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DISADVANTAGED?**

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ENTRY INTO UNIVERSITY: ARE THE CHILDREN OF IMMIGRANTS DISADVANTAGED?

ABSTRACT

The failure or success of students at school can have important impacts on their future studies and labour market outcomes. Furthermore, school performance of the children of immigrants can inform on their adjustment or disadvantage (if any) in the country of destination. This paper examines the tertiary entrance scores of children with migrant parents (first- and second-generations Australians) and children with Australian-born parents. It shows that the tertiary entrance scores do not differ between native-born children with Australian-born parents and second-generation Australians. However, children born overseas with migrant parents (first-generation Australians) have higher tertiary entrance scores than native-born children. One of the main factors contributing to the difference in tertiary entrance scores between first-generation Australians and children with Australian-born parents is the way parental assistance is provided.

JEL Classification: I20; I21; J15.

Keywords: Educational economics; human capital.

1. Introduction

School performance of immigrant children is an important issue for a number of reasons. For example, school is the first major formal organisation that children encounter on their own. Therefore, information on immigrant children's adjustment in the country of destination and relative success can be gauged from performances in schools. Moreover, the importance of parental guidance and support can be examined in the context of their children's school performance. Finally, information on immigrant children's performance in schools can provide a useful guide for government programs that target overseas-born children, especially in the immediate period after arrival.

School performance can be measured in a number ways, including progressing beyond a certain level in school, completion of high school or tertiary entrance scores.¹ This paper compares the tertiary entrance scores of native-born children with native-born parents and children with migrant parents. Among children with migrant parents, comparisons are made between first- and second-generation Australians.² The research presented focuses on family background and early achievements as possible factors influencing tertiary entrance scores. The paper contributes to the literature in a number of ways.

First, the analysis directly captures the adjustment and parental support of overseas-born children from English speaking (ES) and non-English speaking (NES) migrant families. Overseas-born children with migrant parents may come from a different culture and speak a different language compared to native-born children. Because of these differences migrant children may be disadvantaged in the host country's schools, particularly when they first arrive there. However, it is expected that the disadvantage will disappear over time as migrant children, and their parents, adjust. Alternatively, children who were born overseas may benefit from closer family

¹ In Australia the most common method for students wishing to enter a university after completing high school is via the tertiary entrance examination at the end of Year 12. Placement at a university is based on the tertiary entrance examination score students obtain. While each university has its own minimum entrance score requirement, students with a higher tertiary entrance score have a greater chance of entering a university than students with a lower entrance score.

² In this paper native-born children are Australian born with both parents born in Australia. First-generation Australians are those who were born overseas and whose parents were born overseas. Second-generation Australians are those who were born in Australia but whose parents were born overseas.

ties and support which enhance their school performance relative to native-born children.

Second, there may be differences in school performance between overseas-born children with migrant parents (“first-generation migrant children”) and native-born children with overseas-born parents (“second-generation migrant children”). The former, especially those from NES families, may experience both language and cultural barriers when they first arrive in the host country. For “second-generation migrant children”, these barriers may not be prevalent. A comparison between “first- and second-generation migrant children” with the same family background (*i.e.*, from ES or NES families) can provide information on whether there are intergenerational effects on tertiary entrance scores: that is whether any advantages/disadvantages “first-generation migrant children” experience in the host country’s schools carry across to “second-generation children”.

Finally, the relative performance of native-born and overseas-born children can be assessed at different positions on the tertiary entrance scores distribution. The analyses provided will allow family background and other factors to impact tertiary entrance scores differently at each position on the distribution, and this will facilitate a richer comparison between the performance of native-born and overseas-born children.³ For example, parental influences or classroom climate may be more important to children who are performing poorly at school and who need extra assistance than those who are doing well at school.

The results show that the performance of children with Australian-born parents mirrors that of second-generation Australians. More detailed analysis using quantile regression shows that, among first-generation Australians, time in Australia has a negative impact on their tertiary entrance scores and this is consistent along the distribution. In addition, the results suggest that parental support is very beneficial to students who are doing poorly at school. For example, support via parents’ aspiration for their children to pursue post-secondary school study is very important to first-generation Australians who are in the bottom of the tertiary entrance scores compared to those who are in the top of the distribution. However, the way in which parental support is channelled differs between first-generation Australians and children with Australian-born parents.

³ Eide and Showalter (1998) show that, for policy purposes, it is important to consider test scores for the entire distribution.

This paper is organised into five sections. Section 2 presents an overview of the literature on the schooling of immigrant children. Section 3 discusses the data and methodology. Section 4 presents the results, and a conclusion is provided in Section 5.

2. Literature Review

There are a number of reasons why the academic performance of migrant children may differ from that of native-born children. Chief among these are that migrant children are typically socially, culturally and economically different. For example, migrant children may speak a different language to native-born children and lack of English proficiency can prevent children from learning at the same rate as native dominant language speakers. However, Glick and White (2003) suggest that any disadvantages migrant children experience due to lack of proficiency in English could be mitigated by higher parental support and strong family ties. Therefore, differences in parental values and aspirations between migrant families and native families may be an important contributor to differences in the academic achievement of migrant and native-born children. Fuligni (1997), for example, finds that migrant children are often in families that strongly support academic achievement. Migrant parents believe their children can improve their status through education, which means that they encourage their children to overcome the difficulties they may face in schools in order to take advantage of educational opportunities. Duran and Weffer (1992) report that family values influence the behaviour of children at school in the U.S. through the willingness of the children to take on extra work.⁴

An alternative explanation of migrant children's success in schools is related to their interaction with native-born children. Kao and Tienda (1995), for example, argue that the academic success of first-generation migrants is partly due to their lack of interactions with native-born children. As migrant children adjust to the host country they learn the language of the host country, but their parents discourage their primary interaction with native-born peers. In addition migrant children also receive similar encouragement and support for academic pursuits from their ethnic friends. For example, Asian-American students are more likely than other students to be part of an achievement-oriented peer group. These students have the highest level of peer

⁴ Students in the sample analysed could choose to participate in a Math-Science Program. This involved an additional day of courses and homework. Participation can be used to reflect their work orientation as well as educational aspirations.

support for academic purposes and are more likely to study together and help each other with difficult assignments (Fuligni 1997).

Migrant parents also differ from parents of native-born children in their supervision. Migrant parents are less likely to impose rules about household chores which give children more time to focus on their school work. Kao and Tienda (1995) argue that non-academic activities, such as household chores and part-time work, may compete with academic duties and divert students' attention away from scholastic pursuits.

An interesting question arising from the literature is whether migrant children's academic achievement improves or declines as they adjust to their host country. Based on Kao and Tienda's (1995) study, the success of first-generation migrants in schools is based on their isolation from native-born children. This implies that academic achievement of migrant children should decline with time in the host country, as duration of residence provides a measure of the extent of migrant children's assimilation with their native peers. Alternatively, as migrant children, particularly those from NES countries, assimilate to the host country they may be able to adjust better to the school system and this may enhance their academic achievements. In addition, as migrant parents adapt to the host country, they are more successful at implementing their optimistic goals for their children because they are able to gain a minimum familiarity with the educational institutions and also improve their own English proficiency. Worswick (2004), for example, finds that period of residence in Canada for allophone parents enhances the academic achievements of their children

In summary, the disadvantage migrant children experience in schools in the country of destination due to cultural or language differences may be offset by closer family ties and parental support. This theme is further investigated in this paper by extending the analysis to first- and second-generation Australians.

3. Methodology and Data

Previous economic studies of the schooling performance of immigrant children (*e.g.*, Duran and Weffer 1992, Kao and Tienda 1995, Fuligni 1997, Glick and White 2003 and Worswick 2004) have generally included gender, socioeconomic status, parents' aspirations, period of residence and languages in their estimating equations. These studies form the basis for the model of tertiary entrance scores

employed in this paper. These scores are examined using both a pooled sample of Australian-born and foreign-born children as well as separate models for each of the three birthplace groups (native born, first-generation Australians and second-generation Australians).

Thus, the tertiary entrance scores for children who finished Year 12 (T_i) can be represented as:

$$T_i = X_i\beta_1 + S_i\beta_2 + ES_i\beta_3 + NES_i\beta_4 + EYSM_i\beta_5 + NESYSM_i\beta_6 + Y_i\beta_7 + \varepsilon_i \quad (1)$$

The variables in the vector X take into account differences across children with regard to their individual characteristics, aspirations and geographical location. S_i is the vector of school characteristics and the student's motivation (*e.g.*, type of school, classroom climate, engagement in school life). ES_i is a dummy variable that equals one for children with overseas-born parents from English-speaking background countries. Given that these children should have the same level of English proficiency as children with Australian-born parents, this variable is likely to capture cultural influences on school performance. NES_i is a dummy variable that equals one for children whose parents came from non-English speaking (NES) countries. This variable should capture both cultural and language differences. Hence, a comparison of the ES and NES coefficients (which capture, respectively, cultural effects only and the effects of culture and language) will, under the assumption of common cultural effects for the two broad groupings of countries, reveal the impact of language differences on school performance.⁵ The measures of ES and NES can be modified to capture first-generation and second-generation Australians. The variable YSM_i equals the number of years-since-immigration.

Y_i in equation (1) is the Year 9 literacy and numeracy test scores which are used as measures of individual ability.⁶ According to Marks *et al.* (2001), tertiary entrance performance is largely based on academic ability. A number of studies (*e.g.*, Williams *et al.* 1993, Le and Miller 2004) have shown a positive association between an individual's ability and schooling. Despite considerable differences in the approach

⁵ This assumption is likely to be very strong since an immigrant from Africa is assumed to share similar culture to an immigrant from the U.K..

⁶ The ability variable is not a measure of inherent ability. It is a student's score on administered literacy and numeracy tests, and as such provides a measure of early childhood achievement and has been interpreted as skills possessed or the trainability of the students (Williams *et al.* 1993).

used to measure individual ability, the variable is the most important determinant of school performance. ε_i is the random error term that varies across individuals.

In model (1) the child's assimilation and time in Australian schools are captured by years-since-migration. The effects of these on school performance are allowed to vary by ES/NES background. Hence, the coefficient on ESYSM tells us how overseas-born children from an English-speaking background perform after a period of time in Australia, controlling for other influences such as family background. A similar argument applies to the NESYSM term.

The estimates of β are obtained using ordinary least squares, and so give the impacts of the variables on the conditional mean of T . The factors that affect tertiary entrance score may, however, have different effects at different positions on the tertiary score distribution (see, for example, Eide and Showalter, 1998). In order to examine these variations along the tertiary entrance scores distribution quantile regression is used. Following Buchinsky (1998), a quantile regression can be expressed as:

$$T_i = Z_i\beta_\theta + \mu_\theta, \quad Quant_\theta = (T_i|Z_i) = Z_i\beta_\theta \quad (2)$$

where $Quant_\theta(T_i|Z_i)$ is the conditional quantile of T_i , conditional on the vector of explanatory variables Z_i , and $\theta \in (0,1)$. Note that the vector Z encompasses all the exogenous variables included in model (1). It is assumed that $Quant_\theta(\mu_\theta|Z_i) = 0$.

The quantile regression estimates are achieved by minimising the weighted sum of the absolute value of the errors. That is, the θ^{th} conditional quantile regression estimator for β is obtained by minimising:

$$\min \beta \left[\sum_{\{i:T \geq Z_i\beta\}} \theta |T_i - Z_i\beta| + \sum_{\{i:T < Z_i\beta\}} (1-\theta) |T_i - Z_i\beta| \right] \quad (3)$$

The benefit of quantile regression is that it allows for the impact of explanatory variables on the dependent variable to be analysed along the entire distribution of the data sample. This is important for policy reasons where one may be more interested in the tails of the distribution than in the conditional mean. For example, it is important to know if increases in government spending per pupil raise the test scores for students at the bottom of the conditional distribution (Eide and Showalter, 1998).

The data used in this paper are from the *Longitudinal Surveys of Australian Youth* (LSAY), 1995 Cohort (Y95). This is a national representative sample of Year 9 students in 1995. The sample was stratified by state of schooling, with students from smaller states being over-sampled. Student selection within each state was proportional to the size of the school sector, namely government schools, catholic schools and non-government, non-catholic (independent) schools. Within the school sectors, schools were selected proportional to their size. The data collected covers the period 1995 to 2004. The 1995 data were collected from a self-completion questionnaire that students were asked to fill out at the time they undertook the literacy and numeracy tests. Data for subsequent years were collected either by telephone interviews or mailed out questionnaires. The sample size in 1995 was 13,613. This paper focuses on data collected between 1995 and 1999. The end point 1999 is chosen because this is the year when students who enrolled in Year 9 in 1995 are expected to have completed Year 12 and sat the tertiary entrance examinations.

The data collected include information on individual characteristics (*e.g.*, birthplace, gender, student's aspiration, language spoken at home) and schooling (*e.g.*, type of school, school subjects, proficiency of teachers).

Two points should be noted with respect to the data. First, among children with overseas-born parents, two measures can be used to distinguish between those from English-speaking and non-English speaking countries. Under the Australian Standard Classification of Countries for Social Statistics (ASCCSS), the main English speaking (ES) countries comprise Australia, Canada, Ireland, New Zealand, South Africa, United Kingdom and United States. This classification is based on main countries from which Australia receives, or has received, significant numbers of overseas settlers who are likely to speak English. The ES countries will have similar cultural traditions and institutional structures to Australia. In contrast, all other countries not identified as ES are classified as non-English speaking (NES).

An alternative measure is the English Proficiency (EP) Country Groups (Department of Immigrant and Multicultural and Indigenous Affairs 2003). In this case ES countries are defined as those rating 98 percent or higher on an English Proficiency index and having a sizeable immigrant population in Australia (at least

10,000 usual residents).⁷ This group is also referred to as EP1. The NES groups can be categorised on the basis of the EP index into three groups. The first group contains immigrants from countries with a rating of 80 percent or higher (EP2). The second group contains immigrants with a rating of at least 50 percent but less than 80 percent (EP3). The final group contains immigrants with a rating below 50 percent (EP4). For the purpose of this study, a broader ES group is formed as those in EP1 countries and the top half of EP2 countries (countries above 90 on the English Proficiency index).⁸ The NES group is defined as the bottom half of EP2, EP3 and EP4 countries. This measure is used to explore the sensitivity of the findings of inclusion of a wider, and intuitively reasonable, range of countries in the ES grouping.

Thus first- and second-generation Australian children from English-speaking families are those with both parents who were born outside of Australia in EP1 countries and the top half of EP2 countries (countries above 90 percent rating). First- and second generation Australian children from non-English speaking countries are those with both parents who were born outside Australia in the bottom half of EP2 countries, EP3 and EP4 countries.⁹

In this paper the broad measure of ES/NES based on the English Proficiency Country Groups provides the basis for the main set of analyses. However, to test if the results are sensitive to classification of ES/NES countries, the ASCCSS measure was also used and relevant comment is provided below.

Second, tertiary entrance scores in all states, except Queensland, are equivalent, and range from zero to 99.99. Queensland's entrance scores are converted to an equivalent of the other State/Territory scales.¹⁰ All scores under 30 are assigned a score of 30 because the Equivalent National Tertiary Entrance Rank does not include scores below 30. Hence, the score ranges from 30 to 99.99 (Marks *et al.* 2001).

⁷ The EP index is the percentage of recent immigrants (those entering in the five years before the 2001 Census of Population and Housing) who speak only English at home, or where a language other than English is spoken at home, they speak English 'Very Well' or 'Well'.

⁸ Migrants from EP1 and the top half of EP2 countries are classified into a single group because these migrants share very similar settlement success (*e.g.*, unemployment rates) (Department of Immigration and Multicultural and Indigenous Affairs, 2003).

⁹ The analyses exclude children who have one overseas-born parent and one Australian-born parent. This represents 10 percent of the sample size. This is a standard practice (see Australian Bureau of Statistics, 2003).

¹⁰ See Table A1 in Appendix A for the conversion details.

The weighted means of tertiary entrance scores for various birthplace groups are presented in Table 1. Data from the top panel show that, on average, children from ES migrant families have higher tertiary entrance scores (75) compared to children from NES migrant families and those with Australian-born parents (72). A review of the data for first- and second-generation Australian children shows second-generation Australians perform similar to children with Australian-born parents while first-generation Australians outperform other children. Overall, these aggregate-level data create the impression that children from migrant families perform at least as well as children with Australian-born parents (native born).

Table 1
Weighted Mean Tertiary Entrance Scores

	Mean	Standard Deviation
Australian-born parents	71.71	18.11
English-speaking migrant parents	75.14	19.16
Non-English speaking migrant parents	71.89	18.73
First-generation Australians	76.03	17.60
Second-generation Australians	71.16	19.13

A more detailed analysis of the tertiary entrance scores for various birthplace groups can be presented via the tertiary entrance scores distribution (Table 2). The distribution is presented in ascending order. That is, the ‘0-20’ category represents children in the bottom of the distribution and ‘81-100’ category represents children in the top of the distribution of test scores. When all students in the sample are considered, each quintile should, by definition, have 20 percent of the population (in practice the representation in a quintile can differ slightly from this, owing to peaks in the marks distributions at threshold scores).¹¹ The figures for subgroups in a particular category will differ from 20 percent (or the figures for other groups) to the extent that they are relatively over- or under-represented in the particular quintile.

Focusing first on the top panel of Table 2, it appears that children from ES migrant families do better than those with Australian-born parents. For example, children from ES migrant families are under-represented at the bottom of the tertiary entrance scores distribution compared to the native born. Concomitantly, children from ES migrant families are over-represented at the top of the distribution. In particular, children with overseas-born parents have the highest representation at the

¹¹ These peaks arise because the tertiary entrance scores are self-reported.

top of the distribution (28 percent). Children from NES migrant families perform similar to the native born.

Table 2
Distribution of Tertiary Entrance Scores

	Percent Distribution				
	0-20	21-40	41-60	61-80	81-100
Australian-born parents	19.95	20.66	20.70	20.28	18.40
English-speaking migrant parents	18.07	16.51	16.82	20.87	27.73
Non-English speaking migrant parents	20.55	19.66	19.51	20.33	19.96
First-generation Australians	14.75	18.20	18.66	19.35	29.63
Second-generation Australians	21.94	19.35	19.11	20.81	18.79

A comparison between first -and second-generation Australians reveals that the former outperform the latter. The discrepancy occurs mainly at the bottom and top of the tertiary entrance scores distribution. For example, among first-generation Australians only 15 percent are in the bottom 20 percent of the distribution compared to 22 percent of second-generation Australians. In contrast, 30 percent of first-generation Australians are in the 81-100 percentiles compared to only 19 percent of second-generation Australians.

In order to further examine the differences between the native born and children from migrant families, the characteristics of these students are presented in Table 3. A number of patterns can be observed from the Table 3 data. For example, there is little difference in early childhood achievement across birthplace groups. The literacy scores for the native born and children from migrant families are between 13 and 15 points. Similarly, the numeracy scores for the native born and children from migrant families vary between 13 and 14 points.

There is, however, a sizeable difference in parents' educational attainment and occupational attainment across birthplace groups. Around 35 percent of children with Australian-born parents have a degree or diploma. The percentage is similar for second-generation Australians. In comparison, a higher proportion (42 percent) of parents of first-generation Australians has a degree or a diploma. With regard to occupational attainment, native-born children's parents have a slightly higher score than the parents of first- and second-generation Australians.

Table 3
Selected Mean Characteristics of Native Born and Children from Migrant Families

Variable	Australian-born parents	First- generation Australians	Second- generation Australians
Literacy score	14.92	13.30	14.45
Numeracy score	13.91	13.34	13.48
Parents' education	34.96	41.97	35.57
Parents' occupational attainment	42.12	37.90	37.98
Catholic school	22.08	25.20	29.17
Other independent school	16.97	13.98	16.00
Classroom climate	10.78	10.86	10.86
School climate	11.50	11.54	11.53
Engagement in school life	6.03	5.75	5.85
Satisfaction with school life	28.31	29.88	28.32
Own aspiration	81.54	83.87	83.61
Parents' aspiration	43.04	63.54	51.51

The distributions of the native born and first -and second-generation Australians vary across school types. There is a higher percent of first -and second-generation Australians enrolled in Catholic schools compared to the native born. The difference for other independent schools' enrolment is smaller across birthplace groups.

While the data show very little difference across the broad birthplace groups in the student's perception of school and their involvement in school life, there is considerable difference with regard to their parents' aspirations. Only 43 percent of the native born have parents who plan for them to pursue further studies after finishing school. In comparison, 52 percent of second-generation Australians' parents plan for them to pursue further study. Parents' aspiration for their children to pursue post-school education is highest among first-generation Australians (64 percent). This may lead to differences in parental support and encouragement to children across birthplace groups.

4. Results

In this section OLS is used in an initial examination of the differences across birthplace groups in the conditional means of tertiary entrance scores and how they vary with length of residence in Australia, early childhood achievements and other factors. Following this, quantile regression is used to inform on how the factors mentioned impact tertiary scores at different positions on the distribution.

The analysis will first focus on OLS results. Three models are estimated, the first where a comparison is made between children with Australian-born parents and all children from migrant families, the second where comparison is made between the native born and first-generation Australians and finally a comparison is made between the native born and second-generation Australians.

4.1. Ordinary Least Squares

The three columns in Table 4 each contain different samples of migrant families. In column (i) the samples of ES and NES incorporate all children from migrant families. In column (ii) the samples of ES and NES include first-generation Australians only. That is, second-generation Australians are excluded from the sample. In column (iii) the samples of ES and NES include second-generation Australians only. That is, first-generation Australians are excluded from the sample. In each specification, the coefficients on the ES and NES shift variables refer to the difference in scores of the children of recently arrived immigrants in the particular sample compared with the Australian-born parent benchmark group. The coefficients on the interaction terms with period of residence capture the adjustment effects that have been emphasised in the immigration literature.

Table 4
OLS Estimates of Tertiary Entrance Scores — Birthplace Effects

	Australian-born parents and children from migrant families (i)		Australian-born parents and first- generation Australians (ii)		Australian-born parents and second- generation Australians (iii)	
Variable	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	2.288	0.75	3.249	0.89	0.240	0.07
<i>Personal</i>						
Female	3.574	6.65	3.634	5.68	3.536	6.25
<i>Family</i>						
English-speaking parents	-0.742	-0.58	7.529	2.61	-2.078	-1.50
ESYSM	0.473	1.50	-0.395	-0.97		
Non-English speaking parents	1.133	1.92	11.990	6.50	0.620	1.04
NESYSM	0.219	0.78	-0.893	-2.73		
F(23, 3 582)	81.59					
F(23, 2 500)			57.20			
F(20, 3 200)					84.12	
Sample size	3 606		2 524		3 221	

Note: The model also includes variables for ability, parents' education and occupational attainment, number of siblings, consultation with family members about work, school and future career, school effects, areas of residence and aspirations.

The Table 4 results (column i) show that migrant children from ES background families are not disadvantaged in Australian schools, and migrant children from NES families do better than those with Australian-born parents. Moreover, as children from migrant families increase their stay in Australia there is no significant difference in tertiary scores between them and the Australian born. In comparison, Worswick (2004) reports a positive effect of time spent in Canada on migrant children's improvement in academic performance (vocabulary and reading).¹²

The results in column (ii) show that recently arrived first-generation Australians, regardless of whether they are from ES or NES countries, perform better than children with Australian-born parents. The marks advantage of ES and NES students are eight percentage points and 12 percentage points, respectively. Note that the mark advantage dissipates with time spent in Australia for first-generation Australians from NES families. The pattern, of an initial advantage followed by dissipation, has been commonly reported in the immigrant health literature (Chiswick, Lee and Miller 2008).

With regard to second-generation Australians (column iii), the results show that these students do as well as children with Australian-born parents. Hence, it appears there is no positive intergenerational effect on tertiary entrance scores. That is, the advantage first-generation Australians enjoy over children with Australian-born parents does not extend to second-generation Australians.

As discussed in Section 3, it is possible that the birthplace effects are sensitive to the measures of ES and NES. Hence, equation (1) was estimated using the more narrow definitions of ES and NES outlined above.¹³ Under this alternative the ES countries are Canada, U.S., Ireland, U.K., New Zealand and South Africa. The NES grouping comprises of all countries not in the ES group. The results for the ES group are sensitive to this birthplace categorisation, whereas those for the NES countries do not differ between the broad and narrow measure of birthplace groups. Thus, the statistically significant positive effect for ES among first-generation Australians in Table 4 disappeared under the narrow definition, and the marginally insignificant negative effect among second-generation Australians become significant under the narrow definition. As the narrow and broad definitions simply involve the reallocation

¹² Experiments show that time spent in Australia increases math scores for first-generation Australians.

¹³ Results are available upon request.

of a part of the sample (that can be thought of as straddling ‘pure’ ES and NES groups), the changes outlined here are intuitively reasonable.

The discrepancy in tertiary scores between first-generation Australians and those with Australian-born parents may reflect differences in the roles of family support, individual characteristics, *etc.* These determinants of tertiary performance are constrained to have the same impact for the birthplace groups considered in each of the columns of Table 4. In order to further examine this discrepancy, separate equations of tertiary entrance scores are estimated for the native born, first-generation Australians and second-generation Australians. The results are presented in Table 5.

An important result from Table 5 is the gender difference in tertiary entrance scores. This is very similar to Marks *et al.* (2001), who suggest that achievement growth is greater for females than males on average during the final years of secondary school. The gender difference is most pronounced for first-generation Australians compared to second-generation Australians or children with Australian-born parents.

For first-generation Australians (column ii), the more recent cohort (arrived in Australia between 1985 and 1995) has higher tertiary entrance scores than children from the earlier cohort (arrived prior to 1985).¹⁴ This may reflect differences in the quality of cohorts as well as the impact of time spent in Australia. The adjustment explanation is consistent with Kao and Tunda’s (1995) suggestion that academic achievements of migrant children decline as they spend more time in the U.S. and interact more with native-born youth.

Parental influences can affect children’s tertiary entrance scores in a number of ways. For example, parents who have a high level of education can serve as a role model for their children and may provide more encouragement and superior advice than less educated parents (Le and Miller 2004). The results show that parents’ educational attainment has a strong, positive effect on the tertiary entrance scores of native-born children and second-generation Australians. Compared to children whose parents do not have a post-secondary school degree, the tertiary entrance scores of children whose parents have a post-secondary school degree are between three and five percentage points higher. However, parents’ educational attainment does not have a significant impact on the tertiary entrance scores of first-generation Australians.

¹⁴ Cohort information is used in place of period of residence, as it is a more flexible approach.

Table 5
OLS Estimates of Tertiary Entrance Scores

Variable	Australian-born parents (i)		First-generation Australians (ii)		Second-generation Australians (iii)	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	1.469	0.36	8.853	1.11	-2.643	-0.43
<i>Personal</i>						
Female	3.473	5.00	4.282	2.70	3.732	3.91
Literacy score	1.255	9.70	1.074	4.78	1.510	8.62
Numeracy score	1.691	14.19	1.969	8.08	1.652	9.79
<i>Cohort arrival</i>						
1985 – 1990	n.a.	n.a.	3.082	1.88	n.a.	n.a.
1991 – 1995	n.a.	n.a.	7.292	3.84	n.a.	n.a.
<i>Family</i>						
English-speaking parents	n.a.	n.a.	0.713	0.45	-3.063	-2.13
Parents' education	3.318	4.52	2.301	1.58	4.918	4.48
Parents' occupational status	0.687	4.58	0.026	0.79	0.067	3.08
Number of siblings	0.018	0.97	0.013	0.29	-0.037	-0.26
Family discussion – work, school	0.812	0.31	-8.276	-1.88	4.484	1.23
Family discussion – future career	0.139	0.09	6.816	2.05	-3.693	-1.35
<i>School Effects</i>						
Catholic	5.007	6.39	2.652	1.49	2.399	2.16
Other independent	3.908	4.31	9.891	4.83	4.025	3.25
Classroom climate	0.156	0.72	0.320	0.60	0.583	1.92
School climate	0.492	2.51	0.280	0.64	0.270	0.86
Engagement in school life	0.082	0.79	-0.244	-0.97	0.244	1.59
Satisfaction with school life	0.283	4.00	0.423	3.09	0.378	3.77
<i>Area of Residence</i>						
Rural	-0.564	-0.65	-4.764	-1.59	-2.388	-1.59
Region	-0.232	-0.30	-6.757	-2.42	-4.058	-3.01
<i>Aspirations</i>						
Own	4.826	5.18	-2.336	-1.54	0.927	0.68
Parents	1.241	1.93	4.562	2.99	1.877	2.02
F(18, 2 120)	58.83					
F(21, 363)			13.58			
F(19, 1 062)					33.84	
Adjusted R ²	32.74		40.76		36.60	
Sample size	2 139		385		1 082	

Note: n.a. = not applicable.

Similarly, the occupational status of parents has a positive impact on the tertiary entrance scores of both native-born children and second-generation Australians but it does not affect the scores of first-generation Australians. Hence, positive externalities from parents' educational attainment and occupational status appear not to be important for first-generation Australians' tertiary entrance scores.¹⁵

Other family influences include children's discussion with their families about their work, school, job and future career. For first-generation Australians this is

¹⁵ The parents of these children will have spent less time, on average, in Australia than the parents of second-generation Australians. These measures of status may only emerge as significant influences on educational outcomes after a considerable period of residence (of the parents) in Australia, with other factors being more important during the shorter term settlement process.

significant. However, discussion of their work, school and job with family members for this group is associated with lower tertiary entrance scores (at the 10 percent level) whereas discussion about their future career is associated with higher scores.

The marks advantage for those who attend non-government schools may reflect a number of differences, such as in school facilities, the composition of the student body and in the quality of teachers (see Williams and Carpenter 1991 and Vella 1999). The results in Table 5 for the school type variables are consistent with previous studies in Australia (*e.g.*, Marks *et al.* 2001, Vella 1999) and show that, compared to those who attend government schools, those who attend Catholic and other independent schools have higher tertiary entrance scores. These findings are similar for the native born and second-generation Australians, but among first-generation migrants there is no advantage to those attending Catholic schools over government schools.

The contextual variables in this paper are similar to those adopted by Marks *et al.* (2001) and Le and Miller (2004). Included are four variables which capture classroom and school climate as well as students' engagement in school life and students' satisfaction with school life.¹⁶ The results show that student satisfaction with school life is a significant determinant of tertiary entry scores for each of the three groups examined. Of the other measures, school climate is significant in the equation for children with Australian-born parents and classroom climate is significant for second-generation Australians. The mixed results could reflect the generally small magnitude of the effect of the contextual variables. Marks *et al.* (2001) reported insignificant effects for contextual variables when socioeconomic background differences between schools are controlled for in the model.¹⁷

Parental support via parents' aspiration for their children to pursue further studies affects tertiary entrance scores of children from all birthplace groups, and the effect is stronger for first-generation Australians (where children were born abroad) than for other groups. It is weakest (and significant only at 6 percent level) for the children who have Australian-born parents. For the latter group, however, but not for either of the groups with foreign-born parents, children's own aspirations are

¹⁶ The contextual variables capture factors such as classroom and school experiences of student when they were in Year 9 or 10 and can be used as proxies for current learning environment.

¹⁷ Marks *et al.* (2001) have two measures of contextual variables which differ from the current study, namely the mean school achievement score and the mean school socioeconomic status. When both of these variables are controlled for, classroom climate and the student's general satisfaction with school are not significant determinants of tertiary entrance scores.

statistically significant and numerically very important. These results differ from Fuligni (1997) who reports students' attitudes and behaviour account for 40 percent to 70 percent of the generational differences in academic performance. This may be because the effects of family on students' performance are channelled through more proximal factors on the students' own attitudes and behaviour. The difference in findings for Australia and the U.S. may reflect a greater heterogeneity of parental aspirations in Australia: Duran and Weffer (1992) report that in the U.S. nearly all parents stated that they want their children to finish school and continue with college.

4.2 Quantile Regressions

From the OLS results second-generation Australians' school performance mirrors that of children with Australian-born parents while first-generation Australians perform better than the latter. Some of the factors contributing to this difference include the avenue through which parental support is channelled, student's satisfaction with school life and individual ability. Hence, we will use quantile regression to investigate these factors further.¹⁸ Only results of direct relevance to the key findings mentioned above will be presented.

From Table 6 a comparison between first-generation Australians and children with Australian-born parents reveals that the former outperform the latter but the difference is not consistent along the tertiary entrance scores distribution. For example, first-generation Australians from ES migrant families perform better than the children with Australian-born parents between the 30th and 80th percentiles. Birthplace does not matter for children from ES migrant families who are in the bottom 10 percent of the distribution and those who are in the top 90 percent of the distribution. The difference in tertiary entrance scores between first-generation Australians from NES migrant families and the native born is less pronounced at the top of the distribution. The biggest difference is at the bottom of the distribution (between 10th and 40th percentiles). Time in Australia reduces the tertiary entrance scores of children from NES migrant families, and this is significant between the 30th and 80th percentiles. However, time in Australia does not affect the entrance scores of children from NES migrant families who are either in the bottom or top of the distribution.

¹⁸ Extensive analysis parallel to Tables 4 and 5 were undertaken and the results are available upon request.

Table 6

Quantile Estimates of Tertiary Entrance Scores — Children with Australian-born Parents and First-generation Australians

Variable	10%	20%	30%	40%	50%	60%	70%	80%	90%
	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>	<i>Coeff.</i>
Constant	-27.394 (-3.57)	-28.556 (-5.24)	-26.222 (-4.24)	-10.531 (-1.79)	2.165 (0.39)	14.386 (3.10)	25.997 (7.05)	31.546 (8.51)	50.519 (10.47)
<i>Personal</i>									
Female	5.574 (3.86)	6.262 (5.37)	5.206 (4.97)	4.587 (5.76)	3.054 (3.75)	2.335 (3.30)	1.105 (1.59)	1.329 (2.03)	0.279 (0.45)
English speaking	4.073 (0.44)	8.393 (1.42)	9.330 (2.01)	8.094 (1.89)	9.039 (2.30)	9.006 (2.94)	8.226 (3.12)	7.710 (3.58)	4.601 (1.31)
ESYSM	0.321 (0.26)	0.364 (0.39)	-0.522 (-0.72)	-0.986 (-1.55)	-0.856 (-1.48)	-0.737 (-1.59)	-0.398 (-1.09)	-0.583 (-1.54)	-0.248 (-0.49)
Non-English speaking	12.249 (2.29)	16.430 (4.55)	15.906 (5.27)	13.672 (5.47)	11.641 (5.53)	10.916 (4.18)	11.664 (5.02)	11.254 (7.07)	9.230 (4.78)
NESYSM	-0.765 (-0.65)	-0.375 (-0.50)	-1.252 (-1.87)	-1.426 (-2.57)	-1.060 (-2.50)	-0.841 (-2.32)	-0.706 (-2.43)	-0.835 (-2.67)	-0.558 (-1.32)
<i>Sample</i>	2 524								

Note: t-statistics are in parentheses.

The model also includes variables for ability, parents' education and occupational attainment, number of siblings, consultation with family members about work, school and future career, school effects, areas of residence and aspirations.

Table 7 contains separate results for children with Australian-born parents and first-generation Australians. A comparison shows that gender is particularly important between the 10th and 60th percentiles of the distribution for children with Australian-born parents. Among first-generation Australians, girls do better than boys only if they are in the bottom 10 percent and 30 percent of the distribution. While the OLS results show that, on average, girls outperform boys in schools, quantile regressions show this applies to only a small group of students. Furthermore, the quantile regression results suggest that gender is not as important to the tertiary entrance scores of first-generation Australians.

With regard to family influences, there are several differences across birthplace groups. For example, parents' education increases tertiary entrance scores of the native born. However, the impact is less pronounced at the top of the distribution. In contrast, parents' education does not affect first-generation Australians' tertiary entrance scores, except for those in top 90 percent of the distribution. Similar results are reported along the distribution for occupational status of parents, though the magnitude of effect is smaller compared to parents' education. This suggests that parental guidance on children's schooling outcome is channelled via different avenues across birthplace groups. Moreover, parental guidance via educational attainment appears to be more important to native-born students who are performing poorly at school compared to those who are performing well.

Further indications of how parental influence impacts school outcomes across birthplace groups are highlighted via the results for individual and parental aspirations. Among first-generation Australians, parents' plans for their children to pursue post-secondary education are very important to enhancing their tertiary entrance scores, particularly for those in the bottom 10 percent and 20 percent of the distribution. Parental aspiration has no significant effect on tertiary entrance scores of first-generation Australians who are in the top 90 percent of the distribution. While parents' aspiration does improve tertiary entrance scores of children with Australian-born parents, the magnitude of effect is less pronounced compared to first-generation Australians. A similar pattern is observed for second-generation Australians (results not shown). Hence, it would appear that parental influence on tertiary entrance scores dissipates between first- and second-generation Australians. Moreover, while the OLS results show, on average, that parental aspiration positively affects their children's school performance, the results from quantile regression show that parental influence

matters more for first-generation Australians, especially those who are in the bottom of the distribution.

It would also seem that parents' aspiration dominates individual's aspiration among first-generation Australians. Own aspiration does not affect the tertiary entrance scores of first-generation Australians, except of those in the bottom 20 percent of the distribution. In comparison own aspiration positively affects the tertiary entrances scores of the native born. In particular, own aspirations have a greater impact for the native born who are in the bottom half of the distribution than for those who are in the top half of the distribution. The comparison is striking between the bottom 10 percent and top 90 percent of the distribution.

Overall, the quantile regression results have drawn attention to some important differences in the effects of variables across the distribution, particularly gender differences and parental influences. However they also show, as with the OLS results, that differences between the schooling outcomes of first-generation Australians and the native born do not carry over to second-generation Australians. That is, there appears to be an emersion into Australian society that is associated with a dissipation of the educational advantage of first-generation Australians.

Table 7

Quantile Estimates of Tertiary Entrance Scores — Children with Australian-born Parents and First-generation Australians

Australian-born Parents	10%	20%	30%	40%	50%	60%	70%	80%	90%
Variable	Coeff.								
Constant	-37.791*	-31.370*	-25.825*	-13.975*	1.774	10.534*	24.130*	29.933*	46.125*
<i>Personal</i>									
Female	5.083*	6.612*	5.059*	4.724*	3.423*	2.213*	1.042	0.869	0.191
Literacy score	1.242*	1.496*	1.665*	1.686*	1.605*	1.509*	1.226*	1.234*	0.942*
Numeracy score	2.088*	2.189*	1.976*	1.822*	1.696*	1.590*	1.443*	1.266*	1.156*
<i>Family</i>									
Parents' education	3.982*	2.551*	3.833*	3.965*	3.939*	3.258*	3.658*	3.070*	1.240*
Parents' occupational attainment	0.063*	0.097*	0.073*	0.053*	0.064*	0.063*	0.062*	0.040*	0.039*
<i>School Effects</i>									
Satisfaction with school life	0.252*	0.311*	0.360*	0.298*	0.277*	0.279*	0.205*	0.232*	0.220*
<i>Aspirations</i>									
Own	6.225*	7.232*	5.367*	4.990*	5.210*	3.369*	4.481*	3.872*	2.428*
Parents	2.792*	0.698	-0.014	0.704*	1.152	1.713*	1.555*	1.131*	1.221*
<i>Sample size</i>	2 139								
First-generation Australians	10%	20%	30%	40%	50%	60%	70%	80%	90%
Variable	Coeff.								
Constant	-14.665*	-34.291*	-14.094	-0.693	9.625	22.445*	23.907*	29.496*	57.390*
<i>Personal</i>									
Female	7.770*	4.636	4.877*	2.481	1.280	2.424	0.805	0.532	0.671
Literacy score	0.338	1.314*	1.656*	1.596*	1.152*	1.009*	0.925*	0.865*	0.618*
Numeracy score	2.452*	2.230*	1.981*	1.923*	1.940*	1.921*	1.808*	1.624*	1.132*
<i>Family</i>									
Parents' education	1.460	2.449	2.490	2.567	2.873	2.436	1.349	1.372	2.872*
Parents' occupational attainment	0.101	0.105*	0.062	0.056	0.048	0.047	0.053	0.049	0.023
<i>School Effects</i>									
Satisfaction with school life	0.443	0.791*	0.513*	0.442*	0.448*	0.297*	0.293*	0.276*	0.096
<i>Aspirations</i>									
Own	-5.598	-7.046*	-0.770	-0.353	1.592	1.008	1.499	1.236	-0.421
Parents	8.981*	8.000*	5.577*	5.947*	5.502*	4.417*	4.706*	4.046*	-0.298
<i>Sample size</i>	385								

Note: * denotes significance at 10 percent or higher.

5. Conclusion

This paper examines the tertiary entrance scores of children with overseas-born parents and those with Australian-born parents (native born). The analysis also incorporates study of the school performance of first- and second-generation Australians. Overall, children with overseas-born parents perform relatively well compared to those with Australian-born parents. However, there is no evidence of an intergenerational effect on tertiary entrance scores. That is, while first-generation Australians have higher tertiary entrance scores compared to the native born, second-generation Australians have similar tertiary scores to the native born. The difference in tertiary entrance scores between first- and second-generation Australians with parents from the same birthplace suggests any cultural or family influences that affect tertiary scores do not extend to second-generation Australians. When separate models were estimated for each of the birthplace groups the results show that, on average, second-generation Australians share similar performance to the native born.

Early childhood achievements (literacy and numeracy) are very important determinants of tertiary entrance scores. More specifically, higher tertiary and numeracy scores enhance tertiary entrance scores for students who are in the top and bottom of the distribution. Hence, literacy and numeracy scores ascertained when the students were in Year 9 are good predictors of tertiary entrance scores. This suggests that programs that target students who are struggling in basic literacy and numeracy skills when they are young will be very beneficial to their future academic success.

In terms of parental influences, the difference between the native born, first-generation Australians and second-generation Australians seems to be how it is channelled. Parental support via educational attainment and occupation status has similar effects for the native born and second-generation Australians. Among first-generation Australians, family support and family environment that fosters academic excellence comes from parents' aspirations for their children to pursue post-secondary school study

As expected, the student's own motivation is an important determinant of their success. For students in the top and bottom of the distribution, those who planned to finish Year 12 and pursue further studies have higher tertiary entrance scores than those who do not share this aspiration.

Finally, differences between the OLS and quantile regression results indicate that factors such as birthplace, migrant adjustment, school effects and early

achievements do not have uniform impacts across the tertiary entrance scores distribution. Moreover, it appears that students who are in the bottom of the tertiary entrance scores distribution benefit more from parental guidance and possibly a school environment that fosters learning than those who are in the top of the distribution.

The most important finding, though, is that first-generation Australians do very well at school, suggesting there is no need for extra policy considerations in their adjustment to life in Australia. This is coupled with a finding that second-generation Australians' schooling outcomes are similar to those of children with Australian-born parents. This shows an adjustment process similar to that documented in the immigrant health literature (Chiswick *et al.* 2008). This suggests a high degree of consistency in the patterns of immigrant adjustment reported in empirical studies.

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Appendix A

Definitions of Variables

A.1 Dependent Variable

Tertiary entrance scores: This variable has a minimum of 30 and a maximum of 99.99. The tertiary entrance scores in all states except Queensland are equivalent. For example, an Equivalent National Tertiary Entrance score of 81.0 in Victoria is the equivalent of a University Admission Index of 81.0 in the ACT or New South Wales, and a Tertiary Entrance Rank of 81.0 in South Australia, Northern Territory, Western Australia or Tasmania. Queensland's Overall Position scores are converted to an equivalent of the other State/Territory scales (see Table A1) (Marks *et al.* 2001).

A.2 Independent Variables

Female: This variable is set to unity for female. Males are assigned a value of zero.

Literacy score: This variable is computed from the literacy test students took in 1995 (Year 9). The students' raw scores range from zero to 20. The test comprised 20 items and includes answering questions from some text such as newspaper articles. The text comprises short articles and longer textual passages.

Numeracy score: This variable is computed from the numeracy test students took in 1995 (Year 9). The students' raw scores range from zero to 20. The test comprised three types of questions: mathematical operations, practical applications of numerical skills and application of abstract mathematical concepts.

Native born: This variable is set to unity if the student has both parents born in Australia.

English-speaking: This variable is set to unity if the student has both parents born outside of Australia in an English-speaking country or a non-English speaking country which is ranked highly on the English proficiency measure. These countries are UK, Ireland, NZ, US, America (excluding South America), Canada, South Africa, Switzerland, Germany, Australia, Netherlands, Belgium, Denmark, Sweden, Norway, Finland, Singapore, Malaysia, India, Philippines, Brunei, Maldives, Christmas Island, Israel, Zimbabwe, Kenya, Seychelles, Nigeria, Other Pacific Islands (including Cook Islands), Fiji, Solomon Islands, Norfolk Island, Papua New Guinea, Jamaica, Bermuda, Barbados, Mexico and Iceland.

Non-English speaking: This variable is set to unity if the student has both parents born outside of Australia in a non-English speaking country (with low ranking of English proficiency). Countries not listed in the English-speaking group are assumed to be non-English speaking countries.

First-generation Australians: This variable is set to unity if the student was born overseas and has parents who were born overseas.

Second-generation Australians: This variable is set to unity if the student was born in Australia but has parents who were born overseas.

ESYSM: This is an interaction term between period of residence and migrant children from ES families.

NESYSM: This is an interaction term between period of residence and migrant children from NES families.

Period of residence: This variable measures the number of years migrant children have resided in Australia. Those who have resided less than one year are allocated six months.

Arrived 1985 – 1990: This variable is set to unity if the student arrived in Australia between 1985 and 1990.

Arrived 1991 – 1995: This variable is set to unity if the student arrived in Australia between 1991 and 1995.

Parents' education: This variable is set to unity if either parent's highest educational attainment is a degree or diploma.

Parent's occupational status: This variable measures the occupational status of the parents. If the father's occupational status differs from the mother's then the father's status is used. Where the father's occupational status is missing the mother's occupational status is used. Occupational status is measured by the ANU scale. This is a continuous variable with ascending values 0-100. It is based on the ASCO version two codes. This variable measures relative differences in labour market power, occupational prestige, occupational requirements and occupational rewards (Jones 1989).

Number of siblings: This variable measures the number of brothers and sisters the student has.

Family discussion – work, school: This variable is set to unity if the student talks to his/her family about work, school and job at least once a week, once a month or once a year.

Family discussion – future career: This variable is set to unity if the student talks to his/her family about future career at least once a week, once a month or once a year.

Catholic: This variable is set to unity if the student attended a catholic school in year 12.

Other independent: This variable is set to unity if the student attended a non-catholic, non-government school in year 12.

Classroom climate: This variable measures the student's perceptions in Year 10 of their classroom and covered whether they thought students were eager to learn, whether students made good progress, whether students worked hard and whether students were well behaved. A continuous variable is formed from the categorical responses concerning these issues for each student and the mean of this obtained for each school.

School climate: This variable measures student's perception in Year 10 of the level of their teachers, the level of discipline and student learning. A continuous variable is formed from the categorical responses concerning these issues for each student and the mean obtained for each school.

Engagement in school life: This variable measures student's involvement in sport, community work, music, debating and drama in Year 10. A continuous variable is formed from the categorical responses concerning these activities and the mean of this obtained for each school.

Satisfaction with school life: This variable measures the student's general satisfaction with school and is formed from the student's attitudes to school collected in the first wave of the interviews (Year 9). A continuous variable is formed from the categorical responses to the attitudinal questions for each student and the mean of this obtained for each school.

Rural: This variable is set to unity if the student resides in an area with fewer than 1,000 people.

Region: This variable is set to unity if the student resides in an area with 1,000 – 99,000 people.

Own aspiration: This variable is set to unity if the student planned at the time of the interviews (Year 9) to finish Year 12 and pursue further studies.

Parents' aspiration: This variable is set to unity if the student's parents planned at the time of the interviews (Year 9) for the student to pursue further studies after finishing school.

Table A1
 Relationship between Overall Position in Queensland and Tertiary Scores in Other
 States, 1998

NSW, ACT, VIC, SA, NT, WA, TAS	QLD OVERALL POSITION
99.99	1
99.50	1
99.00	2
98.50	2
98.00	2
97.50	3
97.00	3
96.50	3
96.00	4
95.50	4
95.00	4
94.00	5
93.00	6
92.00	6
91.00	6
90.00	7
89.00	7
88.00	8
87.00	8
86.00	9
85.00	9
84.00	9
83.00	10
82.00	10
81.00	11
80.00	11
75.00	13
70.00	14
65.00	16
60.00	17
55.00	19
50.00	20
45.00	21
40.00	22
35.00	23
30.00	24

Note: NSW = New South Wales; ACT = Australian Capital Territory; VIC = Victoria; SA = South Australia; NT = Northern Territory; WA = Western Australia; TAS = Tasmania; QLD = Queensland.

Source: Marks *et al.* (2001).

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