherland (2003) for the introduction of a greater number of Indigenous learning communities. Such communities, where schools become the focal point for the community and support a greater role for Indigenous parents in their own and their child's education, are likely to make Indigenous parents more comfortable in sending their children to what they see as a culturally inclusive school.

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References


Appendix. Model results

The probit model is used to fit the data, with the parameters of the model estimated through maximum likelihood estimation techniques (Greene 2000). The associations each of the independent variables has with the probability of attendance are expressed as marginal effects or the estimated change in probability of attending preschool after varying one characteristic but keeping all else constant. So, as an example, the marginal effect of being Indigenous for a four-year-old is -0.052. This means that, according to the model, an Indigenous four-year-old has a probability of attending preschool 0.052 points lower than an otherwise identical non-Indigenous child. The coefficient estimates used to derive these marginal effects are available from the author upon request.

The presentation of results begins with the model estimates for each age separately and then those done separately by Indigenous status for 4–5-year-olds. Those variables that were not significant at the 10 per cent level of significance are marked as ‘−’ with those only significant at the 10 per cent but not the 5 per cent level marked with an ‘∗’ and those significant at the 5 per cent but not 1 per cent significance level marked with an ‘∗∗’. Variables that are insignificant at the 10 per cent level of significance are labelled as ‘−’ and the bottom four lines of the table give some characteristics of the model. The observed probability refers to the proportion of people in that age group who were reported to be attending preschool, not controlling for any other characteristics. The second line gives estimated probability of the base case child attending preschool. The next line gives the sample size for the estimations with the final line in the table presenting a commonly used diagnostic statistic (Pseudo R²) which varies between zero and one, reflecting how well the model fits the data (the higher the number the better the fit).