Corbett, H. D., & Wilson, B. (1990). *Testing, reform and rebellion*. Norward, NJ: Ablex.

Deal, T. E., & Celotti, L. D. (1980). How much influence do (and can) educational administrators have on classrooms? *Phi Delta Kappan, 61*(7), 471-478.

Firestone, W. A. (1985). The study of loose-coupling. In A. Kerckoff. (Ed.), *Research in sociology of education and socialization*. Greenwich, CT: JAI Press.

Fullan, M., & Miles, M. (1991). *Getting educational reform right: What works and what doesn't*. Unpublished Paper. University of Toronto: Center for Policy Research.

Hargreaves, A., & Macmillian, R. (1990, April). *Balkanized secondary schools and the malaise of modernity*. Paper presented at the annual meeting of the American Educational Research Association San Francisco.

Hargreaves, A., & Wignall, R. (1989). *Time for the teacher: A study of collegial relations among elementary school teachers*. Final report of a project funded under Transfer Grant 51/1070. Toronto: OISE.

Hyslop, A. G. (1988). Trade unions and the state since 1945: Corporatism and hegemony, *International Journal of Sociology and Social Policy*, 53-90.

Levine, D., & Eubanks, E. (1992). Site-based management: Engine for reform or pipedreams? Prospects, pitfalls and prerequisites for success. In J. Lane and E. Epps (eds) *Restructuring the schools: Problems and prospects*. Berkeley: McCutchan.

March, J. G., & Olsen, J. P. (1976). *Ambiguity and choice in organizations*. Bergen, Norway: Universitets forlaget.

Ministry of Education. (1989). *School development plans: Policy and guidelines* .. Perth. W. A. Education Department.

Ministry of Education. (1990). *School decision making: Policy and guidelines* Perth. W. A. Education Department.

Rosenholtz, S. (1987). Workplace conditions that affect teacher quality and commitment: Implications for the design of teacher induction programs. *Elementary School Journal, 89* (4), 521-540.

Rallis, S. F. (1990). Teachers and organizational change: *Can professionalism transform schools?* Paper presented at the annual meeting of the American Educational Research Association , Boston.

Weick, K. E. (1976). Educational organizations as loosely coupled systems. *Administrative Science Quarterly, 21*, 1-19.

Wilson, B. L., & Dickson Corbett, H. (1983). Organization and change: The effects of school linkages on quantity of implementation. *Educational Administration Quarterly, 19*(4), 85-104.

The late birthday effect in Western Australia

Bob Peck & Karen Trimmer
Secondary Education Authority
Western Australia

The "Late Birthday Effect" is a label given to the observation that students who fail to thrive in the early years of primary school are frequently those with late birthdays - e.g. in November and December. This effect is manifested in Western Australia where the rules for entering primary school result in late birthday students being developmentally less mature than the rest of their classmates. For how many years does this effect persist? Does it affect achievement in Senior Secondary School and, by implication, access to university?

An analysis of tertiary entrance scores for 17 year old Western Australian school leavers in 1992 and 1993 showed that for students who enter school at the normal time and who progress at the normal rate there was no evidence of lower achievement by late birthday students; however, there was a conspicuous shortfall in the number of late birthday students in this year group. A comparison with birth statistics showed that late birthday students are more likely to be aged 18 on leaving senior secondary school. They are also less likely to be university-bound than students with early birthdays.

A comparison of data from other Australian states confirmed the findings from Western Australia; namely, immature school starters are generally more likely to have their entry to school delayed or be made to repeat a year, but those who do progress at the normal rate suffer no disadvantage in access to university. Since the rules for starting school differ from state to state, this effect is attributed to developmental maturity rather than seasonal factors affecting innate intelligence. Since the removal of students from the "normal" cohort - by delaying school entry, making students repeat, or due to students leaving before the end of Year 12 - does not increase the mean tertiary entrance score of late birthday students who progress at the normal rate, it is concluded that such interventions are unrelated to academic potential.

[**Key Words**: Late birthday effect, Tertiary Entrance Score, school entry age.]

Introduction

In Western Australia, where students enter primary school at the start of the year in which their sixth birthday falls, a "late birthday effect" is manifested in the early years of schooling. Teachers report that students with late birthdays - e.g. in November and December - tend to thrive less well than the developmentally more advanced members of their class with early birthdays. This effect is particularly noticeable in Western Australia where, for the most part, students are locked into step with their year group all the way from the start of primary school to the end of senior secondary school.

Since a lack of developmental maturity affects academic progress in the early years of primary school, the following question arises: "Does the late birthday effect persist to the end of senior secondary schooling?" Furthermore, since academic achievement in Year 12 determines access to university (and a whole range of life choices consequent upon university entry), are children permanently affected by the fortuitous relationship between their birthday and the rules for entering school?

This research was initiated by a question from the Ministerial Task Force on Voluntary Full-time Pre-primary Education and Related Matters, one of whose terms of reference was "...to consider the appropriate entry age for children entering a full-day program [of formal education], taking into account the situation in other states of Australia." The findings of this task force were subsequently published in a document informally referred to as the Scott Report (1993). This term of reference arose from one of the main concerns expressed about the full-time pre-primary policy operating during 1992: namely, that some children admitted to pre-primary centres were too young for a five days a week full-time education program. Currently in Western Australia parents may voluntarily send children to pre-primary centres at the beginning of the year in which their fifth birthday falls, i.e. shortly after their fourth birthday. In no other Australian state or territory is entry to pre-primary schooling possible so early; hence this state's particular concern about the late birthday effect.

The late birthday effect is a phenomenon well known to parents of children entering school. The extent of this effect has been reported variously: Kinard and Reinherz (1986) found that there were age group differences in achievement in the first year of schooling which disappeared in subsequent years; Sweetland and de Simone (1987) found that late birthday children in grades 1-4 performed at a significantly lower standard than their classmates; Mortimore *et al* (1988) found that 7 year old students with birthdays late in the school year did less well in reading, writing and mathematics, were twice as likely to have behavioural difficulties and were more likely to have a negative attitude to school than students born early in the school year; Bell and Daniels (1990) found that the effect could be found in students aged 11-15 taking science assessments.

Apart from a direct effect on academic achievement, the late birthday effect has been linked to other factors which would be expected to affect schooling: Diamond (1983), for instance, reported that late birthday students have a higher incidence of specific learning disabilities; and Jackson (1964) and Thompson (1971) reported that the late birthday effect is enhanced when internal assessment is used, since teachers tend to victimise the youngest members of the class. Routley and de Lemos (1993) describe strategies by parents to avoid the late birthday effect by delaying school entry until the next academic year and show that age on entry to school depends on sex and socioeconomic status.

In Western Australia the Education Act (1928) and its regulations make it compulsory for parents to cause their children to attend school at the start of the year in which their sixth birthday falls. This may or may not be subsequent to a period of pre-primary education. A small number of parents manage to negotiate a year's deferral of entry, but the majority of students enter according to policy. From then on, students in Western Australia normally march locked in step through one grade per year until they leave school. The only concession to developmentally appropriate practice is to advance or retard a very small number of students who are exceptionally conspicuous misfits.

Having access to data on senior secondary school achievement, the authors were asked to find out whether the late birthday effect persisted to the end of Year 12. This main question was broadened to ask:

- whether students with late birthdays may be expected to obtain the same Tertiary Entrance Score (TES) as those with early birthdays,
- whether students with late birthdays are as likely to stay in school to the end of Year 12 as students with early birthdays, and
- whether students with late birthdays are as likely to aspire to university places as those with early birthdays.

Method

Data from Western Australia came from the Secondary Education Authority's (SEA) database. The New Zealand Qualifications Authority, the Board of Studies (NSW), the Board of Senior Secondary Studies (ACT), the Board of Senior Secondary School Studies (Queensland) and the Schools Board of Tasmania supplied similar data for comparative purposes. Monthly birth statistics were obtained from the Australian Bureau of Statistics and Statistics New Zealand. Repeaters were removed from the SEA data. For some investigations, SEA data on leavers from two different years were pooled to provide a larger sample of the population.

In Western Australia, the variable *Achievement* was operationalised as the Tertiary Entrance Score (TES) calculated by the SEA. Subject to the restriction that at least one course must be taken from each of two categories - Humanities (not including English) and Science/Quantitative courses - the average of the best four scaled marks (maximum 100) from TES courses is compared with the average of the best five scaled marks. The higher of the two averages is multiplied by five and added to ten percent of the student's mark in the Australian Scaling Test, giving a possible maximum TES of 510.

SPSSPC Version 6.0 was used for ANOVA studies. Chi-square tests were carried out manually, using birth statistics as a basis for expected values.

Results

(i) Data on seventeen year old Western Australian leavers with a valid TES who were in Year 12 for the first time in 1991 and 1992 were analysed by ANOVA. The effect of *Age* on *Achievement* of seventeen year olds was found to be non-significant when Age was operationalised as "thirds", i.e. four month periods with those in the first *third* born in January-April, the second *third* born in May-August and the third *third* born in September-December (see Table 1).

Table 1: Effect of *Age* on *Achievement* of 17 year old leavers, WA, 1991-2

Third	Count	Mean TES	sd of TES
Jan-Apr	6872	304.19	70.35
May-Aug	6779	305.47	71.00
Sep-Dec	6165	304.74	70.10

($F = 1.44$, df = 2,19813 , $p = 0.567$)

No two groups were found to be significantly different; however, it was noticed that this data set included far fewer students born in the last *third* of the year than in the other time periods.

(ii) The effect of *Sex* on *Achievement* was found to be significant but *Sex* and *Age* did not have a significant interaction effect on *Achievement* (see Table 2).

(iii) In case the use of four-month categories (*thirds*) is too coarse a measure of *Age,* Experiment (i) was repeated with a finer scale for *Age*. The effect of *Age*, operationalised as month of birth (MOB), on the *Achievement* of 17 year old Western Australian leavers was found to be non-significant ($F = 1.44$, df = 11,19804 , $p = 0.146$). No two *Age* groups were found to have significantly different mean TES when the Scheffé procedure was used to make multiple comparisons at the $p=0.05$ level. It can be seen in Table 3 that there is a considerable reduction in the number of students born in the last two months of the year.

Table 2: Effect of *Age* and *Sex* on *Achievement* of 17 year old leavers WA, 1991-1992

2(a)

	SEX			
	MALE		FEMALE	
THIRD	**Mean TES**	**Frequency**	**Mean TES**	**Frequency**
Jan-Apr	305.59	3180	302.98	3692
May-Aug	306.48	3093	304.62	3686
Sep-Dec	306.87	2683	303.10	3482

2(b)

EFFECT	df	F	p
Age	2	0.58	0.56
Sex	1	7.25	0.007
Age x *Sex*	2	0.29	0.75

Table 3: Effect of *Age* (monthly) on *Achievement* of 17 year old leavers WA, 1991-1992

Month of Birth	Frequency	Mean TES	sd of TES
January	1716	301.50	70.41
February	1604	301.84	71.39
March	1838	307.06	70.77
April	1714	305.99	68.73
May	1797	304.86	70.78
June	1663	307.87	71.22
July	1664	303.85	71.47
August	1655	305.35	70.53
September	1621	304.70	70.70
October	1709	305.13	68.59
November	1484	306.81	68.93
December	1351	302.02	72.50

(iv) Since the late birthday effect on 16 year old and 18 year old students was also of interest, a wider range of Year 12 leavers was considered. The subjects were aged 16-18 when they were in Year 12. Year 12 repeaters were excluded, but those who had been delayed at some other stage of schooling and those who had been accelerated were included. ANOVA was used to investigate the effect of *Age*, operationalised as 9 groups each covering birthdays in a four-month period (*thirds*) over three years, on *Achievement*. *Age* was found to have a significant effect on *Achievement* ($F = 31\times 57$, df = 8,23935, $p < 0\times 001$). Table 4 shows which groups are significantly different at the $p = 0.05$ level.

Table 4: Effect of *Age* on *Achievement* of school leavers aged 16-18 WA, 1991-1992

Birth day Group	Age at end of Year 12	Month of Birth	Fre-quency	Mean TES	s.d. of TES	Significantly Different Groups
1	16	SOND	25	322.2	95.98	nil
2	16	MJJA	72	362.1	71.99	4,5,6,7,8,9
3	16	JFMA	349	342.5	74.89	4,5,6,7,8,9
4	17	SOND	6569	304.3	68.83	2,3,7,8
5	17	MJJA	7184	304.8	70.03	2,3,7,8
6	17	JFMA	7239	303.5	69.47	2,3,7,8
7	18	SOND	1316	290.4	73.17	2,3,4,5,6
8	18	MJJA	719	287.7	74.98	2,3,4,5,6
9	18	JFMA	471	295.1	76.87	2,3

The mean TES and the number of students in each age group are displayed in Figures 1 and 2 respectively.

(v) The apparent deficit of late birthday students was investigated using data from seventeen year old leavers in 1992. These students were in Year 12 for the first time (i.e. repeaters were excluded). The number of seventeen year olds in Year 12 was compared with the number of persons born in each quarter of 1975. A chi-square test was performed using the data in Table 5 to test the hypothesis that students with late birthdays have just as good a chance of staying in step with the rest of their age cohort as any other student. It may be seen in Table 5 that the hypothesis may be rejected and that the major term contributing to a high value of chi-square is that of the late birthday students.

(vi) In order to find out if Sex was a factor in the previous result, seventeen year olds who left Year 12 in 1992 were categorised by Sex and two chi-square tests were carried out on females and males separately. The null hypothesis under test is that late birthday students (of each sex in turn) have as good a chance of progressing to Year 12 at the same rate as other students.

Figure 1: Variation of TES, by age group, Western Australia 1992-93

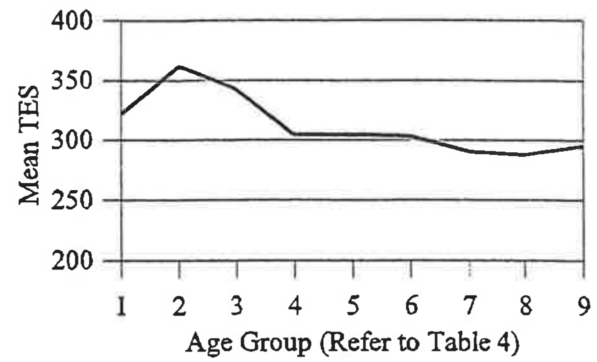


Figure 2: Distribution of ages of leavers with a TES, Western Australia 1992-93

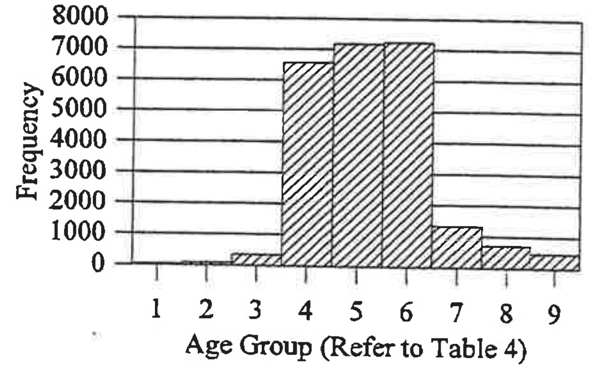


Table 5: Observed and expected numbers of 17 year old Year 12 students, Western Australia 1992

Quarter	No of births 17 years earlier	O Observed No of Year 12 students	E Expected No of Year 12 Students	$\frac{(O-E)^2}{E}$
Jan-Mar	5212	3426	3373	.83
Apr-Jun	5019	3401	3248.1	7.20
Jul-Aug	5139	3370	3325.75	.59
Sep-Dec	4965	2963	3213.15	19.47
Total	20335	13160	13160	28.09

(Chi-square = 28.09, df = 3, $p < 0.005$)

Table 6a: Female students by age

Birth Period (1975)	No. of Births 17 y. earlier	O Observed	E Expected	(O-E)²/E
Last Quarter	2396	1586	1698.27	7.42
Other	7487	5419	5306.73	2.38
Totals	9883	7005		9.80

Table 6b: Male students by age

Birth Period (1975)	No. of Births 17 y. earlier	O Observed	E Expected	(O-E)²/E
Last Quarter	2569	1377	1514.31	12.45
Other	7883	4784	4646.69	4.06
Totals	10452	6161	6161	16.51

For females, Table 6a shows a significant deficit was found in the number of students (Chi-square = 9.80, df = 3, $p < 0.025$). For males (Table 6b), the null hypothesis may be rejected with even more confidence (Chi-square = 16.51, df = 3, $p < 0.005$).

(vii) The cohort of students with birthdays in the last quarter of 1975 was examined to see whether a year's delay, at any stage in their education before Year 12, made them less likely to undertake studies which could lead to university admission. Only students reaching Year 12 for the first time were considered, and they were categorised as either 17 or 18 years old and as either university-bound or non-university-bound. The results are shown in Table 7.

Table 7: Contingency table for late birthday students born in 1975, WA
(O=Observed frequency, E=Expected frequency based on birth statistics)

		Age in Year 12: 17	18	Total
University-bound	O	9631	1127	
	E	9358.5	1399.5	
Non-university-bound	O	3529	841	
	E	3801.5	568.5	
	SO	13160	1968	15128

Age on reaching Year 12 was found to have a significant effect on students' aspirations (Chi-square = 211.14, df = 1, $p < .005$). Students reaching Year 12 for the first time at the age of 18 are significantly less likely to be aiming for a university place than those who do so a year younger.

(viii) Students who completed Year 12 for the first time in 1992, aged 17, were examined to see if Age had an effect on their aspirations for higher education. They were categorised according to birth quarter and whether or not their course combination could lead to a TES (Table 8). For these 17 year old students, late birthday students were found to be as likely as others to be aiming for university (Chi-square = 0.88, df = 1, $p > 0.10$).

(ix) Students who reached Year 12 for the first time at the age of 18 were examined to see if their month of birth had an effect on their aspirations towards university.

Table 8: Contingency table for 17 year old students in Year 12 WA 1992
(O=Observed frequency, E=Expected frequency)

		Month of Birth: Jan-Mar	Oct-Dec	Total
University-bound	O	2540	2166	
	E	2523.5	2182.5	
Non-university-bound	O	886	797	
	E	902.5	780.5	
	SO	3426	2963	6389

Table 9: Contingency table for 18 year old students in Year 12, WA 1993
(O=Observed frequency, E=Expected frequency)

		Month of Birth: Jan-Mar	Oct-Dec	Total
University-bound	O	161	447	
	E	161.7	446.3	
Non-university-bound	O	126	345	
	E	125.3	345.7	
	SO	287	792	1079

No evidence was found to reject the hypothesis that late birthday 18 year olds are as likely to be university-bound as early birthday 18 year olds (Chi-square = .01, df = 1, $p > 0.90$) while attempting Year 12 for the first time.

Discussion

The finding that 16 year olds are, in general, higher achievers than 17 year olds (Figure 1) is hardly surprising in the Western Australian context. Nor is it surprising to find that *Sex* has an effect on the achievement of seventeen year olds, but the data in Western Australia show that males may be expected to obtain higher tertiary entrance scores than females, *ceteris paribus*. The direction of this gender difference is opposite to that currently being reported in many other Australian states (e.g. SSABSA, 1993) and some factors contributing to this effect are discussed by Peck and Trimmer (1994).

Students in the Western Australian system who progress "normally", i.e. starting Year 1 at the beginning of the year of their sixth birthday and advancing one grade every year, are more likely than their age-peers in the grade below to be enrolled in courses from which a TES can be calculated. (Students taking such a combination of courses will be described as "university-bound" even though possession of a TES is no guarantee of a place. We can be more definite about describing non-university-bound students because their course combinations can not possibly lead to a TES). It has been found in this study that students completing Year 12 for the first time at the age of 18 are less likely to be university-bound than those aged 17.

When 17 year old Year 12 students were examined, it was found that their month of birth had no effect on their TES nor on whether or not they appeared to be university-bound. Students with late birthdays may be expected to obtain just as high tertiary entrance scores as those with early birthdays. Students with late birthdays are as likely as those with early birthdays to be university-bound. However, amongst this cohort of 17 year old students the late birthday students appear to be significantly under-represented. This conclusion was reached by comparing the number born in each quarter with expected values derived from birth statistics. The shortfall of late birthday students in this age group is due to a deficit of both males and females.

It may be concluded that for students who start normally and make normal progress through school the late birthday effect has no effect on achievement nor on students' aspirations towards university. However, members of their age-cohort who reach the end of secondary school one year later are less likely to be university-bound and, if they are university-bound, may be expected to have lower tertiary entrance scores. For these 18 year old school leavers, those with late birthdays may be expected to have the same TES and university aspirations as those with early birthdays.

It is curious that 17 year old late birthday students may be expected to have as high a TES as students born in other months of the year. If, as a result of developmentally inappropriate practice in the early years of primary school, late birthday students fail to receive the same educational opportunities as other students, one might possibly expect these students to manifest lower achievement in Year 12. Alternatively, if they were not thriving in school, one might expect them to be more likely to leave school at the end of Year 10 or Year 11. In any case, the removal of the least able students from their year group ought to raise the average ability of those remaining. This is not found. It is as if the deficit in 17 year old late birthday students arises from removal of a random sample (as regards future academic achievement) from their cohort. Furthermore, students who reach the end of Year 12 one year later than the "normal" cohort as a result of either being made to repeat a year or of having their entry postponed by their parents are less likely to be university-bound and may expect to have a significantly lower TES.

Comparisons with other educational systems

The accreditation authorities of Queensland, the Australian Capital Territory, Tasmania, New South Wales and New Zealand supplied statistics on achievement of senior secondary students who left school in 1993. These statistics were broadly analogous to those of Western Australia (used in the previous sections), with some differences in terminology. The rules for entry to Year 1 of primary school, as they applied 12 - 15 years ago when the 1993 leavers started school, were also obtained (Table 10). These rules were used to determine which age group, if any, may have been disadvantaged by immaturity on entry to Year 1 of primary school. Due to differences in the rules which determine eligibility to start school, this age group did not always have late birthdays as in Western Australia. In the results below, this group of students will be termed "*immature starters*". The achievement of *immature starters* was compared with that of other age groups by means of t-tests. The number of university-bound students in each age group was compared with the values expected from the corresponding birth statistics, obtained from the ABS, using chi-square tests. It was assumed that the effects of migration were negligible.

In Western Australia, Queensland, the Australian Capital Territory, Tasmania and New South Wales it is possible to identify a group of students who, by virtue of their month of birth, will enter Year 1 of primary school as *immature starters*. The TES (or equivalent) and population of these *immature starters* were contrasted with those of a group of students with different birth months who reached Year 12 at the same time.

Table 10: Rules (paraphrased) for starting school in various Australian states and territories, *circa* 1975

Western Australia	Students started school in Year 1 at the beginning of the year in which their sixth birthday fell.
Queensland	Students whose fifth birthday fell in the previous year had to start school in Year 1 at the beginning of the year. Students whose fifth birthday fell in January or February of the academic year could opt to start school or wait another year. All students entered school in Year 1 at the beginning of the year.
ACT	Students were admitted to kindergarten at the start of each semester provided they had turned 5. The cut-off dates for entry in each semester were 31 January and 15 July. There was some scope for continuous or monthly enrolment at the discretion of schools. At the end of the school year kindergarten students progressed to Year 1.
Tasmania	Students aged 4.6 to 4.11 on 1 January were admitted at the beginning of the year to one year of kindergarten, followed by Year 1. Students aged 4.0 to 4.5 on 1 January were admitted at the beginning of the year to one year of kindergarten followed by one year of preparatory, then Year 1 of primary school.
NSW	Students aged at least 4.9 were admitted to kindergarten at the start of each school year, and continually thereafter until 30 April. At the end of this year (for some, an incomplete year) of kindergarten, students entered Year 1 of primary school.
New Zealand	Students enter primary school continuously from kindergarten, as and when teachers judge that they are ready. In the early years of primary school they are taught in multi-aged groupings.

In Queensland those born from October to December are the *immature starters*. Their mean OP in 1993 was 12.75. Those born between April and September of the same year achieved a mean OP of about 13.1. (It should be noted that a low OP represents high achievement.) The nature of the OP scale makes it difficult to test the significance of this difference, but according to Allen (1994):

> Those who are 17 in Year 12 achieve at about the same level regardless of birthday. However, those with late birthdays are more likely than those with early birthdays to be 18 in Year 12 and to be achieving less well despite being older.

The number of 17 year old *immature starters* was 8158 (the expected value based on birth statistics and the total number of 17 year old Year 12 students was 9487). The deficit of *immature starters* in this cohort of school leavers was significant (chi-square = 330.8, $p < 0.005$).

In the ACT children born between January and April were identified as *immature starters* since they spend less time in kindergarten before entering primary school in step with those born in the second half of the previous year. The mean TER of the *immature starters* (63.82) was compared with that of students born between September and December of the previous year (62.66) and no significant difference was found ($t = 0.99$, $p > 0.10$). The number of *immature starters* was 644; the expected value based on birth statistics and the total population of this cohort of Year 12 students was 686. The deficit of *immature starters* in this cohort of school leavers was significant (chi-square = 5.12, $p < 0.025$).

In Tasmania children born between April and June may be identified as *immature starters*. The 1993 leavers included 306 of them, with a mean TES of 50.68. These students were compared with their classmates born between July and September in the previous year (the corresponding early birthday group) whose mean TES was 51.31. There was found to be no significant difference between the TES of these groups ($t = 0.43$, $p > 0.25$). The expected number of *immature starters* in this cohort was 348, and the actual number (306) was significantly smaller (chi-square = 11.81, $p < 0.005$).

In New South Wales *immature starters* may be identified as those born between January and April. Their mean TES in 1993 was 260. They were compared with other members of this cohort who were born in May and June of the previous year (mean TES = 266). Unfortunately, the data available did not include standard deviations so it can not be concluded whether this difference is significant. The numbers of students in these two groups were compared with birth statistics in a chi-square test which showed that populations did not differ significantly from expected values (chi-square = 2.84, $p > 0.05$).

In New Zealand the flexible entry system and the operation of a policy of developmentally appropriate practice make it impossible to identify any group of *immature* starters. The flexibility of their educational system results in a wide spread of ages amongst leavers (see Figure 3).

Table 11 summarises the findings above. The table shows that in nearly every case these *immature starters* have a significantly worse chance of progressing through formal schooling in step with others who enter Year 1 at the same time; they either have to repeat a year or finish school before reaching Year 12. However, in the case of New South Wales the achievement of Year 12 students who started and finished school in step is independent of birthday. Nor was there a shortfall in the number of *immature starters*. It is possible that this is related to a more flexible policy for advancing and delaying progress through Years 1 to 12.

The age distributions of university-bound Year 12 school leavers in several Australian states and New Zealand are shown in Figure 3. The vast differences in population between students in the various educational systems have been removed by normalising the frequency scales in order to see more clearly the shapes of the distributions. (It should be noted that for some states *Age* is shown in quarterly groupings and for others in four-month groupings - a result of the diverse ways in which data were supplied.) Despite the effects of truncating these distributions due to lack of data (e.g. the ACT distribution appears as if there may be a significant proportion of 19 year old Year 12 students), and despite extraneous effects such as migration into and out of the educational systems, Figure 3 allows us to see that

- Western Australian students finish Year 12 approximately 6 months younger than students from the ACT, Tasmania, New South Wales and New Zealand.

- The vast majority of Western Australian students appear to stay firmly locked in step with their peers who start primary school at the same time.

Table 11: Summary Comparison between Educational Systems

State or Territory	Months of birth of *immature starters*	Do *immature starters* who finish Year 12 in step with their *peers achieve at a lower level?	Are *immature starters* as likely to reach Year 12 at the same time as their *peers?
Queensland	Oct - Dec	No	No
ACT	Jan - April	No	No
Tasmania	April - June	No	No
Western Australia	Sept - Dec	No	No
New South Wales	Jan-April	Not known	Yes
New Zealand	Not Applicable	Not Applicable	Not Applicable

* "Peers" in this context are students who start Year 1 together.

Conclusion

This survey of educational systems confirms that the Western Australian system gives students an earlier start and an earlier end to schooling than other Australian states. It also (see Figure 3) keeps students locked into step relatively rigidly in comparison with other systems, which implies a certain lack of flexibility in providing for the needs of individuals.

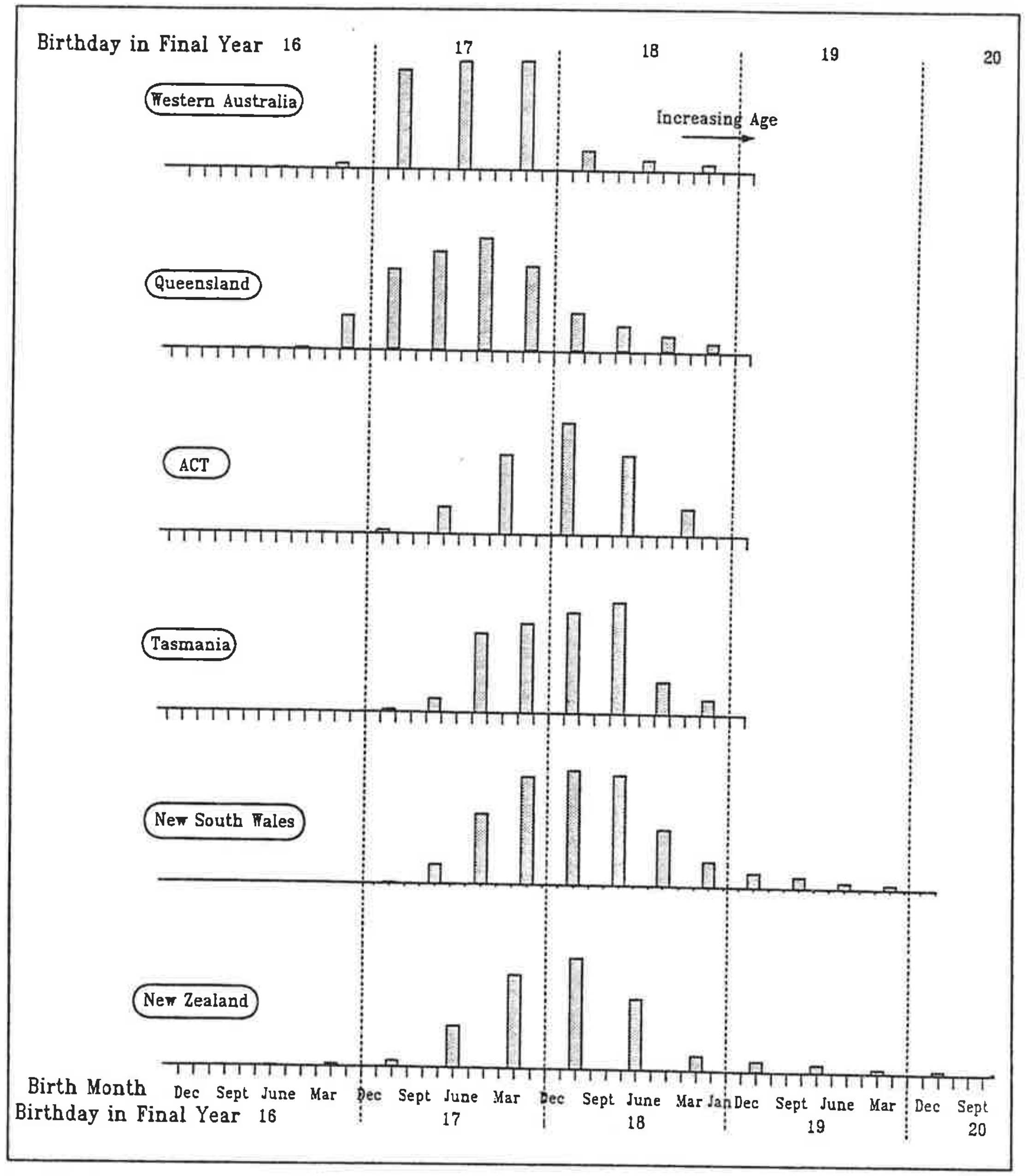
In several other Australian states evidence was found to support the Western Australian findings that in Year 12:

1) late birthday students are as likely to achieve as highly as other students in the same class who started school at the same time;
2) late birthday students are more likely than other students to reach Year 12 one year later, achieve less well than those who made "normal" progress and be non-university-bound.

The discovery that *immature starters* are more likely to reach Year 12 later than their peers is not merely a "late birthday effect", i.e. something to do with the calendar. This was shown by re-casting the research question in terms of *immature starters*, whose birthdays vary from state to state (see Table 11). Also, the finding that the "late birthday effect" can be discerned in Year 12 statistics does not necessarily mean that the effect persists for twelve years of schooling. After all, *immature starters* who are obliged to repeat Year 1 will be a year older than their classmates for the rest of their school lives. However, the consequences of coping with the late birthday effect - e.g. by making a student repeat a year or by the student leaving school at the earliest opportunity - may have a permanent effect on students' achievement at the end of senior secondary school, and hence on their chances of applying successfully for places at university. Curtis (1983) showed that, in the USA, students who were behind their age group in grade were more likely to drop out of school.

The fact that, in several states, the *immature starters* have the same average achievement as their peers suggests that the students who were held back were not lacking in academic potential; otherwise, their removal would raise the average achievement of this cohort. Their removal from the "normal" cohort is tantamount to removing a random sample, as far as future Year 12 achievement is concerned. An alternative hypothesis to account for this observation is that the loss of less able students (by making them repeat a year, or through their early departure from school) has exactly the same effect on the mean achievement of each age group, and leaves the mean TES of late birthday students in the "normal" cohort equal to that of other age groups. To believe this calls for acceptance of some remarkable coincidences in the data of several states.

Figure 3: Age distribution of Year 12 Leavers with a TES Australian States and New Zealand 1992-1993
(Frequency scales normalised)



The authors of this paper are inclined to prefer the simpler conclusion that students who are made to repeat a year of school (and those for whom a decision was made to start school a year late) were selected for this treatment in a manner unrelated to future academic potential. This treatment is more likely to be applied to late birthday students (or *immature starters* in states other than Western Australia).

Doubtless, at the time it is decided on, there are good reasons for delaying the start of school or for making a student repeat a year ¾ perhaps such decisions are based on students' behaviour. If so, one would expect a link between sex and making normal progress through the school system. A comparison, by sex, of birth statistics with the Year 12 population lends some support to this hypothesis.

Although there is no evidence for the late birthday effect operating at the level of senior secondary school its effects at an earlier stage of education may be permanent. Recent political debate in this state has focussed on a proposal which would entail, amongst other things, raising the school entry age by six months. This would simply transfer the late birthday effect to a different group of students. Although this might have some merit because the late birthday effect is probably attenuated by increasing the school starting age, it seems short-sighted to ignore the possibility of eliminating it by introducing more flexible entry to the early years of school.

Acknowledgments

The authors are indebted to Terry Werner of the Education policy and Coordination Bureau (WA) for the question which initiated this research, and to the following for the provision of data: Bob Edwards of the ACT Board of Senior Secondary Studies, Reg Allen of the Queensland Board of Senior Secondary School Studies, Graham Fish and Jim Fitzgerald of the Schools Board of Tasmania, Jim Strachan and Fiona Strachan of the New Zealand Qualifications Authority, Bob MacCann and Trevor Harrison of the New South Wales Board of Studies.

References

Allen, J.R. (1994). Private communication.

Bell, J. & Daniels, S. (1990). Are Summer-born children disadvantaged? The birth date effect in education, *Oxford Review of Education, 16*(1), pp.67-80.

Curtis, J. et al. (1983). Dropout prediction, a paper presented at the 67th annual meeting of the AERA at Montreal in 1983.

Diamond, G.H. (1983). The birthdate effect - A maturational effect?, *Journal of Learning Disabilities, 16*(3), pp.161-164.

Education Act (WA) (1928), Perth, Western Australia.

Jackson, B. (1964). *Streaming: an educational system in miniature*, Routledge and Kegan Paul, London.

Kinard, E.M. & Reinherz, H.(1986). Birthdate effects on school performance and adjustment: A longitudinal study, *Journal of Educational Research, 79*(6), pp.366-372.

Meisels, S.J. (1992). Doing harm and doing Good: Iatrogenic effects of early childhood enrollment and promotion policies, *Early Childhood Research Quarterly*, 7, pp.155-174.

Ministerial task force on voluntary full-time pre-primary education and related matters (1993). *Voluntary full-time pre-primary Education in Western Australia: An Issues Paper*, Perth: Government of Western Australia.

Martindale, C. & Black, W.F. (1970). *Journal of Genetic Psychology*, 117, pp.137-138.

Mortimore, P., Sammons, P., Stoll, L., Lewis, D. & Ecob, R. (1988). *School Matters: The junior years*, Wells Open Books, UK.

Peck, R.G. & Trimmer, K.J.(1994). Gender Differences in Tertiary Entrance Scores, a paper presented at the 1994 AARE Conference, Newcastle, NSW.

Routley, V. & de Lemos, M.M. (1993). Changing Trends in School Entry Age in Victoria, *Australian Journal of Early Childhood, 18*(2), pp.30-37.

Senior Secondary Assessment Board of South Australia (1993). Gender Equity in Senior Secondary School Assessment (ESSSA) Project Final Report, Adelaide, SA.

Sweetland, J.D. & de Simone, P.S. (1987). Age of entry, sex and academic achievement in elementary school children, *Psychology in the Schools, 24*(4), pp.406-412.

Thompson, D. (1971). Season of Birth and Success in Secondary Schools, *Educational Research, 14*, pp.56-60.

The Youth Challenge project: Models, measurement and mentors

L.T. Pike
Edith Cowan Universaity
A.I. Thompson
Ballajura Community College
L.J. Thonpson
L.J. Thompson & Associates

This paper describes an extensive research project examining the Youth Challenge Project, which is currently being undertaken in a selection of West Australian metropolitan and rural primary and secondary schools. The project has three major aims:

1. to further develop a conceptual model of self-esteem development in children
2. to evauate the efficacy of different means of assessing self-esteem
3. to examine the role of different forms of mentoring that are being applied in a series of prolgrammes that are being implemented as part of the project with children identified as "at-risk" due to low self-esteem.

The paper provides an outline of the research project's evolution and progress to date, along with current and future tasks for the research team.

Introduction

This paper presents the most recent developments in the Youth Challenge Project (YCP). YCP has been running for 12 years in Western Australian primary and secondary schools and has as its focus enhancement of self-esteem in students identified as "at-risk". The paper provides an overview of YCP illustrating the changes it has undergone, the self-esteem enhancement model underlying YCP and the most recent developments in measurement and mentoring.

An overview of the Youth Challenge project

YCPs are community based projects for "at-risk" youth that have been implemented in Perth and country Western Australia. As such, they are part of an evolutionary process whereby the projects have been developed, refined and implemented in a variety of settings, with modifications and improvements gained