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Educational Achievement in Māori: The Roles of Cultural Identity and Social Disadvantage

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Abstract

The present study investigates the roles of Māori cultural identity and socio-economic status in educational outcomes in a New Zealand birth cohort studied from birth to the age of 25. There were statistically significant (all p values $< .01$) associations between cultural identity and educational outcomes, with those of Māori ethnic identification having generally lower levels of educational achievement outcomes when compared to non-Māori. In addition, those of Māori ethnic identification were exposed to significantly ($p < .05$) greater levels of socio-economic disadvantage in childhood. Control for socio-economic factors largely reduced the associations between cultural identity and educational outcomes to statistical non-significance. The findings suggest that educational underachievement amongst Māori can be largely explained by disparities in socio-economic status during childhood.

One of the most well established features of New Zealand's education system is the enduring disparity in educational achievement between Māori and non-Māori. Using the standard educational indicators of participation and attainment, Māori are less likely to attend an early childhood education facility before entering primary school, are far less likely to leave school with upper secondary school qualifications, and are also less likely to possess formal or tertiary level qualifications when compared to other New Zealanders (Ministry of Social Development, 2007). In addition, there has been a worrying trend in the rising truancy and suspension rates of Māori relative to school attendance (Ministry of Education, 2007). Given the recognised contribution of education to improve income levels, standards of living, and psychosocial outcomes (Duncan, Yeung, Brooks-Gunn & Smith, 1998; Fergusson & Woodward, 2000; Fergusson, Swain-Campbell & Horwood, 2002), these consistently lower levels of achievement by Māori in New Zealand's education system have been a long standing source of concern and debate (Fergusson, Lloyd & Horwood, 1991; Meijl, 1994; Alton-Lee, 2003; Ministry of Education, 2005). Two schools of thought have come to dominate discussion on the origins of this discrepancy in educational performance between Māori and non-Māori educational achievement and why it persists.

The first view argues that with the advent of the colonisation of New Zealand, Māori have been subjected to continuous disadvantage in an education system and curriculum that was imposed upon them (Smith, 1999; Bishop & Glynn, 1999; Pihama, Cram & Walker, 2002). Although variations in this argument are evident, all assume that differences in culture play a critical role in explaining Māori educational under-achievement. From this perspective, present day disparities are the result of an education system that historically neglected to recognise cultural differences between Māori and non-Māori. Included among the commonly cited differences are disparate worldviews (Smith, 1999), distinct pedagogical practices (Bishop, Berryman & Richardson, 2002), and contrasting styles of cognition (Durie, 1994). By failing to acknowledge, and cater for, these assumed differences it is believed that Māori were being educated in culturally inappropriate

learning environments. Central to this view, therefore, is the contention that Māori educational under-achievement is best understood as an outcome of a systemic failure to actively recognise, transmit, and reinforce Māori cultural values and beliefs across the education spectrum (Fitzsimons & Smith, 2000). The result of this failure, it is claimed, has been a loss of cultural esteem and by direct association, Māori identity, which has led to current disparities between Māori and non-Māori in education (Durie, 2005; Bishop, Berryman, Cavanagh & Teddy, 2007).

The second school of thought has focused on the role of socio-economic disparities rather than cultural differences to explain the educational gap between Māori and their New Zealand counterparts (Chapple, Jefferies, & Walker, 1997). Importantly, this perspective duly recognises that Māori have indeed been subjected to adverse historical processes such as colonialism, institutional racism, and judicial disadvantage (Poata-Smith, 1997; Freeman-Moir, 1997). As a consequence, it is acknowledged that Māori represent a minority ethnic group, which has endured serious hardship including loss of customary rights and significant disruption to social organisation. However, while these factors are accepted as influencing Māori socio-political structures, the underlying cause believed to impede education achievement by Māori is access to, and participation in, New Zealand's capitalist economic system (Chapple, 1999, 2000; Rata, 2003). Accordingly, it is the disadvantaged position of Māori within the nation's labour market economy that has led to poorer education outcomes for Māori. Integral to this alternative perspective therefore are the links made between economic status, resource capacity, and educational performance.

With respect to economic status, Māori continue to occupy a more marginalised position when compared to other New Zealanders (Statistics New Zealand, 2002). Proponents of this view therefore posit that the lower socio-economic status of Māori directly constrains access to the resources known to influence education participation and attainment. To take one example, because Māori are more likely to be brought up in a single parent environment than non-Māori, access to income may be limited, which can influence the material conditions and intra-familial dynamics within the family unit (Ministry of Women's Affairs, 2001). In turn, Māori may be exposed to

greater social adversity and psychosocial risk than other New Zealanders, the influence of which is revealed through lower educational achievement (Chapple, Jefferies, & Walker, 1997). Critically, however, this position argues that it is not ethnicity or culture *per se* that influences education outcomes. Rather, education differentiation between groups is a product of their respective economic positioning within specific nations (Marks, 2006). Applied to the New Zealand context, educational under-achievement of Māori arises through the lower socio-economic status of this group's members within the nation's labour market.

The issue that clearly divides these two schools of thought concerns the mechanisms that lead to educational under-performance by Māori. The first view, which advocates a cultural model of explanation, assumes that these mechanisms are specific to Māori. This model has led to the development of cultural-specific education domains where the education of Māori is initiated within the auspices of a Māori world-view using alternative pedagogical practices. On the other hand, the second view, offers a socio-economic model of explanation. This perspective argues that it is the lower socio-economic status of Māori, which inhibits access by Māori to the resources that lead to better educational outcomes. Contrary to the cultural model of explanation however, this view suggests that educational under-achievement arising through limited access to resources is not unique to Māori. Any economically disadvantaged group, irrespective of ethnicity or culture, will be exposed to the risk factors and life processes that result in educational under-performance.

Despite the length and extent of the debate about the origins of Māori educational disadvantage, there have been few studies that have sought to ascertain the extent to which differences in cultural identity and socio-economic status account for the ethnic differences in educational under-achievement. In this paper we use data gathered over the course of a 25 year longitudinal study to examine the contributions of these factors to educational outcomes in adolescence and young adulthood. The specific aims of the paper were to

- 1) To document the association between Māori cultural identity and overall levels of educational achievement by the age of 25.

- 2) To examine the extent to which ethnic disparities in educational achievement could be explained by socio-economic factors including maternal and paternal education, family socio-economic status, and family living standards.

More generally the aims of the paper were to explore the relative roles of cultural identification and social disadvantage in contributing to the educational disadvantage of young Māori adults.

Methods

The data were gathered during the course of the Christchurch Health and Development Study (CHDS). In this study a birth cohort of 1265 children (635 males, 630 females) born in the Christchurch (New Zealand) urban region in mid-1977 has been studied at birth, 4 months, 1 year and annually to age 16 years, and again at ages 18, 21 and 25 years. Information from a variety of sources has been used including: parental interviews; teacher reports; self-reports; psychometric assessments; medical and other record data.(Fergusson & Horwood, 2001; Fergusson, Horwood, Shannon, & Lawton, 1989). The analyses were based on 984 study participants for whom information was available for ethnic identity at age 21 years and educational outcomes to age 25 years (77.8% of the original sample). All study information was collected on the basis of signed and informed consent from study participants.

Cultural identity

At age 21 years respondents were asked about their ancestry, cultural identification, level of participation in Māori cultural domains, and proficiency in the Māori language (Broughton, Fergusson, Rimene, Horwood, & Sporle, 2000). These are widely used as standard indicators to determine degrees of Māori ethnic identification and Māori cultural identity. On the basis of this questioning, 11.1% of sample members self-identified as New Zealand Māori. A further breakdown of this group showed 45.9% reporting sole Māori identity and 54.1% reporting Māori ethnic identity and identity with another ethnic group. For the purposes of the present analysis, those reporting sole Māori identity were classified as having a sole Māori identity, while those reporting

both Māori identity and another ethnic identity were classified as having Māori/other ethnic identity. All other participants were classified as being non-Māori. Comparisons of the sole Māori and Māori/other group showed sole Māori participants were more likely to endorse having taken part in several aspects of Māori culture, including: frequency of marae visits ($p < .001$); being a member of a Māori group, organisation or sports team ($p < .05$); being a member of a kapa haka (cultural performance) group ($p < .001$); attending tangi (funeral) or unveiling ($p < .001$); listening to Māori language radio programmes and watching Māori language television programmes ($p < .001$); and listening and watching programmes in the English language about Māori ($p < .001$). The descriptors of ‘sole Māori’, ‘Māori/other ethnic identity’, and ‘non-Māori’ were originally recommended by Pomare, Keefe-Ormsby, Ormsby, Pearce, Reid, Robson & Watene-Haydon (1995) in their analyses examining ethnic trends in public health epidemiology.

Educational attainment

The outcome measures in the present study were based on assessments of cohort members’ attainment of New Zealand high school and tertiary educational qualifications. The measures were chosen to reflect an ascending and progressive order of qualifications from those who attained no educational qualifications to those who attained a university degree. It should be noted that the cohort members completed high school qualifications that were in effect prior to the adoption of the NCEA framework in 2002.

At ages 18, 21 and 25 cohort members were questioned about their history of enrolment in educational institutions and their attainment of educational qualifications. Using this information the following hierarchy of measures of educational attainment was developed for the current investigation.

No high school qualifications. Sample members who had never attained any of the below high school qualifications by age 21, either while they were at high school or subsequently as adult

students, were classified as having no high school qualifications: 18.1% of the sample had failed to attain any high school qualifications.

School Certificate passes. At ages 18 and 21, participants were questioned as to the number of School Certificate examinations they had undertaken and the grades received for each subject. A measure of success in School Certificate examinations was based on a count of the number of pass (A, B or C) grades attained in these examinations.

Sixth Form Certificate. At ages 18 and 21, participants were questioned as to whether they had achieved Sixth Form Certificate and the subjects undertaken: 68.9% of the sample reported having attained Sixth Form Certificate.

Higher School Certificate. At ages 18 and 21, sample members were questioned about the attainment of Higher School Certificate: 42.3% of the sample had attained this qualification.

University Bursary. At ages 18 and 21 participants were questioned as to whether they had undertaken University Bursary examinations and the outcome of these examinations: 28.1% of the sample had passed the requirements for receiving a University Bursary.

Attended University. At ages 21 and 25, sample members were questioned as to whether they had ever enrolled at University, either full-time or part-time: 39.9% of the sample reported ever attending University by age 25.

University degree or equivalent. At age 25, sample members were questioned as to whether they had ever attained a Bachelor's level or higher degree from a university or equivalent tertiary institution: 26.1% of the sample reported having attained a degree.

Overall achievement score. Finally, a further outcome measure was devised to reflect the overall progression of each cohort member through the hierarchy of educational qualifications. As progression through secondary and tertiary qualifications has the properties of a Guttman-like scale (typically one must attain a particular qualification in order to move on to the next level), each level in the progression was assigned an ordinal value (from 0 = no high school qualifications to 6 =

gained university degree), and each individual received a score based on his or her highest level of qualification. This score served as a measure of overall achievement in these analyses.

Covariate factors

A range of covariate factors were chosen for the analyses, based on: (a) their correlation with ethnic identity; and (b) previous research on the present cohort suggesting that the factors were related to educational achievement. The following covariate factors were chosen for inclusion in the analyses:

Maternal and paternal education. Maternal and paternal education level was assessed at the time of the survey child's birth using a three point scale which reflected the highest level of educational achievement attained. This scale was: 1 = parent lacked formal educational qualifications (had not graduated from high school); 2 = parent had secondary level educational qualifications (had graduated from high school); 3 = parent had tertiary level qualifications (had obtained a university degree or tertiary technical qualification).

Family socio-economic status (at birth). This was assessed at the time of the survey child's birth using the Elley-Irving (1976) scale of socio-economic status for New Zealand. This scale classifies SES into 6 levels on the basis of paternal occupation ranging from 1 = professional occupations to 6 = unskilled occupations.

Average family living standards (ages 0-10). At each year a global assessment of the material living standards of the family was obtained by means of an interviewer rating. Ratings were made on a five point scale that ranged from "very good" to "very poor". These ratings were summed over the 10 year period and divided by 10 to give a measure of typical family living standards during this period.

Results

Associations between cultural identification and educational achievement

Table 1 shows the sample classified into three groups on the basis of ethnic identification reported at age 21: non-Māori (N = 875), sole Māori identity, (N= 50) and Māori/other ethnic identity (N = 59). For each group the Table shows rates of educational achievement outcomes over the period to age 25 years. Inspection of the Table shows that non-Māori reported the highest levels of educational attainment, followed by those of Māori/other ethnic identity, and finally those of sole Māori identity. To test these trends for significance, logistic and multiple regression models were fitted to the individual educational achievement outcomes and the overall educational achievement score by age 25. The results of this analysis are summarised in Table 1 which reports:

- 1) The overall significance of ethnicity as a predictor of educational achievement. The results show a statistically significant tendency (all p values <.01) for educational achievement to vary with ethnic identification. For the overall educational achievement score, participants in the Māori identification groups had a significantly lower score than non-Māori (p < .0001).
- 2) Pairwise contrasts between the three groups. These show that non-Māori had levels of educational achievement that were significantly greater than those of sole Māori (all p values <.01) on each individual measure of educational achievement, as well as the overall measure of educational achievement (p < .0001). Non-Māori also had significantly (all p-values < .05) higher levels of achievement than those of Māori/other identity on four of seven individual measures of educational achievement (school certificate passing grades; higher school certificate; university bursary, gaining university degree). In addition, non-Māori had significantly (p < .05) higher scores than those of Māori/other identity on the overall educational achievement measure. There was a marginally significant difference (p < .10) between the two Māori identity groups on the measure of overall educational achievement, with those of Māori/other ethnic identity having marginally higher levels of overall educational achievement by age 25.

INSERT TABLE 1 HERE

Associations between cultural identification and socio-economic factors

Table 2 shows the associations between cultural identification and a range of socio-economic factors (see Methods). The associations were tested for significance using linear regression models.

The Table shows:

- 1) In general, non-Māori had lower rates of adverse socio-economic factors than either sole Māori or Māori/other identity groups. Non-Māori had significantly lower rates of parents lacking formal educational qualifications than either sole Māori ($p < .0001$) or Māori/other identity ($p < .01$), as well as significantly higher mean levels of socio-economic status at birth than either sole Māori ($p < .0001$) or Māori/other identity ($p < .01$). There were no significant differences between the two Māori identity groups on these measures (all p values $> .10$).
- 2) Non-Māori had higher levels of average family living standards from ages 0-10 than either sole Māori ($p < .0001$) or Māori/other identity ($p < .0001$). In addition, those of Māori/other identity had significantly higher levels of average family living standards than those of sole Māori identity ($p < .05$).

INSERT TABLE 2 HERE

Adjustments for socio-economic factors

One explanation for the ethnic identification differences observed in Table 1 is that these differences reflect between-group differences in exposure to socio-economic disadvantage. To examine this issue, the associations between cultural identification and the educational achievement outcomes shown in Table 1 were adjusted to take account of the socio-economic factors listed in Table 2, by extending the logistic and multiple regression models to include the socio-economic covariate factors. The results of these analyses are shown in Table 3 which shows the percentages

(for dichotomous outcomes) and means (for continuous outcomes) after adjustment for socio-economic factors. Estimates of the adjusted means or percentages for each outcome were obtained using the methods described by Lee (1981). The Table shows that, in all cases, adjustment for socio-economic factors substantially reduced the size of the between-group differences in educational achievement. Furthermore, with the exception of university degree attainment, adjustment for covariate factors reduced the size of the group differences to statistical non-significance (all p values $> .20$). For university degree attainment, those of Māori/other ethnic identity were significantly ($p < .05$) less likely to have completed a university degree than those in the non-Māori group after adjustment for socio-economic factors. These findings suggest that the differences between cultural identification groups in terms of educational achievement may, for the most part, be attributed to increased rates of exposure during childhood to adverse socio-economic conditions amongst individuals in the two Māori identity groups.

INSERT TABLE 3 HERE

Discussion

Over the previous two decades, educational policy in New Zealand has undergone a major transformation (Fitzsimons & Smith, 2000; Alton-Lee, 2003). The key objective motivating this transformation has been to improve the learning experiences and educational performance of Māori, who traditionally have not achieved at the same level as other New Zealanders in this realm. The development of a parallel system of education for Māori is often noted as an exemplar of the educational reforms (Smith, 2000; Bishop *et al.* 2007). For this reason it has been suggested that the primary institution where Māori cultural revitalisation has taken place is education (Bishop & Glynn, 1999; Smith, 2000; Pihama, Cram & Walker, 2002). However, within the field, there has also been a concerted debate about the respective contributions of cultural identity and socio-economic status to influence education outcomes of Māori.

In this research, we have used data gathered over the course of a 25 year longitudinal study to examine the linkages between ethnic identification, social disadvantage, and educational achievement. The study has a number of advantages including: i) collection of longitudinal data on educational outcomes from the point of school leaving into young adulthood; ii) assessment of variations in ethnic identification; and, iii) prospective measurement of exposure to family socio-economic disadvantage in childhood. The study leads to the following findings and conclusions.

In agreement with previous findings (Fergusson, Lloyd & Horwood, 1991) there were consistent tendencies for levels of educational achievement by age 25 to vary with ethnic identification. Māori fared less well on a wide range of measures including levels of achievement at secondary school, and participation in tertiary study. While those with a sole Māori identity tended to have lower educational achievement than those reporting Māori and other identity, these differences were relatively small and statistically non-significant.

Further analysis showed clear linkages between measures of family socio-economic status and cultural identification. This analysis showed that those reporting Māori ethnic identity were exposed to far greater socio-economic disadvantage in childhood than those of non-Māori identity. While those with a sole Māori identity experienced greater socio-economic disadvantage than those of Māori and other identity these differences were not large and were statistically non-significant.

The findings revealing clear linkages between Māori cultural identification and family socio-economic circumstances in childhood raised the possibility that the higher rate of educational under-achievement amongst Māori was a consequence of disadvantaged socio-economic status rather than cultural identity. To test this hypothesis the differences between cultural identity groups were adjusted, statistically, for family socio-economic status in childhood. With one exception, these adjustments were sufficient to explain the linkages between educational achievement and cultural identity. The exception was attainment of a university degree with non-Māori having approximately twice the rate of degree attainment of individuals in either Māori identity group after adjustment for socio-economic factors. Furthermore, after adjustment for socio-economic factors

there was no evidence to suggest that variations in cultural identity played any detectable role in the educational achievement of those reporting Māori cultural identity.

Collectively, these findings suggest that the origins of educational under-achievement for Māori enrolled in this birth cohort were, for the most part, explained by their exposure to family socio-economic disadvantage in childhood rather than by factors relating to cultural identity. The factors that placed young Māori at an educational disadvantage clearly overlapped and were similar to the factors that led to educational disadvantage amongst non-Māori. These findings pose a clear challenge to the prevailing view that the origins of Māori educational disadvantage rest with cultural processes that are specific to Māori. Rather they suggest that the association between ethnicity and educational achievement found in this study was a special case of a more general trend for children from socio-economically disadvantaged backgrounds to achieve less well in the context of the New Zealand education system. It is, however, important that the caveats and limitations that apply to this research are clearly stated.

The major limitation of this study is that the findings apply to a particular birth cohort born in a particular region of New Zealand in 1977. It would be premature and misleading to assume that the findings from this study would necessarily correspond to those obtained from more recent birth cohorts or from other New Zealand regions. It is possible that birth cohorts raised in other regions have been or continue to be exposed to a different set of circumstances, which feasibly could influence the linkages between cultural identity, socio-economic status, and educational achievement reported here. For example, it is acknowledged that New Zealand's market reforms of the 1980's, involving the deregulation of the labour market did impact the economic viability and prosperity of regions differently (Kelsey, 1995). Regarding this caveat however, it is also plausible that there are regional variations relative to the degree to which individuals may be exposed to Māori cultural domains and revitalisation initiatives such as Māori specific educational institutions. Either of these environmental factors could conceivably influence results procured from other

cohort studies examining the theorised association between identity, economic status, and educational achievement.

While these caveats should be born in mind the findings of the present study raise issues that require some answers. In particular while the dominant explanation of the educational under-achievement of young Māori has focussed increasingly on cultural factors, there is little direct evidence to show that these factors actually contribute to the educational disadvantage of young Māori. To a large extent, current investments into Māori specific educational systems has been justified on the basis of conjecture and concerns about issues of social equity. For example, over the past twenty-five years a range of policy-led reforms have been implemented across New Zealand's education sector to address national aspirations to improve the learning experiences and academic performance of Māori. These reforms have created a parallel education system whereby Māori-specific initiatives such as *kohanga reo*, *kura kaupapa*, and *whare wananga* have been developed from pre-school through to the tertiary level to provide alternative education venues for Māori (Smith, 1992; Bishop & Glynn, 1999). By providing culturally immersive environments, these initiatives are widely regarded as being instrumental in enhancing the education prospects of Māori. Moreover, by increasing the number of domains where education is imparted through the medium of the Māori language, these alternative sites of education are also seen as an invaluable resource to facilitate Māori cultural revitalisation (Smith, 2000). Clearly, an important research priority therefore needs to involve examining the extent to which different educational models based on assumptions about cultural differences do in fact benefit Māori.

A further criticism of the study is that the measurement of cultural identity was limited and that a more comprehensive assessment may have produced different results. While such a criticism has merit, it is of interest to note that parallel papers from this cohort, which investigate issues of crime and mental health have shown that being of sole Māori identity was a protective factor that reduced risks of crime and mental health problems (Marie, Fergusson, & Boden (in press); Marie, Fergusson, & Boden, (under review)). Against the background of that research it is of interest to

find that cultural factors did not appear to play a similar role in the educational achievement of Māori respondents of this cohort.

In summary, the findings from this study suggest that ethnic differences in the educational achievement of the CHDS cohort can largely be explained by socio-economic factors rather than the ethnic identity of respondents. While it is advisable not to generalise these findings beyond the CHDS cohort, the results clearly highlight the need for more searching and in depth research into the origins of Māori educational disadvantage, including the role of social factors such as exposure to relative socio-economic deprivation. Such an approach will help serve to ensure that investments to ameliorate educational disadvantage in New Zealand are well founded in evidence.

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Table 1: Associations between cultural identification and educational achievement up to age 25

| Measure | Māori Identity | | | p ¹ |
|---|-----------------------------|-------------------------------------|-----------------------------|----------------|
| | Sole Māori (n=50) | Māori + other identity (n=59) | Non-Māori (n=875) | |
| <u>High School achievement (by age 21)</u> | | | | |
| % with no high school qualifications | 32.0 ^a | 23.7 ^{a,b} | 16.0 ^b | <.01 |
| Mean (SD) passes in School Certificate | 1.98 ^a (1.86) | 2.49 ^a (2.23) | 3.43 ^b (2.25) | <.0001 |
| % gained 6 th Form Certificate | 46.0 ^a | 64.4 ^{a,b} | 71.4 ^b | <.001 |
| % gained Higher School Certificate | 24.0 ^a | 32.2 ^a | 46.1 ^b | <.01 |
| % gained University Bursary | 8.0 ^a | 15.3 ^a | 31.5 ^b | <.001 |
| <u>University participation (by age 25)</u> | | | | |
| % attended university | 14.3 ^a | 23.2 ^{a,b} | 33.3 ^b | <.01 |
| % gained university degree | 6.1 ^a | 7.1 ^a | 28.9 ^b | <.0001 |
| <u>Overall achievement (by age 25)</u> | | | | |
| Mean (SD) overall achievement score | 3.00 ^a (1.96) | 3.77 ^a (1.97) | 4.37 ^b (2.24) | <.0001 |

Note: Differing superscripts indicate statistically significant ($p < .05$) pairwise differences

¹ Wald chi-square for dichotomous outcomes; F-test for continuous outcomes

Table 2: Associations between cultural identification and socio-economic factors in childhood

| Measure | Māori Identity | | | p ¹ |
|---|-----------------------------|-----------------------------|-----------------------------|----------------|
| | Sole Māori | Māori + other identity | Non-Māori | |
| % mother lacked formal educational qualifications | 72.0 ^a | 61.0 ^a | 46.4 ^b | <.0001 |
| % father lacked formal educational qualifications | 67.4 ^a | 60.0 ^a | 44.3 ^b | <.0001 |
| Mean (SD) family living standards ages 0-10 ² | 3.2 ^a (0.41) | 3.0 ^b (0.44) | 2.8 ^c (0.45) | <.0001 |
| Mean (SD) family socioeconomic status at birth ² | 4.48 ^a (1.31) | 4.08 ^a (1.38) | 3.45 ^b (1.41) | <.0001 |

Note: Differing superscripts indicate statistically significant ($p < .05$) pairwise differences

¹ Wald chi-square for dichotomous outcomes; F-test for continuous outcomes

² Higher numbers correspond to increasing disadvantage

Table 3: Associations between cultural identification and educational achievement up to age 25, after adjustment for socio-economic factors ¹

| Measure | Māori Identity | | | p ² |
|--|---------------------|------------------------|-------------------|----------------|
| | Sole Māori | Māori + other identity | Non-Māori | |
| <u>High School achievement (by age 21)</u> | | | | |
| Adjusted % with no high school qualifications | 18.2 ^a | 12.7 ^a | 16.5 ^a | >.50 |
| Adjusted mean passes in School Certificate | 2.93 ^a | 3.25 ^a | 3.41 ^a | >.20 |
| Adjusted % gained 6 th Form Certificate | 66.8 ^a | 76.9 ^a | 70.5 ^a | >.30 |
| Adjusted % gained Higher School Certificate | 42.2 ^a | 45.9 ^a | 45.7 ^a | >.80 |
| Adjusted % gained University Bursary | 20.4 ^a | 24.9 ^a | 31.1 ^a | >.30 |
| <u>University participation (by age 25)</u> | | | | |
| Adjusted % attended university | 39.5 ^a | 45.0 ^a | 41.9 ^a | >.80 |
| Adjusted % gained university degree | 16.8 ^{a,b} | 12.8 ^a | 28.3 ^b | <.05 |
| <u>Overall achievement (by age 25)</u> | | | | |
| Adjusted Mean overall achievement score | 4.05 ^a | 4.38 ^a | 4.33 ^a | >.60 |

Note: Differing superscripts indicate statistically significant ($p < .05$) pairwise differences

¹ Covariate factors: maternal education, paternal education, family socio-economic status at birth, average family living standards ages 0-10

² Wald chi-square for dichotomous outcomes; F-test for continuous outcomes