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**The Backgrounds of Canadian Youth and Access to Post-secondary Education:
New Evidence from the Youth in Transition Survey**

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Abstract

This paper exploits the unprecedented rich information available in the Youth in Transition Survey, Sample A (YITS-A) to investigate issues related to access to post-secondary education (PSE). The release of these data make it possible since the cohort was age 19 at the time of the third wave of survey in 2004, and therefore at the point of making decisions with respect to participation in PSE. We find that parental income is positively related to university attendance, although its importance is diminished once parental education is included in the estimation. Similarly, the importance of parental education on university attendance is diminished once high school grades, academic participation, and standardized reading test scores (i.e., PISA results) are included. We argue that these background variables an important inclusion into the model of PSE choice. How these characteristics are developed and the mechanism(s) by which they are transferred from parent to child is likely where future research, and resources, should be targeted.

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I. Introduction

Plenty of attention has recently been focused on attracting students to post-secondary education (PSE) – not only in Canada, but around the Western world. Much of this is driven by the view that the Canada will need increasing numbers of educated workers in order to maintain our position – let alone gain any ground – against competitors in the increasingly integrated global economy. University and college administrators too are well aware that the demographic trends that have favoured the latest tide of enrolments cannot be sustained in the future. As the *size* of the potential applicant pool decreases, they are looking for ways to maintain admissions by increasing the *rate* at which young people choose to attend PSE.

To date, many of the studies conducted on PSE access have tended to concentrate on the financial constraints that may keep qualified students from attending higher education. From an economist's point of view – and economists have done the lion's share of work in this area – this makes a great deal of sense given that the inverse relationship between price and demand has the lofty status of a "law" within the discipline. Thus economists expect that if the price (or tuition) increases, fewer students will desire to attend PSE. Indeed, a number of Canadian studies on the impact of tuition hikes at post-secondary institutions have recently been conducted (Coelli, 2005; Neill, 2005; Johnson and Rahmad, 2005; are recent examples). Up until the fiscal problems of many provincial governments in the mid-1990s, tuition at Canadian PSE institutions was low as a percentage of the total cost of education, ensuring the most students who were able and willing to attend could do so. If low-income families were financially constrained in their ability to send their children, then the student loans system would fill this financial void. As provincial governments reduced their funding to institutions in the 1990s, they were forced to make up for this by increasing revenue from other sources, mainly tuition (Finnie and Usher, 2005). This tuition increase led to concerns that individuals, especially those from low-income backgrounds, may be excluded from participating in PSE.

These changes to the PSE funding regime have not gone unnoticed by the mainstream media, often encouraged by student interest groups whose mandate is to lobby federal and provincial governments for more favourable financial conditions for those attending PSE. Tuition increases are constant fodder for the media and student protests seem certain to be front-page news. Indeed, the relationship between low-cost tuition and PSE access has become conventional wisdom – and therefore should not be questioned – to what seems like all but those few who seriously study the issue. To wit, a recent *Globe and Mail* opinion piece was entitled "The sacred cow of low tuition." It ran on the same day as PSE students from across the country rallied against high tuition.

As Mark Twain once mused: "sacred cows make the best hamburger." In what follows, our intention is to address the importance of some of the non-financial barriers and assess their impact on the PSE participation decision. In particular, we focus on the background of young adults at the time when they are 15-years old and evaluate the importance of these factors on entering either college or university. The availability of the Youth in Transition Survey (YITS) allows an unprecedented look at the importance of many variables that could potentially determine the success or failure of students in accessing PSE in Canada.

What differentiates this research from previous Canadian research on this topic is that we are able to explicitly control for a variety of family background characteristics, most importantly parental income and education, in determining access to PSE. While the YITS has been used in previous research, it has not included the same variety of controls nor has it been used to model

the choice between college and university.² What follows is a user-friendly exposition of two much longer and more technical papers. Readers desiring the full details are directed to Finnie and Mueller (2007a,b).

The paper is organized as follows. The following section contains a review of the pertinent literature. Section III discusses the data as well as a brief outline of the methodology employed. The major results of the descriptive and multivariate analysis are the topic of Section IV. The final section concludes the paper and offers a few policy recommendations based on the major results of the empirical work.

II. Literature Review

It will not be the purpose of this brief section to conduct a comprehensive review of the literature which addresses the factors related to PSE participation. This has been done elsewhere in this volume (Mueller, 2008), as well as by other authors for the Canadian literature (De Broucker, 2005; Junor and Usher, 2004; Looker, 2001; Looker and Lowe, 2001) as well as the US literature (Ehrenberg, 2004; Long 2005). In what follows, we briefly describe the evolution of our knowledge about access to PSE in Canada, and then outline how the subsequent work in this paper fits into this evolving literature.

A good share of the Canadian and international literature has addressed the impacts of financial variables on access to PSE amongst young people. The accumulated evidence, however, suggests that the demand for PSE is price inelastic (Junor and Usher, 2004). The negligible impact of tuition is important for our purposes, since we are unable to control for this influence in our data. Both Christofides, et al. (2001) and Corak, et al. (2003) include parental income in their models of PSE participation and find that tuition generally had little effect, but that parental income is important for university attendance, but not for PSE in general. Frenette (2005) and Drolet (2005) also find that PSE attendance gap between high- and low-income families is narrowed when colleges and universities are both considered, but that students from low-income family are less likely to attend either, especially university. Frenette (2008) finds that 12 per cent of the gap in university participation between students at the top and the bottom income quartiles can be explained by financial constraints. Rivard and Raymond (2004) also find that entrance into PSE is not particularly sensitive to either tuition or family income. More important factors are parental education and academic preparation, although they argue that increased returns to PSE as well as increased student loan amounts were also likely important in reducing the significance of income and tuition variables. The data these authors utilize make these conclusions possible: namely that the financial variables that were hitherto considered important, become much less so when the appropriate variables are included.

For the US, evidence also points to the lack of importance of financial factors when the appropriate background variables and data are utilized. Cameron and Heckman (2001) show that parental income in the child's pre-PSE years is positively correlated with schooling attainment, but this is due to the long-term correlation with family and environmental factors. Keane and Wolpin (2001) perform simulations which suggest that financial transfers from parents to students would only have a modest effect on PSE attendance for those individuals from low-income families. Carneiro and Heckman (2002) argue that since many long-term factors are correlated with short-term financial factors in the period when PSE decisions are made, the latter are often cited as being important when in fact it is the former influences that carry the most weight. These studies together suggest that it is not financial constraints that prohibit young people from attaining PSE, but rather other factors correlated with parental income.

² For example, Finnie, Laporte and Laschelle (2004) do not use the family income variable since they try to match the YITS with the SLS (which does not contain this variable). Frenette (2007) does include a wide array of controls, including family income, but addresses only university attendance.

Finnie, Laporte, and Lascelles (2004) use the 1991 School Leavers Survey (SLS) and the 2000 YITS-B – both of which contain a variety of family background variables – to analyze the influences of these factors on PSE access. They find that participation rates in the 1990s increased most amongst students whose parents were highly educated, although this may partially be due to the fact that education is highly correlated with income. This may be particularly important in the 1990s since tuition increased rapidly in most jurisdictions throughout Canada. Addressing the indirect channels through which parental influences work is the purpose of the paper by Finnie, Lascelles and Sweetman (2005) which also uses the 1991 SLS as well as its follow-up in 1995. The authors find that family background is related to PSE participation both directly and also indirectly through variables such as high school marks, attitudes towards education, etc. Furthermore, the direct effects are generally attenuated when the indirect effects are included, and are strongest for university attendance compared to other types of PSE participation.

What we have learned from these recent studies is that the decision to attend (and to ultimately complete) PSE is a complex one and depends on a variety of financial and nonfinancial variables related to the student's family background, preparedness for post-secondary studies in terms of courses, and activities undertaken during secondary studies. The existing work has also taught us that the inclusion of as many relevant variables seems desirable since many control variables in earlier studies were highly correlated with excluded variables, thus biasing coefficient estimates and (potentially) resulting in misguided policy recommendations. For example, recent Canadian studies generally show that the effect of tuition on the decision to attend PSE is practically nil once family income is taken into consideration, and family income itself is shown to be less important statistically and economically once parental education is included. Ironically, policy discussions still tend to focus on financial-related barriers to entry.

This is the point of departure for the current paper. We utilize the extensive background information contained in the YITS-A to address access to PSE in Canada. Specifically, we add to the existing literature by including a comprehensive set of background variables which are determined before entry into PSE to assess both the direct and indirect impact of these variables on access to college and university.

III. Data and Methodology

The Youth in Transition Survey – Sample A (YITS-A) initially interviewed 15-year olds, their parents, and their high school administrators in 2000. Two follow-up surveys of the young people only were conducted in 2002 and again in 2004. In this final wave of the survey, the young people were 19-years of age, a time when most people have either already entered PSE or the labour force.

We limit the sample to include only those in the nine of the ten provinces, Quebec being the exclusion. Because Quebec has a special system of PSE – *Collège d'enseignement général et professionnel* or CEGEP as it is commonly known – students in Quebec only attend secondary education up to the equivalent of grade 11, and then attend CEGEP to either prepare for a university degree (an additional two years) or to complete a technical program (usually an additional three years). Because of the structure of this system, those attending university in Quebec normally can complete their studies in three years, compared to four years outside of the province. We drop Quebec from our analysis since there is no way in these data to disaggregate the two streams, and this could potentially confound our analysis (i.e., university-bound students could be incorrectly classified as college students or vice versa). The differentiation of college- and university-bound students is key to the analysis that follows. Observations from the territories are also eliminated, owing to small sample sizes.

PSE participation is the first program that a student entered, rather than the highest level attended. This is owing to the fact that more information is available on the first program than on subsequent programs for each individual as well as the fact that we are concerned with the

transition from high school to PSE in this research. Since individuals who have studied outside of Canada might have quite different backgrounds and experiences, we eliminate them from the sample. For the same reason, non-Canadian citizens and those with unknown immigration status are dropped. Finally, we drop those individuals for which there are missing data as well as those who are continuing in high school, since we obviously do not observe any transition into PSE for this latter group. A full accounting of the observations dropped from the sample is contained in Finnie and Mueller (2007a). The final unweighted sample size consists of 16,163 observations: 7,852 males and 8,311 females, although missing observations sometimes changes these numbers slightly in selected estimations.

All estimates that follow are derived from a multinomial logit model whereby young people chose between university, college (including trade school) and not attending PSE. All models control for urban (versus rural) location, province in which the young person attended high school, French minority status, family type (two parents, mother or father only, other), and indicators for minorities and immigrants, and their interaction.³ This methodology was used in earlier work on access by Finnie, Sweetman and Lascelles (2004), albeit on a much less detailed dataset.

IV. Results

Table 1 shows participation rates of males and females in any PSE, and then separated into participation at colleges and universities. A few patterns are present from these data and worthy of note. PSE participation is much higher for females than for males – 69.2 per cent versus 55.9 per cent. This total differential can entirely be accounted for by the higher university participation rates of young women – 44.7 per cent versus 30.9 per cent for males. College participation rates for the sexes are almost identical. The higher university participation rate for young women is well known, at least amongst researchers. Any other differences between the young males and females in our sample are not obvious from the data in this table.

The table shows that young people from urban areas much more likely to attend university. The Maritime provinces and Ontario have the highest rates of PSE participation in the country, while Alberta has the lowest, followed by Saskatchewan. Much of Ontario's high overall participation rate is owing to the proportion of young people attending college rather than university, whereas for the Maritimes high university participation rates – the highest in the country – explain the high overall rates. Family background also appears to be an important determinant of PSE attendance. Young people from two parent families are much more likely to attend PSE than those from other types of families, entirely due to their higher university participation rates. Interestingly, minorities in Canada (whether they are visible minorities, immigrants, or linguistic minorities) all have higher overall PSE participation rates in general, usually the result of higher university participation rates.

Figures 1 through 4 use the data from Table 1 to show participation rates by parental income and parental education for both males and females. First, Figures 1 and 2 show participation rates at college and university by parental income for males and females, respectively. Here college participation rates are at or above 20 per cent for both males and females regardless of family income; the lone exception is for females from the lowest family income group. Also of note is that college participation rates are relatively flat for males, and only a little less amongst females. With the exception of both males and females with the lowest parental incomes, university participation rates are increasing in income, especially for females, approximately double for those in the highest income category compared to those in the second lowest category. A similar pattern is observed for males although overall participation rates are lower than those for females.⁴

³ Details of the models estimated can be found in Finnie and Mueller (2007a, 2007b).

⁴ Although not reported in these figures, total PSE participation is 62.6 per cent for all youth in our sample, but is much higher for females than for males – 69.2 per cent versus 55.9 per cent. This total differential can entirely be accounted for by the higher university participation rates of young women – 44.7 per cent versus 30.9 per cent for males. See Finnie and Mueller (2007a) for more details.

The raw data on parental education and PSE participation rates show even more variance compared to the data on income. Figures 3 and 4 show these results – again for males and females, respectively – but this time by parental education (measured as the parent with the highest level of education). For both males and females, college participation rates increase in parental education, peak, and then decrease thereafter. By contrast, university education increases monotonically in parental education and these increases are dramatic, especially for males. Young men have about a 10 per cent participation rate when they come from a family where the highest level of parental education is less than high school. Contrast this with the more-than-60 per cent figure for those who have one or both parents with a graduate education. For females, the pattern is similar, although the jump not as dramatic: an increase from just under 20 per cent to the mid-70 per cent range as we move from the least educated to the most educated parents.

To summarize, the results from our sample show that participation in PSE, especially university, tends to be increasing in parental education and family income. College attendance first increases in these two variables and then decreases for children from families with the highest levels of education and income. Of course, one lesson we have learnt quite clearly from the literature is that these education and income effects tend to be positively correlated, and then only way to tease them (and other effects) out of the data is to use a multivariate analysis.

In what follows we present the results from estimating a multinomial logit model whereby individuals attend college, attend university, or do not attend either. Changes in the independent variables will jointly affect the university and college decisions of individuals and the marginal effects are what are presented in the figures. Since most of the significant results are for university attendance and because of space limitations, we will limit our comments to the effects on university attendance.⁵ The initial results from the estimation are presented in Figure 5 for males, and Figure 6 for females. In both figures, the marginal effects presented are relative to the omitted parental income category of \$50,000 to \$75,000. Four sets of results are shown: first with only control variables and the parental income variable; second with these variables and parental education added; next as in the second case but with high school grade variables added; and, in the fourth case as the second case but with various scale variables added intended to measure engagement in high school, self-perception, etc.⁶ In all cases, bars with data labels are those where coefficients estimates are significant at at least the 5 per cent level.

As expected, these results differ in a number of important ways relative to the simple summary measures outlined in Figures 1-4. University attendance is increasing in parental income for both males and females regardless of the specification. However, once controls for parental education are also added to the model, the importance of income is diminished greatly, and becomes insignificantly different from zero in many cases, especially amongst males. For example, in the cases without parental education in Figure 5, each level of parental income (except for the lowest) has a significant effect on university attendance. Once parental education is added, however, only the top income group continues to have an effect on attendance, albeit at a much reduced level. The results for females in Figure 6 follow the same general trend, but they are

⁵ This is not to imply that studying access to college is any less important than access to university, only that most of the statistically important results pertain to university access. Readers interested in these results are referred to Finnie and Mueller (2007a,b).

⁶ In these and all figures that follow, the model specification also includes controls for the province where the respondent's high school was located (urban or rural area, as well as province), a dummy variable for French minority status outside of Quebec, a categorical variable for family type (two parents, mother or father only and other), and dummy variables for both visible minorities and immigrants and their interaction. Parental education is the maximum of either the mother or father's education. Similarly, family income is the highest of the mother or the father in the two-parent family case, or the parent who is present in the one-parent case. Grade variables are at the time of the survey in which the respondent was 15 years of age and include the overall grade as well as grades for math, main language (i.e., English or French), and science. Scale variables include measure of academic, social and overall engagement at high school; measures of self-perception, social support and parental behaviours. The score variable is the grade attained on the PISA reading ability test. See Finnie and Mueller (2007b) and/or Appendix Table A-1 for details.

less pronounced. When high school grade variables and scale/score variables are added (in separate estimates), the effects of parental income do not change by much, if at all.

Figures 7 and 8 look at the results of the model somewhat differently: the marginal effects of parental education relative to the omitted case (i.e., high school completed). Here we see a similar pattern as in the previous two figures: namely that participation in university is increasing in parental education. This is hardly surprising given the positive correlation between education and income. What is more surprising is that parental income tends to become less influential on university attendance as more explanatory variables are added to the model; the same does not hold for parental education which continues to exert a strong influence on participation even as new regressors are added to the model.

Another interesting feature of these results is that parental education exerts a much more potent influence on participation than income. Even though it is somewhat difficult to compare these two since they are measured differently, we see that once parental education is added to the model in Figures 5 and 6, the increase in participation for those from the richest families – relative to the control group at the \$50,000-\$75,000 range – is never above 10 percentage points for females or 6 percentage points for males. By contrast, having one parent with at least a BA degree would increase the likelihood of participation by at least 17 percentage points for males and 14 percentage points for females relative to those from the control group (at least one parent with a high school diploma). This general result – that parental education is a stronger predictor of university participation than parental income – has also been found in the Canadian studies by Knighton and Mirza (2002), Drolet (2005), and Rahman, et al. (2005).

Another interesting result from this set of estimates requires a little more explanation. Here we compare the results in Figures 5 and 7 (males) and Figures 6 and 8 (females). The effect of parental income remains relatively unchanged in Figures 5 and 6 when we add the grade variables to the model, whereas the effect of parental education on university attendance is attenuated greatly in both the cases (Figures 7 and 8). This suggests that the influence of parental education works, at least in part, through high school grades. This result is worthy of further investigation since it is not clear the mechanism through which this influence operates. Finally, when we substitute the scale/score variables for the grade variables the result is very similar: little impact on the marginal effect of parental income, but a greater effect (over 50 per cent in some cases) on the marginal effect of parental education.

Next we turn our attention to a detailed analysis of the grades that students receive in high school at the time of the first wave of the survey in 2001 when these young people were 15-years old and the influence that these have on access to PSE. The results of these estimations are in Figures 9 and 10 where the model estimated includes both parental income and education as well as all other controls mentioned above. We outline the marginal effects of high school grades from models where grades are added in both individually and jointly.⁷ Adding the overall numerical high school grade to the model results in higher university participation. The estimates suggest that a ten-percentage point higher grade average in high school will result about a 21 percentage point increase in university participation for males and a 22 percentage point increase for females. Numerical high school grades in each of math, language, and science, also yield positive coefficients in each case although of a smaller magnitude, suggesting that it is overall grades, rather than any individual grade, that is important in determining participation in university. Indeed, when the model is jointly estimated with all grades included, it is still the overall grade that is of paramount importance in determining university attendance. An interesting result is that the math grade is numerically the least important in determining university attendance, whether this enters the model individually or jointly. The lack of numeracy skills (at least as reflected by the math grade) does not appear to be as important as the language grade

⁷ In other words, each grade is entered into the model by itself before including all the grade variables together. This results in four individual regressions, each with a unique grade variables included, and a fifth regression with all grade variables included together.

in any of the specifications for either sex. The same can be said for the science grade. This is somewhat surprising since the importance of high school science and math grades have become conventional wisdom. While this wisdom may be correct for gaining entrance directly into certain university programs – engineering for example – most students enter a general studies program before declaring a major, so it is not unexpected that the overall grades rather than individual subject grades are what is important.

The YITS survey includes a number of “scale” variables which are indices derived from the data collected for the survey. These variables are designed to measure various aspects of a student's engagement in high school, the student's self-esteem, parental behaviours, and the PISA reading score. Each of these variables is normalized at mean zero (mean five for the PISA score) and a standard deviation of one. This is important when interpreting the results below. Details of these variables can be found in Appendix Table A-1.

The influence of scale variables on college and university attendance is addressed in Figures 11 and 12 for males and Figures 13 and 14 for females. As before with the grades variables, these are entered into the basic model both individually and then jointly. The latter case includes all the variables in both figures for each males and female. The two academic variables (academic identification and academic participation) are positively related to university attendance. The most important of these is academic participation (a measure of attending school, doing homework, etc.). For females, being one standard deviation above the mean on this academic participation scale increases university attendance by at least 8.8 percentage points. For males, this figure is 6.8 percentage points. Thus, students who attend class regularly, complete assignments on time, and spend more time studying, are much more likely to attend university than those who do not. Interestingly, social engagement, often thought to be an important determinant of university attendance, is numerically smaller than either of the academic variables and becomes insignificantly different from zero in the jointly estimated model. This holds for both males and females.

Self-perception would also seem to be an important determinant of PSE participation. This category is divided into three subcategories: self-esteem is a measure of self-worth and self-acceptance; self-efficacy is the student's own perception of his competence and confidence in performing class work; and self-mastery is a measure of being in control of one's own destiny. Students who score high on these measures might be more prepared to enter PSE. The results do show that all three are positively and significantly correlated with university attendance, at least when entered individually. Self-efficacy, however, has the largest coefficient for both males and females – about double the value of the others in this category, at least when estimated separately. Furthermore, it remains at about 5 percentage points and significant for both males and females in the jointly estimated model. Social support is important for males, but not for females in the first case, but unimportant statistically for males in the second. Indeed, for females the marginal effect is negative and significant.

Parental behaviour is divided into three subcategories: “monitoring behaviour” addresses how well parents feel informed about the activities of their children, while “nurturance behaviour” and “inconsistent discipline” are both fairly self-explanatory. Of these, monitoring behaviour is both positively related to university attendance for both males and females, although nurturing is important only for males. Finally, inconsistent discipline is negatively related to participation in university. Still, these values are numerically smaller than many of the other influences. Indeed, in the jointly estimated model, none remains important for males, while monitoring behaviour and inconsistent discipline remain significant but decrease in size for females.

Reading ability is also an important correlate of university attendance. This variable has a mean of five and a standard deviation of one and was created from the Programme for International Student Assessment (PISA) reading test results. The point estimates show that females who are one-standard deviation above the mean will on average have about a 19-23 percentage point increase in attending university. For males, the figure is 15-18 percentage points. Considering the

mean probability of attending university for sample is 30.9 per cent for males and 44.7 per cent for females, these reading scores account of about one-half of these figures. The PISA reading score is a standardized test and these results are similar to those obtained by Carneiro and Heckman (2002) who also use standardized test scores to explain differences in college attendance in the United States. It is important to note that the PISA results are from administrative data collected from high schools, whereas the high school grades are self-reported. Finne and Meng (2005) have shown that these types of test score measures of skill perform better than self-assessments of skill. In particular, they use literacy as an example using both types of measures, and find that the self-assessed measure tends to lead to a significant underestimation of the effect of literacy on employment compared to the test measure. In the present work, this bias may also be present, as indicated by the lower coefficients on the high school language variable (which are self-reported) versus the PISA reading score.

When all these scale variables are considered together there are only three variables that stand out for both sexes: academic participation, self-efficacy and reading ability. When the model is jointly estimated it is only these three coefficients that are both economically and statistically significant for both males and females. This latter result is particularly interesting. Since reading ability is a skill derived over a period of time, this result is also consistent with the earlier work on this subject by Cameron and Heckman (2001) and Carneiro and Heckman (2002), both of which point to the importance of long-term family factors in determining success in PSE. The general results presented above are consistent with the sparse Canadian literature on this subject. Finnie, Lascelles and Sweetman (2005) also find that including a variety of high school grades and other background variables reduces the influence of parental education on access. They also find that parental education is still an important influence after these grades and background variables are taken into consideration, especially at the university level. Our results are similar.

What can we make of these results taken together? The fact that more academic participation, and better high school grades or a higher PISA reading ability results are important determinants of university education seems obvious. The lesson here is that working hard and being responsible about one's studies is important. In short, a good work ethic matters. This work ethic is also related to parental education (especially parents with a BA or above) as the coefficients on parental education become less important determinants of university participation when these background variables are added to the model. What is not clear from this analysis is how this work ethic is passed from parent to child: do highly educated parents push their children harder, or is this work ethic transmitted by some other mechanism? The generally small and often insignificant coefficients on the parental behaviour variables seem to provide some supporting evidence for the latter explanation. In any case, they do underline the importance of family background and natural skill endowments as emphasized by Cameron and Heckman (2001), Keane and Wolpin (2001), Carneiro and Heckman (2002), to name but three of these studies.

V. Conclusions and Policy Implications

This research has addressed how the backgrounds of high school graduates are related to access to PSE in Canada. There are several interesting results that can be derived from this work.

First, in accordance with earlier studies, the impact of parental income is reduced once the level of parental education is taken into account. In particular, higher levels of parental education tend to increase the probability that an individual will attend university, and reduce the probability that he or she will attend college.

Second, parental education exerts a much stronger influence on university attendance compared to parental income. Although obviously a young person has no choice, they would do better to have at least one university educated parent rather than one with a high income.

Third, overall high school grades, as well as the three subject grades under consideration, tend to be positively correlated with university attendance. Further, it is the overall high school grade which has the largest influence on university attendance, rather than any individual subject grade. This is an interesting result since it is often assumed that language arts and mathematics grades are what are the most important. Still, this result makes sense if in fact most students take a general studies program upon entering university, so it is not surprising that the universities themselves might prefer individuals who are better overall academically compared to students who excel at one or two subjects.

Fourth, engagement at high school, especially academic participation, is an important determinant of university participation. In fact, it is the most important of all the scale variables included, although self-efficacy (or a feeling of competence and confidence at school) is also demonstrably important. The largest determinant of university participation, however, is the score on the reading portion of the PISA.

Fifth, when any of high school grades, academic participation, or the reading score on the PISA is added to the basic model, the direct effect of parental education is diminished, but not eliminated. Although not shown above, the largest drop in parental education comes from the inclusion of the PISA reading ability score, arguably a much more reliable indicator of ability compared to the other background variables (which are self-reported). In other words, parental education works through both of these sets of variables to influence PSE choice. We cannot tell from these estimates, the path that this influence takes, although it seems certain that hard-working students do better at finding a spot in university. This could be the result of highly educated parents expected more of their children – and having this expectation realized on average – or it could be the result some other characteristic passed on from parent to child which is correlated with parental education, but not observed nor controlled for in the estimates. Further disentangling this result would not only be a fruitful avenue for future research, but an understanding of this dynamic is also essential for prescribing appropriate policy.

The policy implications of this research are not straightforward. We know that parental education and parental income are important determinants in whether children access PSE, and also at what level. But parental education is correlated with other background variables that are themselves important determinants of PSE participation. It is unrealistic to expect policy to change the exigent level of parental education, although policy could influence its level for today's young people, when they themselves are parents. Therefore, the short-term policy focus must be on the correlates of parental education, in particularly those that can be changed by policy. In our model, these are factors such as academic participation and reading ability, as well as high school grades, all of which are positively correlated to the probability of PSE attendance. How these factors are determined is currently unclear, but they are likely developed early in life, so targeting these characteristics then seems like an important consideration for policy makers.

References

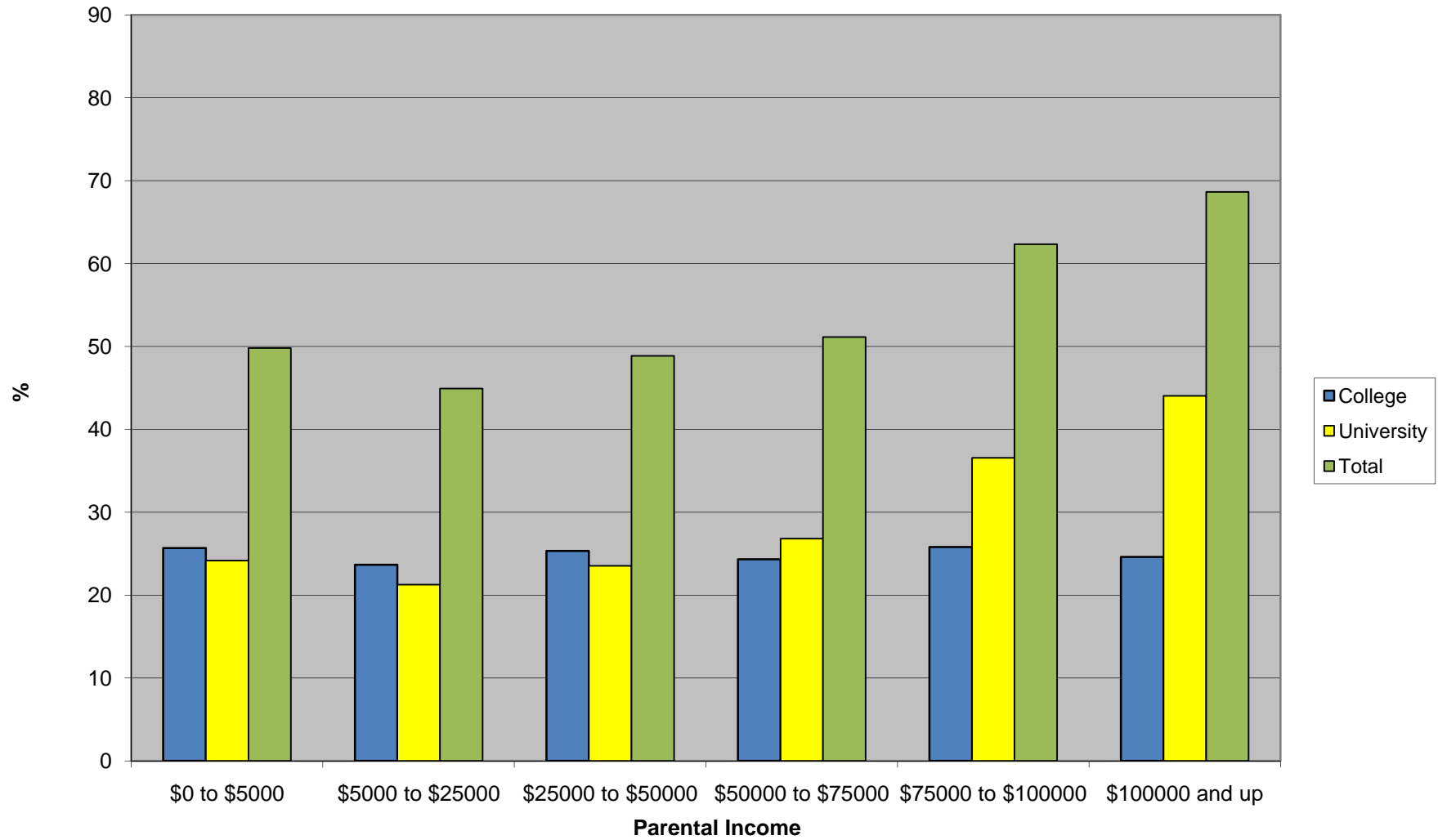
- Cameron, Stephen V., and James J. Heckman. 2001. "The Dynamics of Educational Attainment for Black, Hispanic, and White Males," *Journal of Political Economy* 109(3), 455-99.
- Carneiro, Pablo, and James J. Heckman. 2002. "The Evidence on Credit Constraints in Post-Secondary Schooling," *The Economic Journal* 112, 705-34.
- Christofides, Louis N., Jim Cirello, and Michael Hoy. 2001. "Family Income and Post-Secondary Education in Canada," *Canadian Journal of Higher Education*, 31(1), 177-208.
- Coelli, Michael. 2005. "Tuition, Rationing and Inequality in Post-Secondary Education Attendance," University of British Columbia Working Paper.
- Corak, Miles, Garth Lipps, and John Zhao. 2003. "Family Income and Participation in Post-Secondary Education," Statistics Canada, Analytical Studies, Research Paper No. 210.
- De Broucker, Patrice. 2005. "Getting There and Staying There: Low Income Students and Post-Secondary Education: A Synthesis of Research Findings," Canadian Policy Research Networks, Research Report W-27.
- Drolet, Marie. 2005. "Participation in Post-secondary Education in Canada: Has the Role of Parental Income and Education Changed over the 1990s?" Statistics Canada, Analytical Studies Branch Research Paper Series No. 243.
- Ehrenberg, Ronald G. 2004 "Econometric Studies of Higher Education," *Journal of Econometrics* 121(1-2), 19-37.
- Finnie, Ross, Christine Laporte and Eric Lascelles. 2004. "Family Background and Access to Post-Secondary Education: What Happened over the 1990s?" Statistics Canada, Analytical Studies Research Paper Series No. 226.
- Finnie, Ross, Eric Lascelles, and Arthur Sweetman. 2005. "Who Goes? The Direct and Indirect Effects of Family Background on Access to Postsecondary Education," in *Higher Education in Canada*. Ed. Beach, Charles M., Robin W. Boadway, and R. Marvin McInnis. Montreal and Kingston: McGill-Queen's University Press, 295-338
- Finnie, Ross, and Ronald Meng. 2005. "Literacy and Labour Market Outcomes: Self-assessment versus Test Score Measures," *Applied Economics* 37(17), 1935-51.
- Finnie, Ross, and Richard E. Mueller. 2007a. "High School Student Characteristics and Access to Post-secondary Education in Canada: Evidence from the YITS," mimeo, October 2007.
- Finnie, Ross, and Richard E. Mueller. 2007b. "The Effects of Family Income, Parental Education and Other Background Factors on Access to Post-secondary Education in Canada: Evidence from the YITS," mimeo, December 2007.
- Finnie, Ross, and Alex Usher. 2005. "The Canadian Experiment in Cost-Sharing and its Effects on Access to Higher Education, 1990-2002," Queen's University, School of Policy Studies, Working Paper 39 (January).
- Frenette, Marc. 2005. "The Impact of Tuition Fees on University Access: Evidence from a Large-scale Price Deregulation in Professional Programs," Statistics Canada, Analytical Studies Research Paper Series No. 263.

- Frenette, Marc. 2008. "Why are Youth From Lower-income Families Less Likely to Attend University? Evidence from Academic Abilities, Parental Influences, and Financial Constraints," this volume.
- Johnson, David R., and Fiona Rahmad. 2005. "The Role of Economic Factors, Including the Level of Tuition, in Individual University Participation Decisions in Canada," *Canadian Journal of Higher Education* 35(3), 83-99.
- Junor, Sean, and Alex Usher. 2004. *The Price of Knowledge 2004: Access and Student Finance in Canada*. Montreal: The Canadian Millennium Scholarship Foundation.
- Keane, Michael P., and Kenneth I. Wolpin. 2001. "The Effect of Parental Transfers and Borrowing Constraints on Education Attainment," *International Economic Review* 42(4), 1051-1103.
- Knighton, Tamara, and Sheba Mirza. 2002. "Postsecondary Participation: The Effects of Parents' Education and Household Income," *Education Quarterly Review* 8(3), 25-32.
- Long, Bridget Terry. 2005. "Contributions from the Field of Economics to the Study of College Access and Success," Harvard Graduate School of Education Working Paper.
- Looker, E. Dianne. 2001. "Why Don't They Go On? Factors Affecting the Decisions of Canadian Youth Not to Pursue Post-Secondary Education," Canadian Millennium Scholarship Foundation, Research Series.
- Looker, E. Dianne, and Graham S. Lowe. 2001. "Post-Secondary Access and Student Financial Aid in Canada: Current Knowledge and Research Gaps," Canadian Policy Research Network.
- Mueller, Richard E. 2008. "Access and Persistence of Students from Low-Income Backgrounds in Canadian Post-Secondary Education: A Review of the Literature," this volume.
- Neill, Christine. 2005. "Tuition Fees and the Demand for University Places," Wilfrid Laurier University Working Paper.
- Rahman, Atiz, Jerry Situ, and Vicki Jimmo. 2005. "Participation in Post-secondary Education: Evidence for the Survey of Labour and Income Dynamics," Culture, Tourism and the Centre for Education Statistics Research Paper No. 36, Statistics Canada Catalogue No. 81-595-MIE.
- Rivard, Marc, and Mélanie Raymond. 2004. "The Effect of Tuition Fees on Post-secondary Education in Canada in the late-1990s," Department of Finance Working Paper No. 2004-09.

Table 1 - PSE, College and University Participation Rates by Individual Characteristics, Males and Females

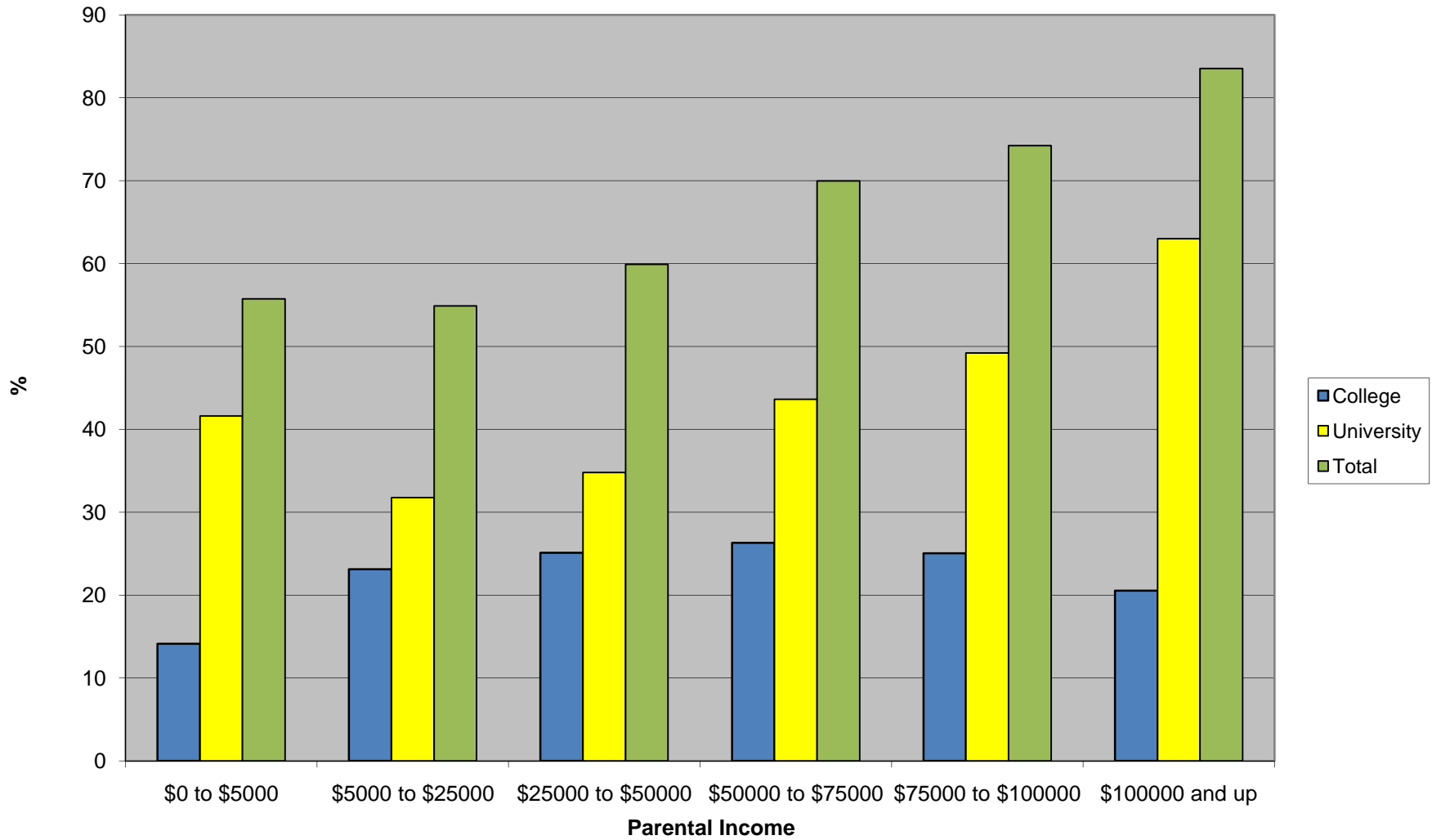
	Any PSE		College		University	
	Males	Females	Males	Females	Males	Females
Overall	55.9	69.2	25.0	24.5	30.9	44.7
HS Region						
Rural	47.8	67.1	26.3	30.8	21.4	36.3
Urban	58.4	69.9	24.5	22.4	33.9	47.4
HS Province						
Newfoundland and Labrador	53.7	68.4	23.9	21.7	29.8	46.7
Prince Edward Island	62.0	73.1	18.7	15.1	43.3	58.0
Nova Scotia	66.3	75.2	19.3	15.8	47.1	59.4
New Brunswick	55.2	72.4	19.3	18.6	35.9	53.7
Ontario	61.8	75.8	31.3	28.8	30.5	47.1
Manitoba	45.0	64.1	11.6	16.7	33.4	47.4
Saskatchewan	46.1	59.3	16.4	18.2	29.8	41.1
Alberta	43.5	56.3	18.2	21.3	25.3	35.0
British Columbia	54.0	62.3	22.6	22.8	31.4	39.5
French minority outside QC						
No	55.7	68.9	24.7	24.2	31.1	44.7
Yes	60.6	76.1	33.0	30.2	27.6	45.9
Family Type						
Two parents	57.5	70.9	25.3	24.3	32.2	46.7
Mother only	46.7	63.6	22.7	26.4	24.0	37.1
Father only	49.8	57.7	26.3	23.2	23.6	34.6
Other	40.7	40.0	20.6	17.7	20.1	22.3
Visible Minority						
Visible minority	69.4	79.0	24.0	22.6	45.5	56.5
Non-visible minority	53.7	67.5	25.1	24.8	28.6	42.7
Immigrant Status						
Canadian by birth	54.8	68.1	25.1	24.9	29.7	43.2
Canadian by immigration	67.6	79.8	23.8	19.7	43.8	60.1
Visible Minority & Canadian by immigration						
No	55.4	68.6	25.0	24.7	30.4	44.0
Yes	66.7	80.2	24.1	20.5	42.6	59.6
Parental/guardian's Education						
Less than HS	28.7	43.8	18.9	24.6	9.8	19.2
HS completed	44.2	59.8	27.3	28.8	16.9	31.1
Some PSE	48.9	68.2	26.7	32.8	22.1	35.5
Trade/College	53.0	65.5	28.8	27.4	24.2	38.0
University-below BA degree	62.2	83.3	27.7	19.4	34.5	63.9
University-BA	71.5	84.9	21.3	18.9	50.2	66.0
University-Grad	82.0	88.1	16.3	11.3	65.6	76.8
Other/unknown	-	-	-	-	-	-
Parental Income Level						
Extremely low (\$0-\$5000)	49.8	55.7	25.7	14.1	24.2	41.6
\$5000 to \$25000	44.9	54.9	23.6	23.1	21.3	31.8
\$25000 to \$50000	48.8	59.9	25.3	25.1	23.5	34.8
\$50000 to \$75000	51.1	70.0	24.3	26.3	26.8	43.6
\$75000 to \$100000	62.3	74.2	25.8	25.0	36.5	49.2
\$100000 and up	68.6	83.5	24.6	20.5	44.0	63.0

Figure 1: PSE Participation Rate by Parental Income, Males



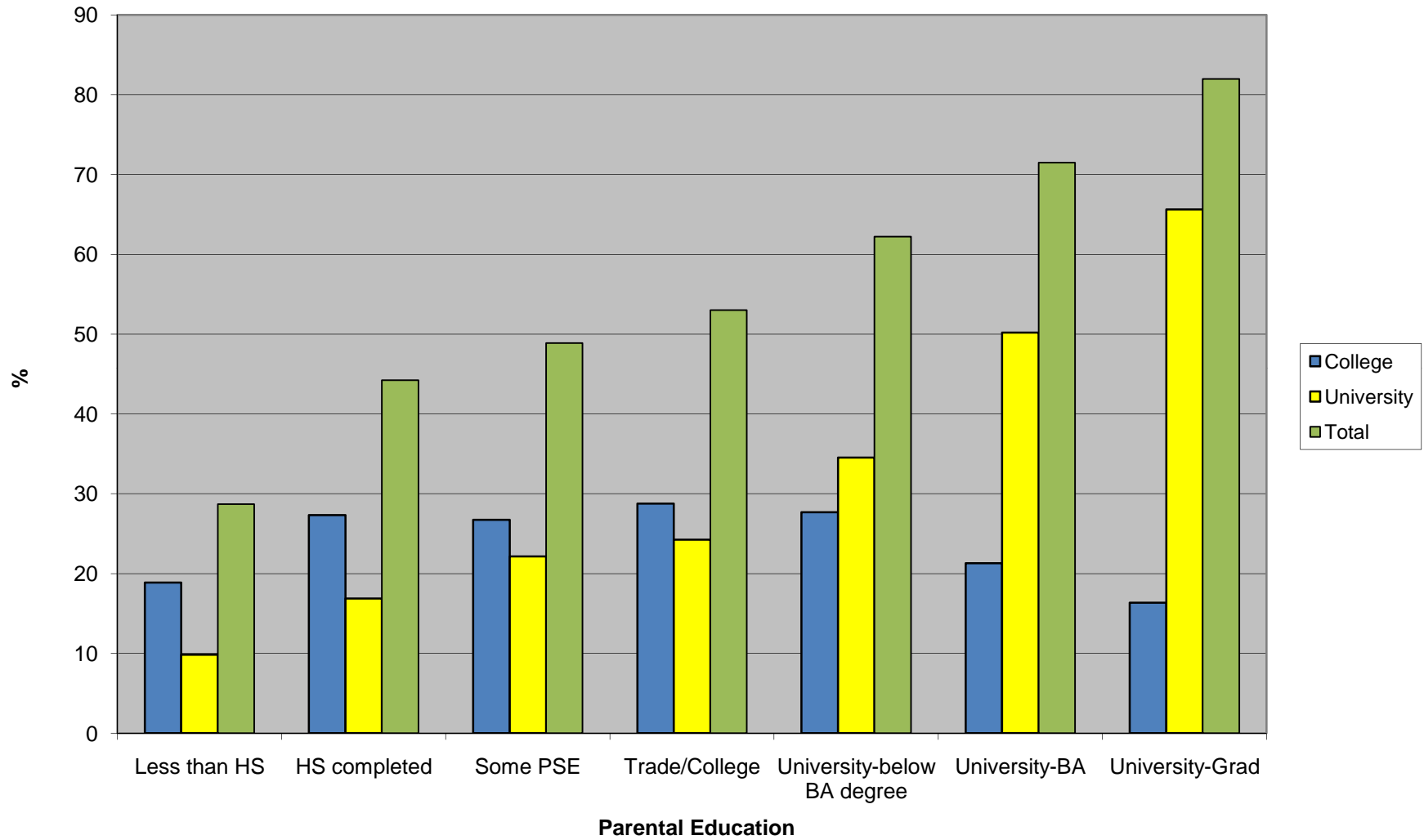
Source: Finnie and Mueller (2007a)

Figure 2: PSE Participation Rate by Parental Income, Females



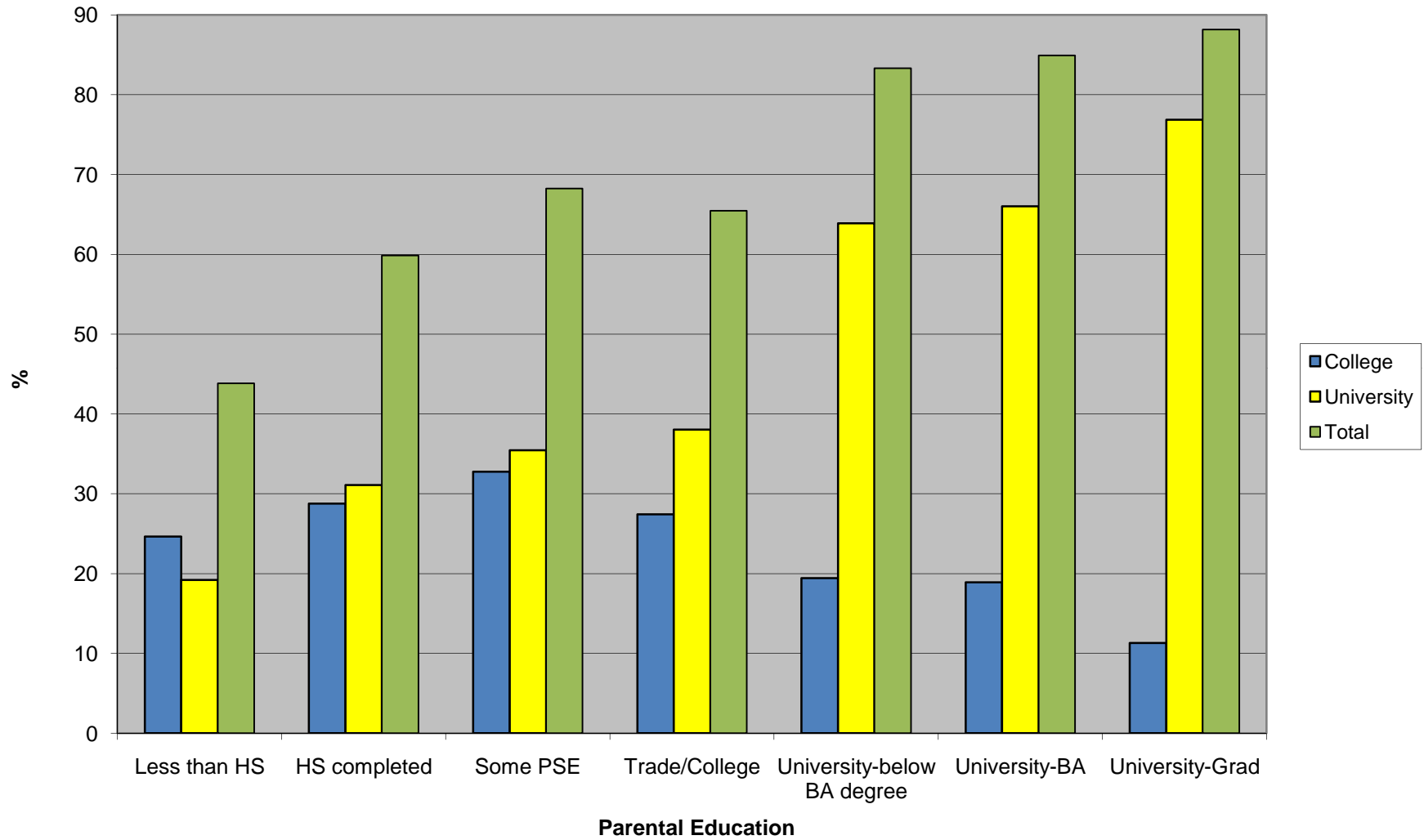
Source: Finnie and Mueller (2007a)

Figure 3: PSE Participation Rate by Parental Education, Males



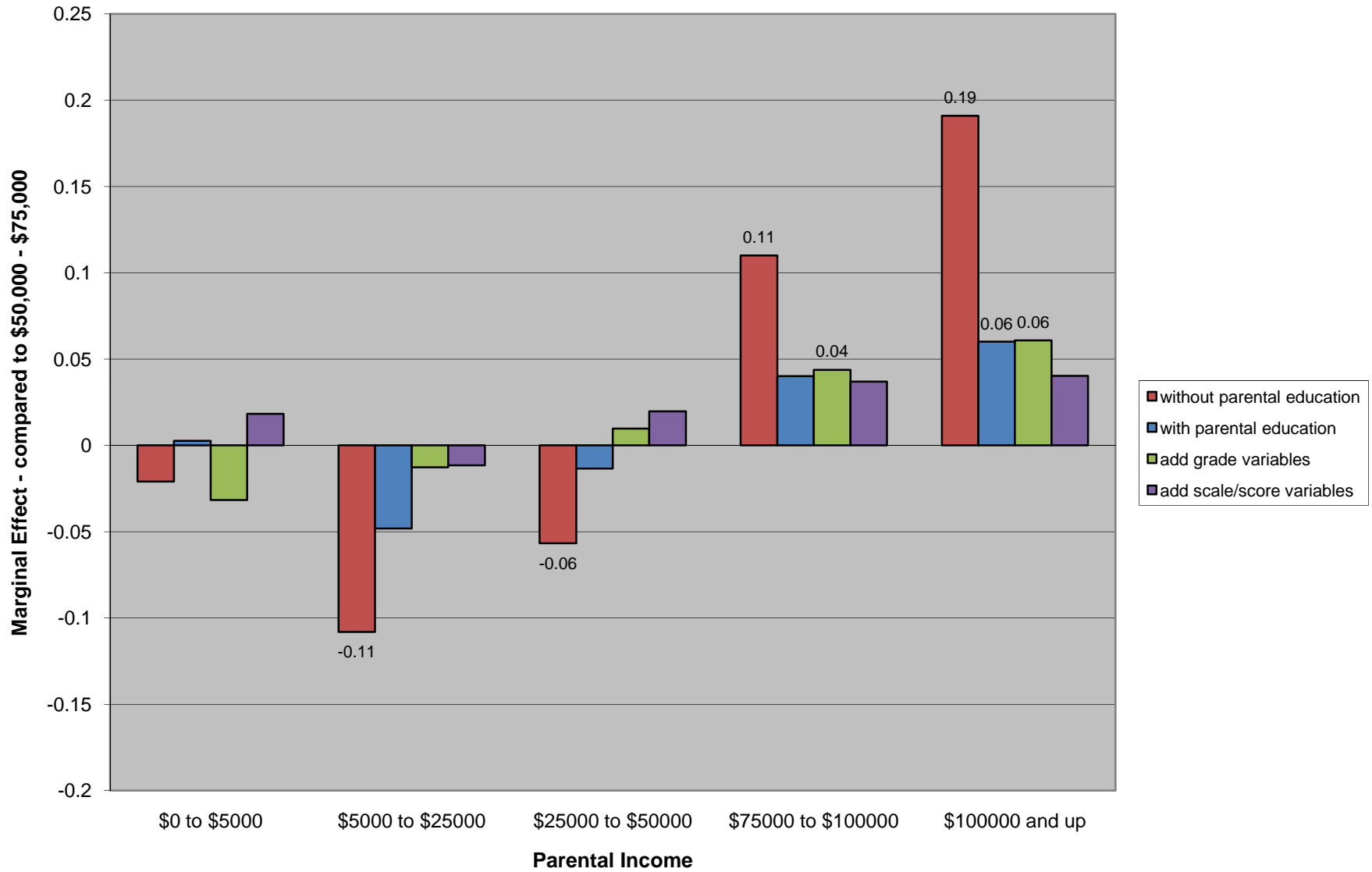
Source: Finnie and Mueller (2007a)

Figure 4: PSE Participation Rate by Parental Education, Females



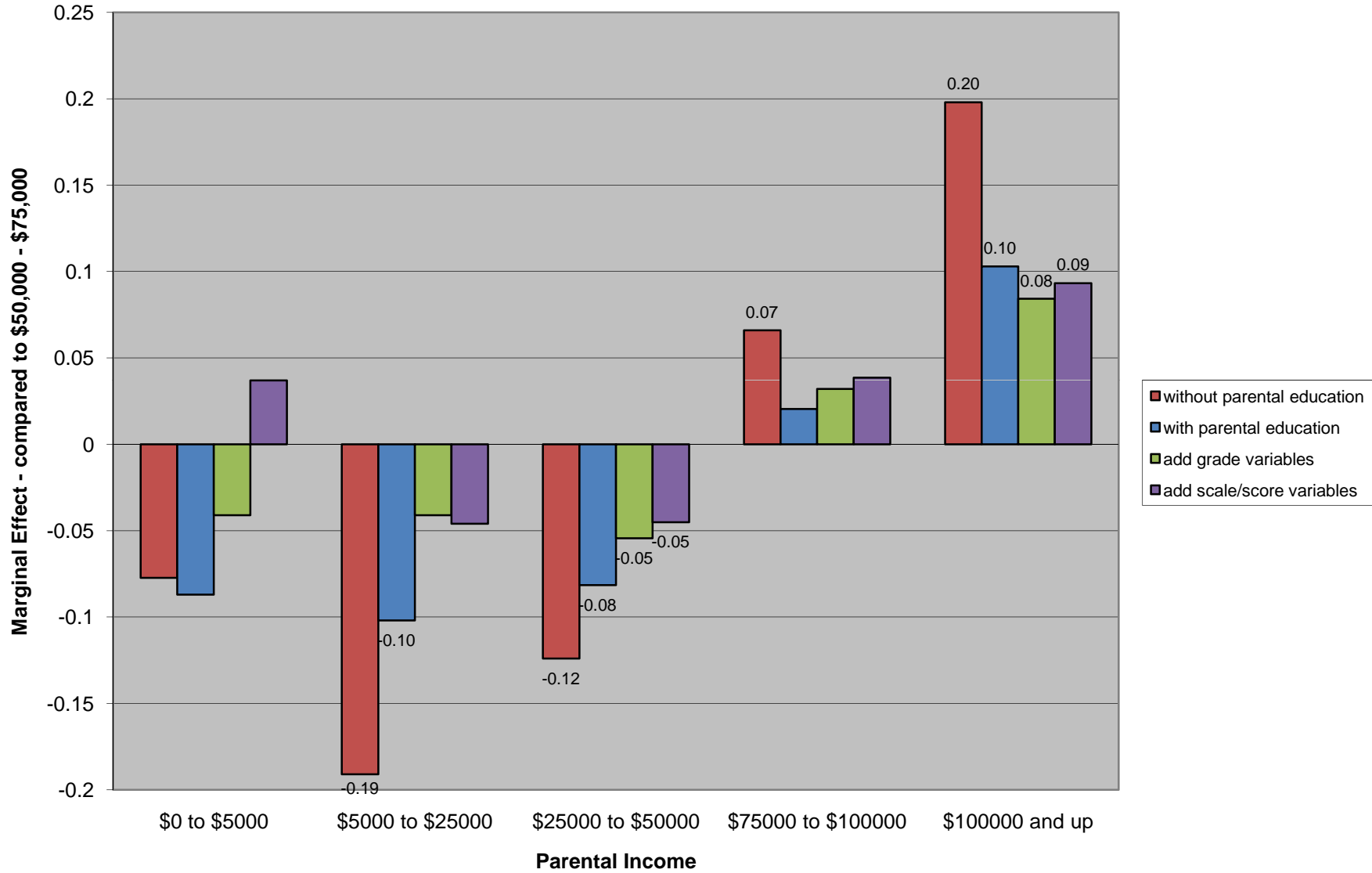
Source: Finnie and Mueller (2007a)

Figure 5: Marginal Effects of Parental Income on Access to University, Males



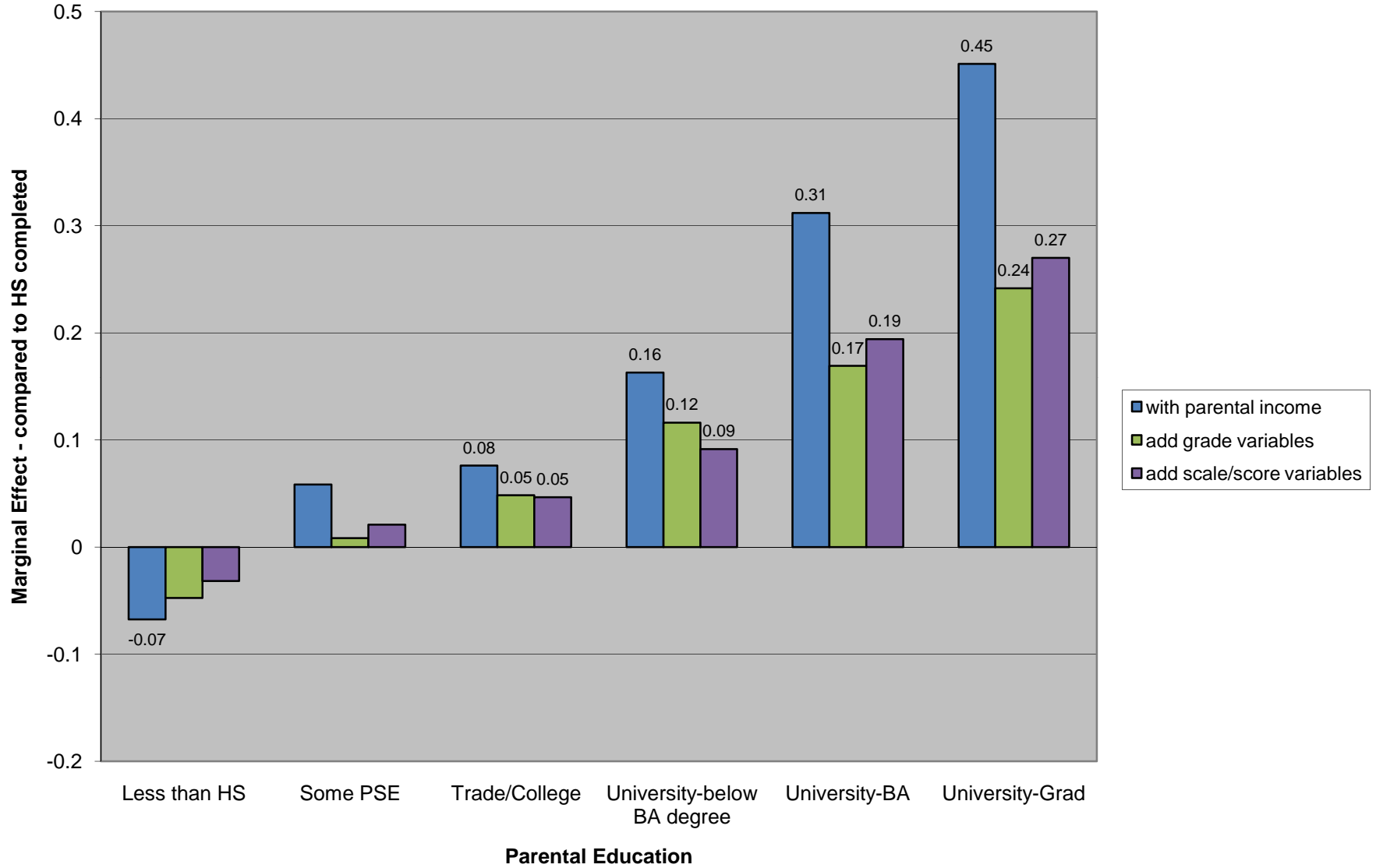
Source: Finnie and Mueller (2007a, 2007b)

Figure 6: Marginal Effects of Parental Income on Access to University, Females



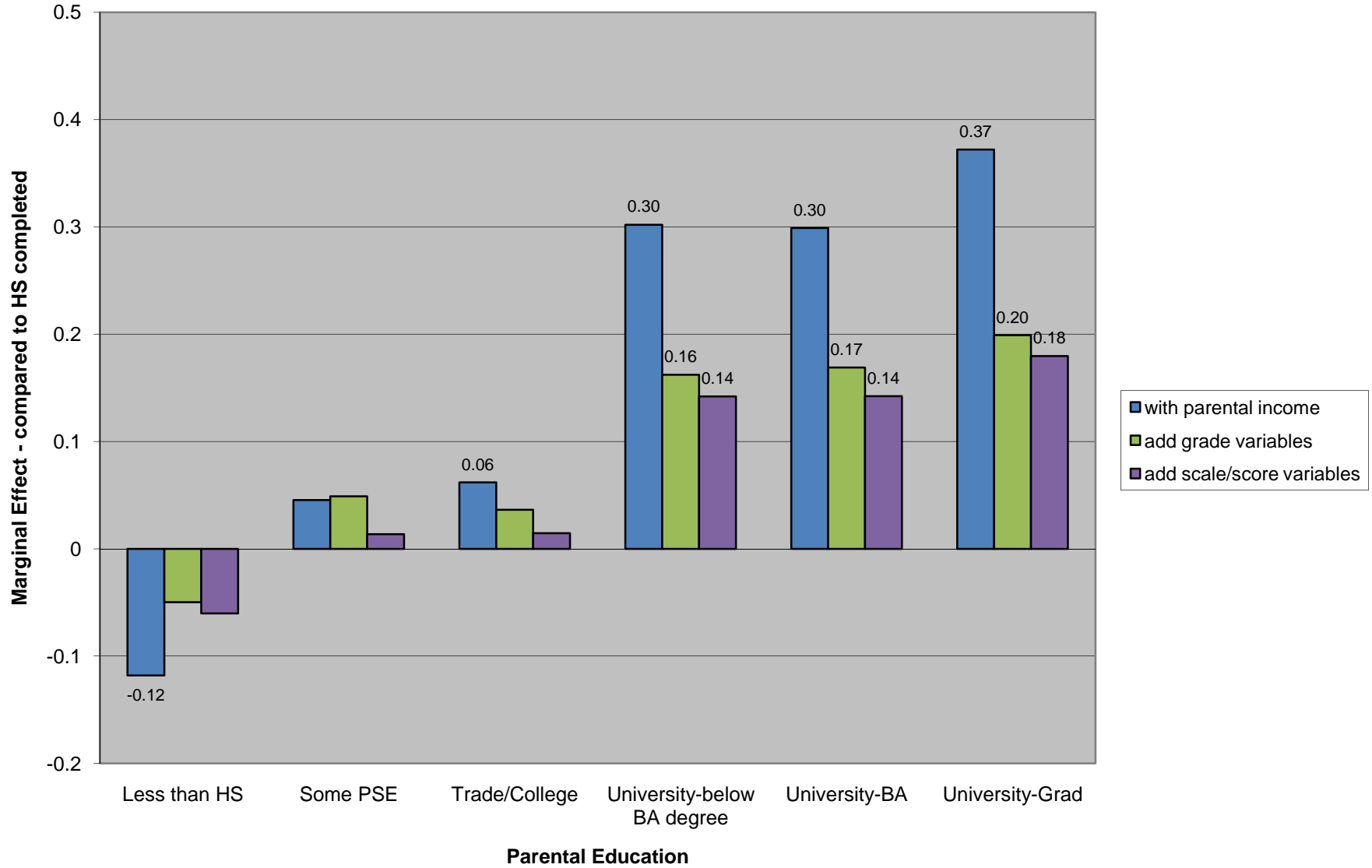
Source: Finnie and Mueller (2007a, 2007b)

Figure 7: Marginal Effects of Parental Education on Access to University, Males



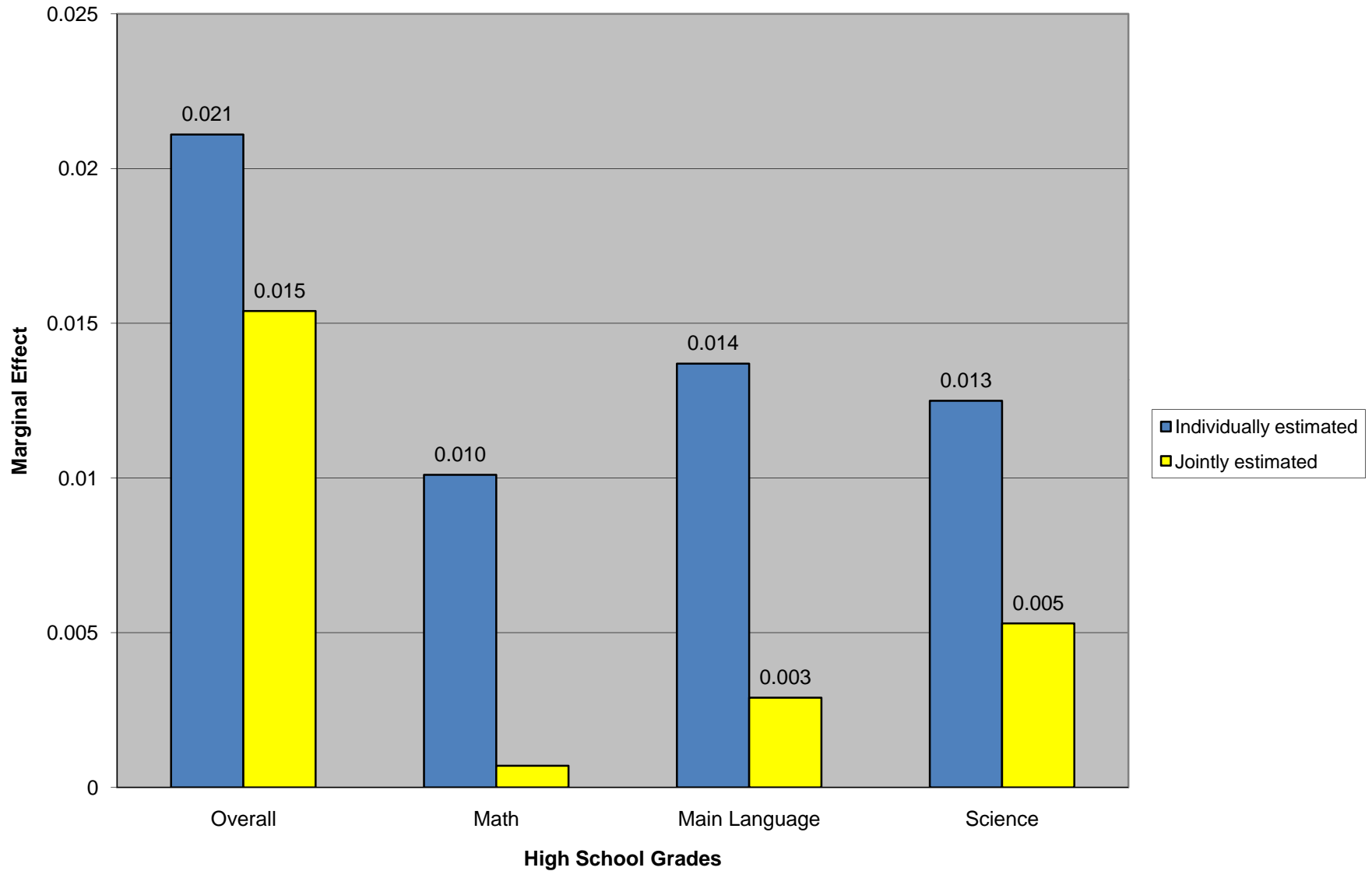
Source: Finnie and Mueller (2007b)

Figure 8: Marginal Effects of Parental Education on Access to University, Females



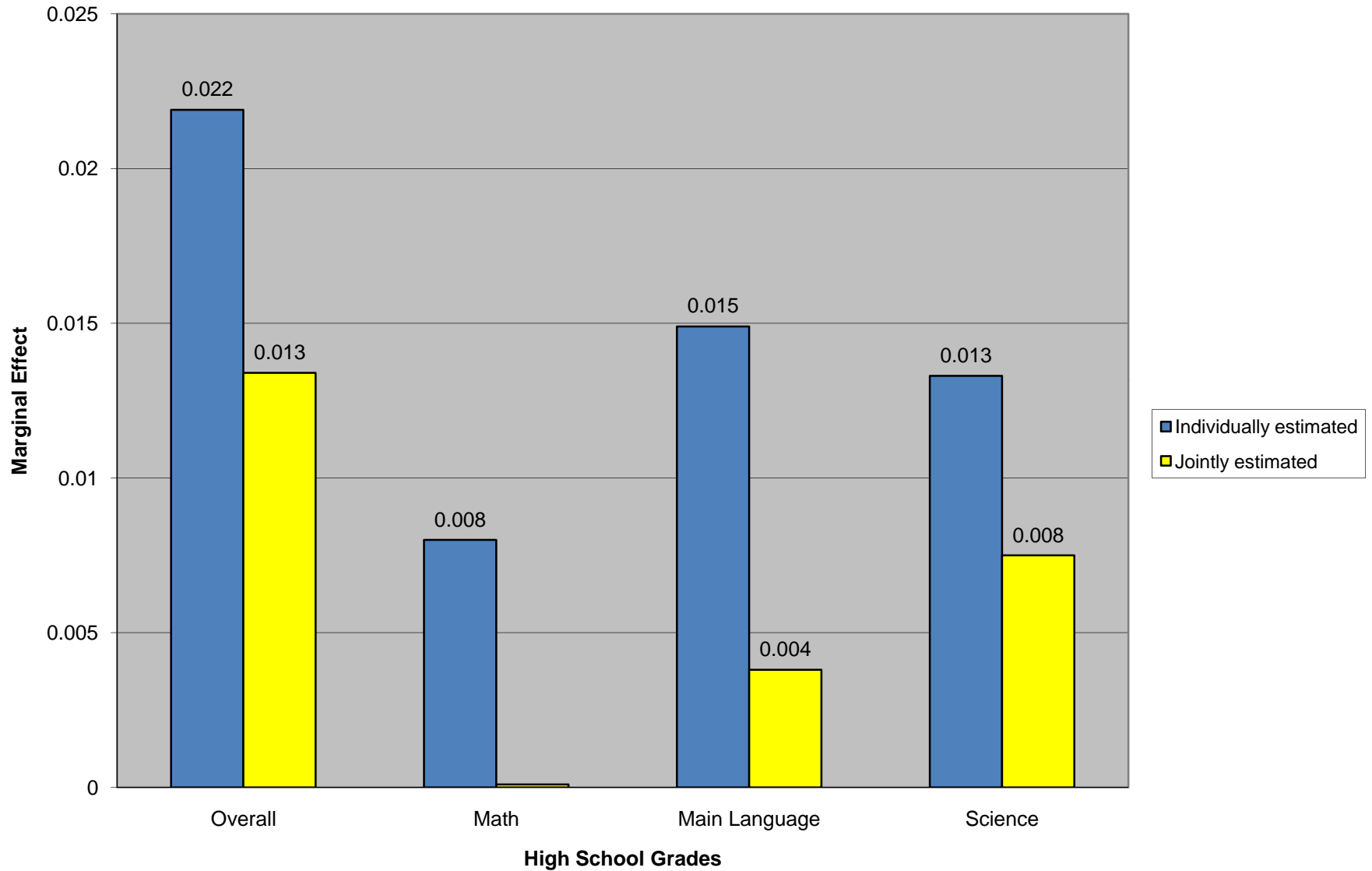
Source: Finnie and Mueller (2007b)

Figure 9: Marginal Effects of HS Grades on Access to University, Males



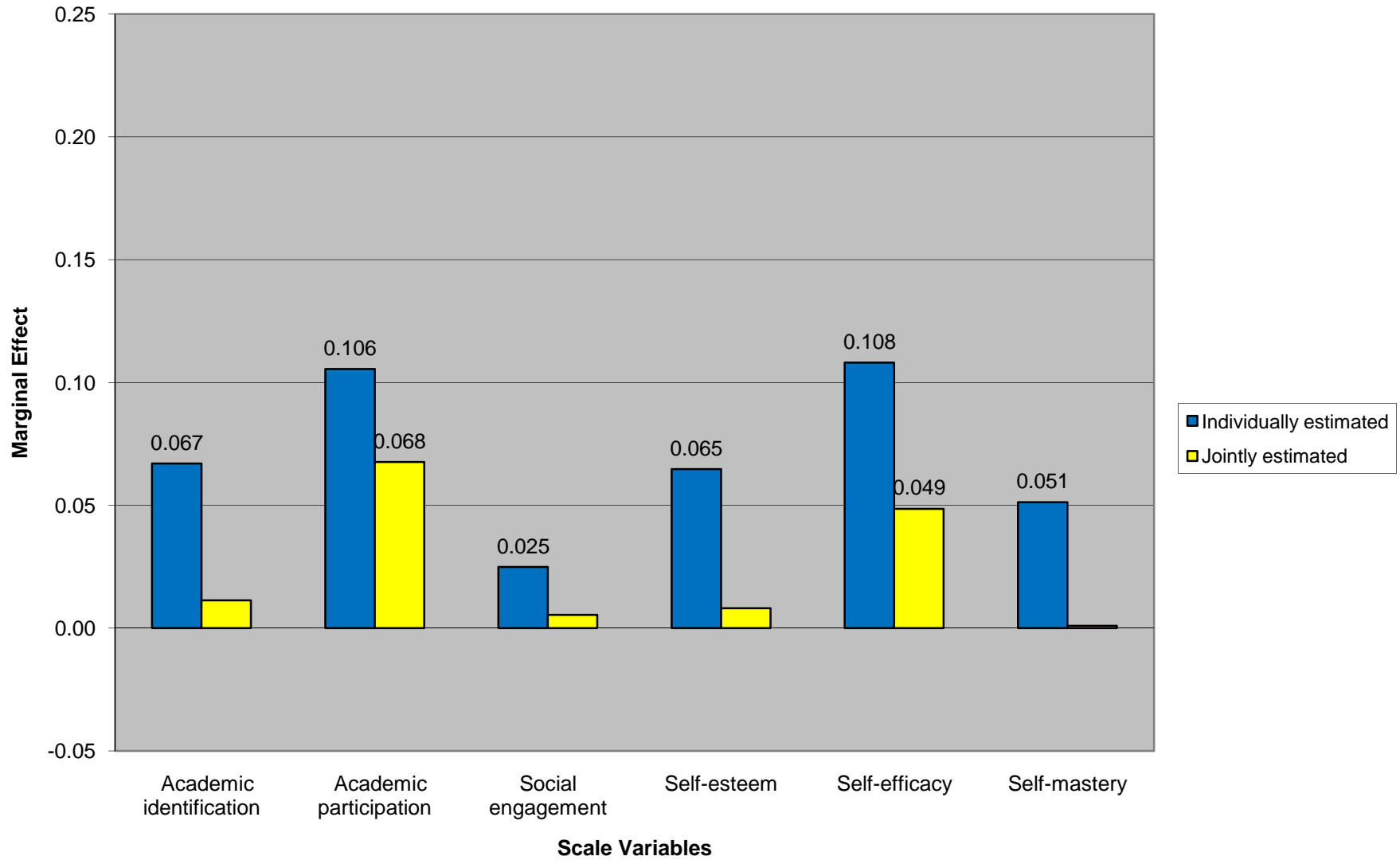
Source: Finnie and Mueller (2007b)

Figure 10: Marginal Effects of HS Grades on Access to University, Females



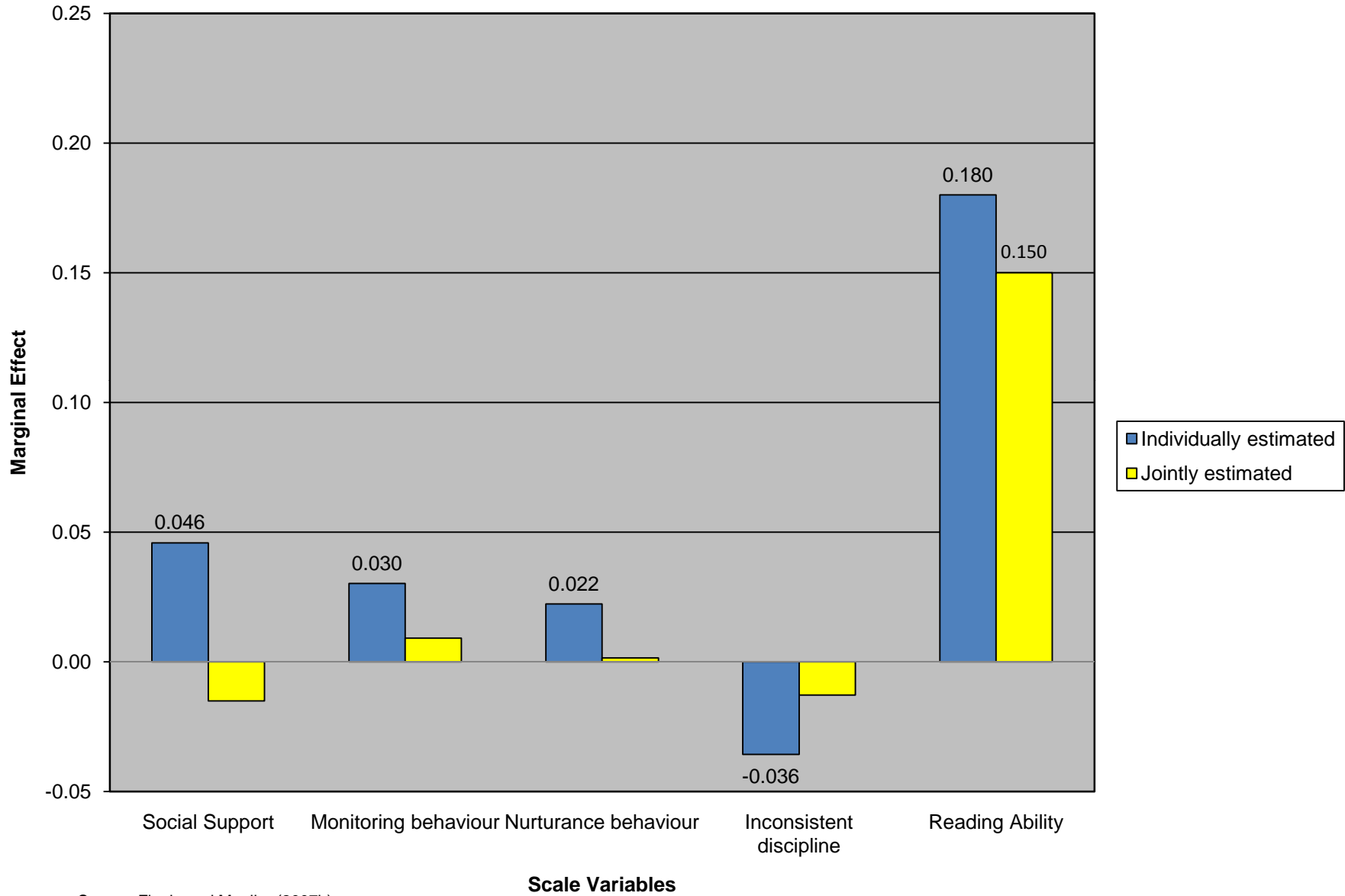
Source: Finnie and Mueller (2007b)

Figure 11: Marginal Effects of Scale Variables of HS Engagement and Self-perception on Access to University, Males



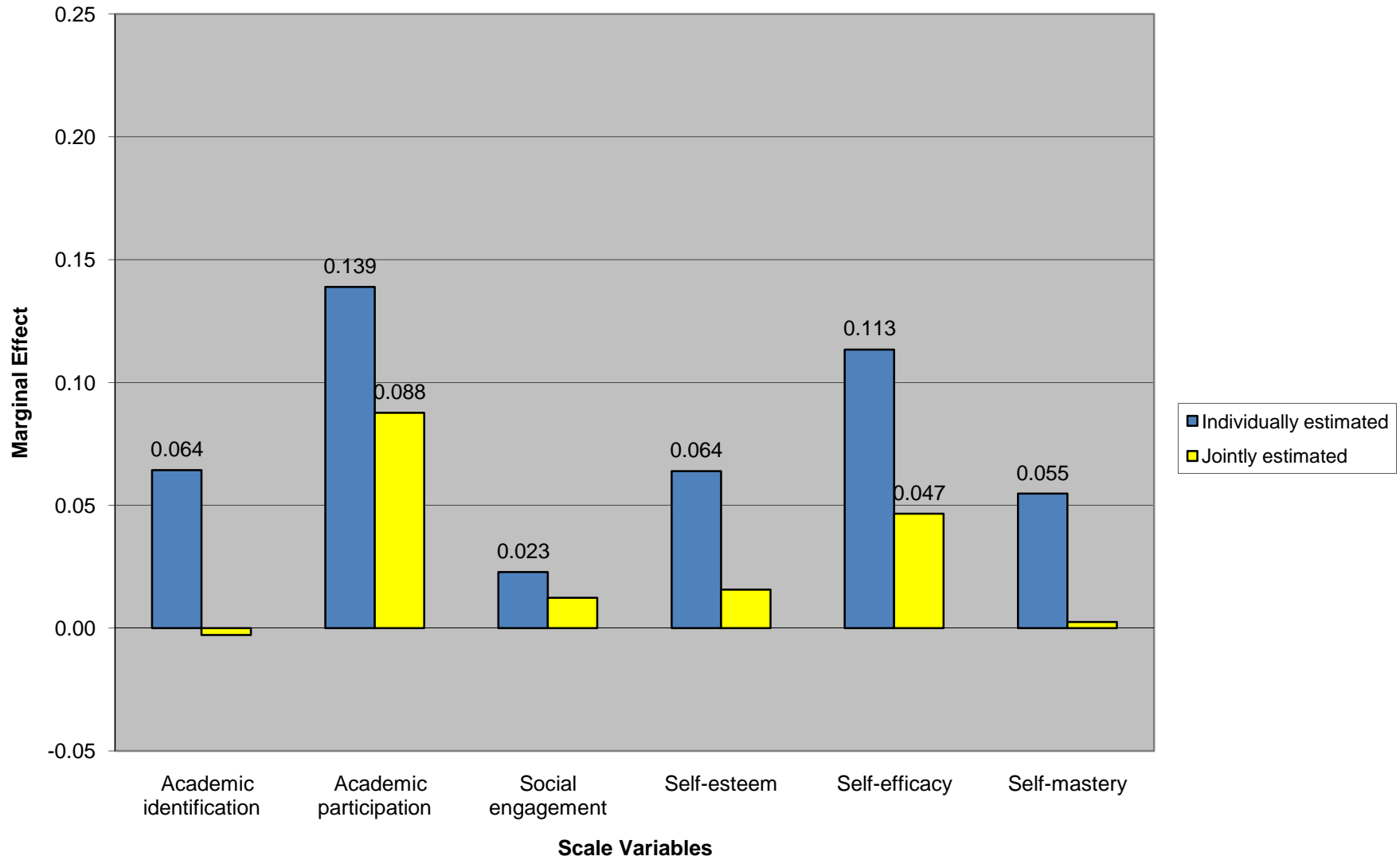
Source: Finnie and Mueller (2007b)

Figure 12: Marginal Effects of Scale Variables of Social Support, Parental Behaviours and PISA Reading Score on Access to University, Males



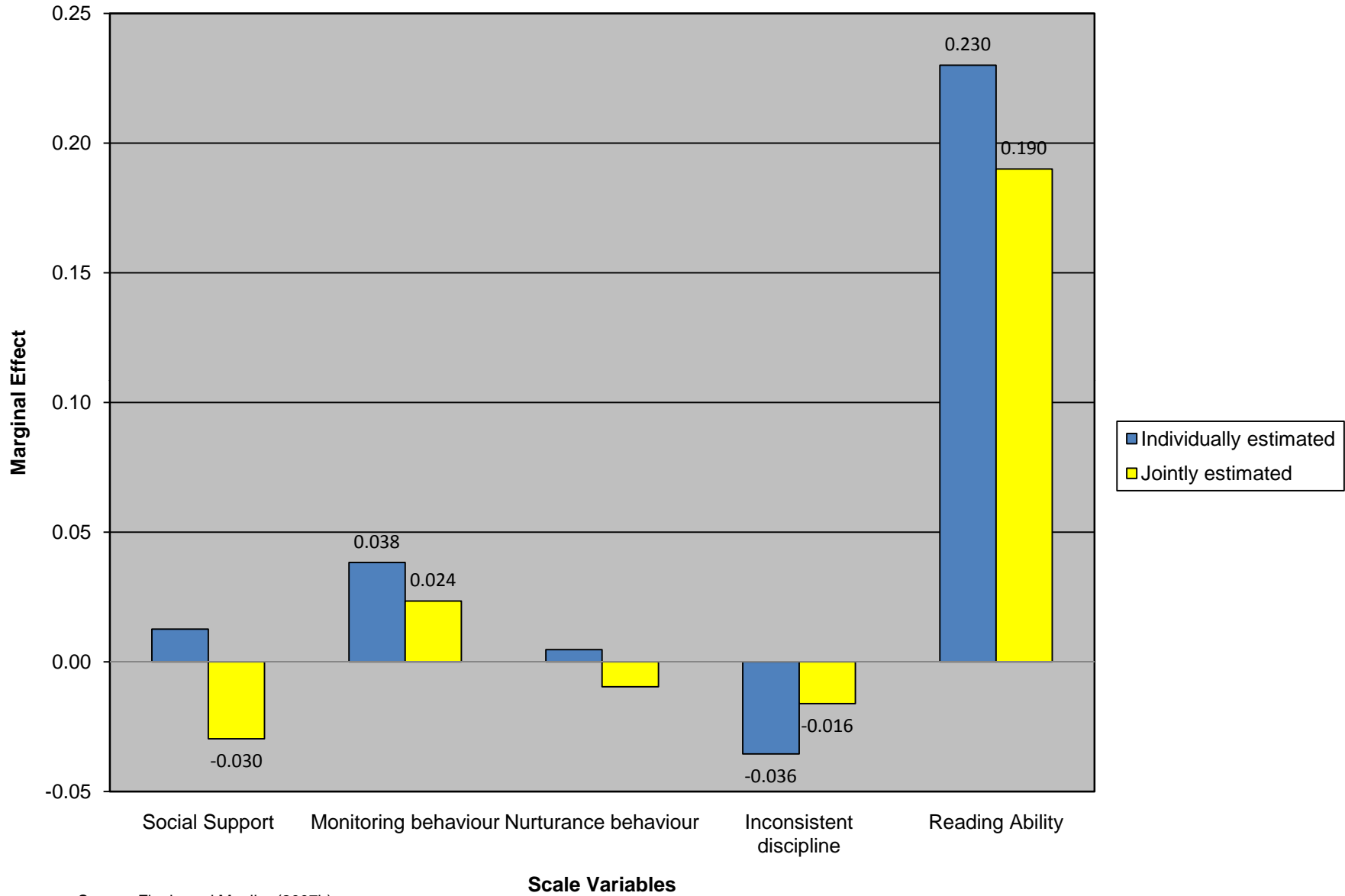
Source: Finnie and Mueller (2007b)

Figure 13: Marginal Effects of Scale Variables of HS Engagement and Self-perception on Access to University, Females



Source: Finnie and Mueller (2007b)

Figure 14: Marginal Effects of Scale Variables of Social Support, Parental Behaviours and PISA Reading Score on Access to University, Females



Source: Finnie and Mueller (2007b)

Appendix Table A-1: Explanation of Scale Variables

Variable	Definition
Academic identification	Measures a respondent's academic identification with high school, the focus of attention is on two components of identification, valuing and belonging. A student who fails to identify with school is expected to have a lack of valuing for the school and a lack of feelings of belonging to the school.
Academic participation	Focusing on the first three levels of taxonomy to academic participation: the acquiescence to the need to attend school, to be prepared and to respond to directions and questions; students demonstrating initiative-taking behaviours; and participation in the social, extracurricular, and athletic aspects of school life in addition to or as a substitute for extensive participation in academic work.
Social engagement	Defined as the identification with and behavioural involvement in the social aspects of school (the school social life). It involves both a feeling of belonging to the school's social environment and a sense of fit between the individual and the school. This connection reflects the extent to which students feel personally accepted, respected, included and supported by others in the school's social environment.
Self-esteem	The self-esteem scale that was chosen for YITS is Morris Rosenberg's 22 self-esteem scale (RSE) (Rosenberg, 1965, p.17). Rosenberg defines self-esteem as favourable or unfavourable attitudes towards self and proposes a series of ten questions to measure it. Within the context of YITS, RSE attempts to measure adolescents' global feelings of self-worth or self-acceptance.
Self-efficacy	Defines academic self-efficacy as the student's competence and confidence in performance of class work as perceived by the student. This concept should be distinguished from global self-efficacy or mastery which is the belief that one has control over one's own destiny.
Self-mastery	The powerlessness scale chosen by YITS is based upon the work of Pearlin and Schooler (1978). This scale, referred to as the Mastery scale ²⁵ , assesses a feeling of powerlessness without reference to concrete life situations. Mastery can be defined as a measure that assesses "the extent to which one regards one's life chances as being under one's own control in contrast to being fatalistically ruled" (Pearlin and Schooler, 1978). Hence, if one scores high on the mastery scale, one does not feel powerless.
Social Support	Measures the availability of social supports, via friends, family and other sources for the youth. Three aspects are included: reliable alliance (the assurance that others can be counted upon for practical help), attachment (emotional closeness) and guidance (advice or information). These aspects are
Monitoring behaviour	Measures parents' monitoring behaviour. A monitoring parent is defined as one who believes that he or she is knowledgeable about his or her child's activities, whereabouts and friends.
Nurturance behaviour	Measures parents' nurturing behaviours. Nurturance represents child-centered effective parenting
Inconsistent discipline	Measures parents' inconsistent discipline or rejection-oriented behaviours,
Reading Ability	Weighted likelihood estimate in reading ability, which is provided for all students who answered at least one reading question. It was transformed to a scale with a mean of 5 and a standard deviation of 1 by using the data for the participating OECD countries only (except the Netherlands).

Source: Finnie and Mueller (2007b)