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ABSTRACT

This study examined the academic experiences of first-year students at York University in Ontario (Canada) who were the first in their families to go to college. A survey of 1,849 first-year students found that 67 percent came from families in which neither parent had attended a university. Not having a parent who graduated from a university did not appear to confer a disadvantage in terms of first-year grade point average (GPA), particularly for students with high Ontario Academic Credit averages. It was also found that first generation college students were less involved in some academic and social activities that contributed to high GPAs, such as hours per week spent on campus and cultural involvement. Involvement in club and extracurricular activities had a negative impact on the GPAs of some groups of students. An appendix provides statistical data on parent education, gender, family income, race, and involvement. (MDM)

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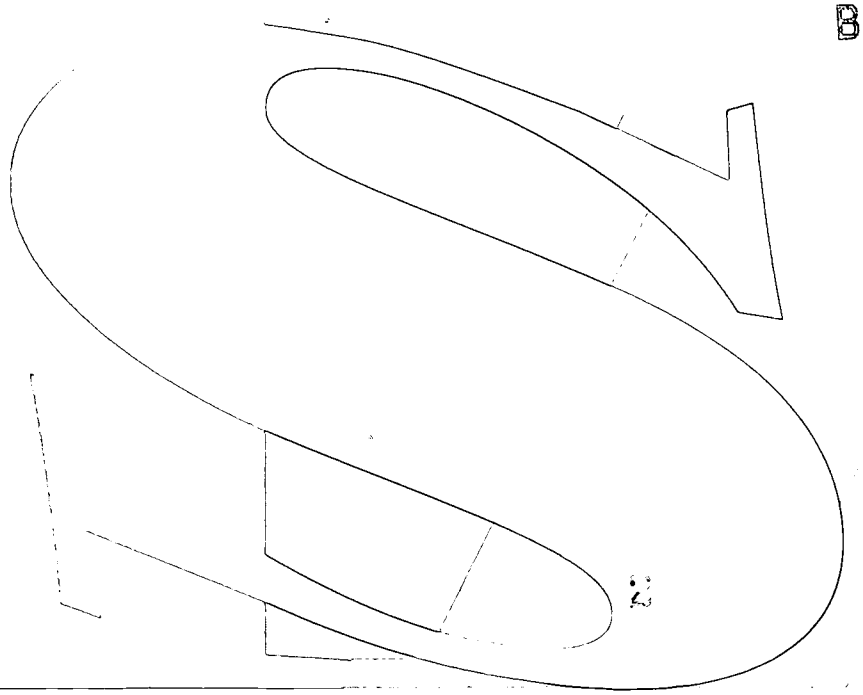
CENTRE FOR RESEARCH IN HIGHER EDUCATION

THE FIRST GENERATION AT YORK UNIVERSITY

J. PAUL GRAYSON



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The following is a working paper.

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Other Publications on York Students

The College-University Linkage: An Examination of Transfer Students in the Faculty of Arts At York University
Stephen Bell (1995) $10.00

The Health of First Year Students
J. Paul Grayson (1995) $10.00

Globe and Mail Reports, Student Experiences, and Negative Racial Encounters
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Summary

The limited information that is available on students who in the United States are the first in their families to go to university indicates greater problems of transition and retention than those for other students. In at least one study it is found that in terms of gains in reading comprehension in first year, first generation students fare worse than traditional students. In a survey of 1,849 first year students at York University it was found that approximately two thirds of students came from families in which they were the first to attend university. Moreover, particularly for students with high Ontario Academic Credit averages, not having a parent who graduated from university does appear to confer some disadvantage in terms of first year grade point average. In addition, first generation students are less involved in some academic and social activities that contribute to high grade point averages. Overall, however, it is unlikely that slightly lower involvement rates detract from the grade point averages of first generation students to any great degree.

Introduction

There is comparatively little information available on students in either the United States or Canada who are the first in their families to attend university (Terenzini et al, 1995:1). In the United States the literature that is available can be divided into three categories. A first group of studies has focused on students' expectations, planning, and college choice processes. Such research has discovered that first generation students are often disadvantaged in terms of knowledge of college and university, personal commitment, and family support. A second group of studies deals with the transition between high school or work and college or university. In this research it has been found that first generation students face the anxieties and dislocations experienced by all students. In addition, they must deal with conflicts between family membership and educational mobility. Finally, research that can be placed in a third category focuses on educational persistence. This research has found that first generation students are at risk in terms of persistence and degree attainment, largely because of relatively low academic and social integration (Terenzini et al, 1995:1 - 3).

In an effort to determine, among other things, if first generation university students' experiences differed from those of other students and if any potential differences had consequences for first-year gains in students' reading, math, and critical thinking abilities, Terenzini et al (1995) examined data collected from 2,685 students who entered 23 institutions of higher education in the Fall of 1992. These institutions were chosen to be representative of the undergraduate population in the United States. Of students included in the analysis, 31% came from families in which neither parent attended college or university.

Terenzini et al (1995:21) argue that first generation students they studied "come [to college/university] less well-prepared and with more non-academic demands on them, and they enter a world where they are less likely to experience many of the conditions that other research indicates are positively related to persistence, performance and learning." Although first generation students started from a lower baseline, their gain in both math and critical thinking skills was similar to that of other students. In reading comprehension, however, first generation students gained less than other students even when adjustments were made for entering reading levels. Differences in gains, however, were slight.

Unfortunately, in Canada, first generation university students have not been studied. Data collected through a mail survey in the Spring of 1995 of 1,849 first year students at York University (response rate approximately 65%), however, allows an examination of the experiences and outcomes of first generation and other students. While information was collected on a number of outcomes in this article attention will be restricted to academic achievement as measured by first year grade point averages (GPA), and the degree to which differential social and academic involvement may have contributed to GPA.

First Generation Students

As noted above, in the United States, approximately 31% of first year students are the first in their families to attend college or university. Unfortunately, similar data for Canada are unavailable. At best, reference can be made to the findings of the first year surveys distributed by the Student Environment Group at the University of Guelph to students who in 1993 entered the University of Calgary, Ryerson Polytechnic University, King's College the University of Western Ontario, the University of Toronto, Nipissing College, the University of Guelph, and Brock

Table 1: Parents' Education

	Father		Mother		York Highest Education Either Parent
	Group of 7	York	Group of 7	York	
Elementary	10%	16%	9%	15%	10%
Some HS	16%	13%	14%	13%	9%
HS	17%	11%	25%	23%	14%
Some University	6%	8%	6%	6%	11%
University	37%	29%	26%	19%	33%
Other*	15%	24%	19%	24%	22%
Total	101% (6731)	101% (1737)	99% (6770)	100% (1769)	99% (1722)

*Other is made up of individuals who had technical, some college, or completed college education. Unfortunately, it is not possible to deal with each separately.

University (for convenience sake, these institutions can be referred to as The Group of Seven). [1] Although first year students in these institutions may not be representative of first year students in Canada, survey data provide some indication of parental educational background.

In Table 1, data from this source has been compared to information collected from York students in February - March, 1995. Perhaps the most striking information to be taken from the table is that in both Group of Seven institutions and York the vast majority of students come from families in which few mothers and fathers have completed university: among the Group of Seven only 37% of fathers and 26% of mothers have university degrees; among first year York students the respective figures are 29% and 19%. A second observation implicit in the foregoing is that fewer York than Group of Seven students have mothers and fathers with university education. A third observation worthy of note is that among Group of Seven students 10% of fathers, and 9% of mothers, have only elementary education; the figures of York students are 16% and 15%.

For York students, the final column of Table 1 also contains information on the highest education received by *either* parent. When examined this way it can be seen that approximately only one third of York students come from families in which at least one parent has a university education. While similar data for the Group of Seven were unavailable, given the data on fathers' and mothers' education, it is likely that only a minority have at least one parent who completed university.

Theoretical and Methodological Approach

In examining the similarities and differences in both experiences and outcomes of first generation compared to other students, it is helpful to utilize the 'input-environment-outcome' (I-E-O) model as developed by Astin (1993:7). In brief, "inputs refer to the characteristics of the student at the time of initial entry to the institution; environment refers to the various programs, policies, faculty, peers, and educational experiences to which the student is exposed; and outcomes refer to the student's

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[1] I would like to thank Brian Pettigrew, University of Guelph, for making these data available. While it would have been preferable to present information on each institution separately, for reasons of confidentiality this was not possible.

characteristics after exposure to the environment." In the case at hand, the intent is to determine whether or not having at least one parent with a university degree (input) leads to experiences within the university (environment) that result in relatively high marks. Experiences falling in the categories of academic and social involvement are of particular concern as in previous examinations each has been found to contribute to positive outcomes such as marks (see Pascarella and Terenzini, 1991, for a summary). This fact notwithstanding, at York it has been discovered that frequently utilized measures of academic and social involvement explain less variance in certain outcomes, such as marks, than at other universities (Grayson, 1994, 1995). The explanation given is that as York is a large commuter university on the suburban fringe of Metropolitan Toronto, students have less time for non-required activities than at some other institutions. Positive classroom experiences, on the other hand, contribute to desired outcomes of the first year.

When utilizing the I-E-O model, or variants of it, researchers frequently use stepwise multiple regression. This technique allows the researcher to examine the effect of input measures, such as parental education, income, gender, age, and high school marks, prior to assessing the effects of environmental factors like academic and social involvement. The benefit of approaching data in this way is that it minimizes the possibility of assuming that, for example, outcomes may be a product of environmental factors (such as academic integration) when in fact students with certain input characteristics (like high secondary school marks) self-select involvement in particular out-of-class academic activities.

While stepwise multiple regression was used in the current analysis, in this article attention will focus on the results of a procedure utilizing classification and regression trees (CART) made available through KnowledgeSeeker (see Brieman et al, 1984 for an explanation). While there are disadvantages associated with the CART procedure,[2] this technique was chosen for three reasons. First, the objective of the article is to identify the combinations of background characteristics, academic and social involvement, and race, that may contribute to, or detract from, GPA. Given this intent, CART is a more appropriate technique than multiple

[2] For example, it has the disadvantage of not smoothing conditional effects over levels of a conditioning variable and therefore loses power by not exploiting the near-additivity and smoothness of many phenomena.

regression. Second, the product of the procedure is more 'visual' than stepwise multiple regression and thereby more easily understood by those without a background in statistics. To the degree that the current research may be of interest to policy makers without a firm grounding in statistics this is an important consideration. Third, the CART technique retains many of the benefits of stepwise regression. Although by default KnowledgeSeeker enters variables in terms of their statistical significance, the researcher can enter variables in a temporal order consistent with the assumptions of the I-E-O model. Accordingly, variables occurring early in the regression trees generated through KnowledgeSeeker represent controls on variables occurring later. These points will become clearer during the discussion of results of the research.

In the current analysis input variables were highest education received by a parent, gender, family income, and Ontario Academic Credit (OAC) marks. Because they may in part be a product of factors like parents' education, OAC marks were only allowed to enter the analysis after the possible effects of the other input variables had been considered.

The environmental variables falling in the academic involvement category that were examined included: number of contacts with faculty, teaching assistants, and staff (Contacts); number of non-required academic activities like attending guest lecturers (Activities Involvement); and frequency of class/tutorial/lab attendance and number of visits to the library (Classroom Involvement). Measures of social involvement included: number of clubs and/or organizations belonged to (Club Involvement); participation in cultural activities (Cultural Involvement); number of hours spent on campus per week (Hours on Campus); utilization of campus services (Service Involvement); number of new friends, time spent with new friends, and visits to campus pubs (Social Involvement); and participation in sports and exercise activities (Sports Involvement). Most measures of academic and social involvement were based on the average z-score for a number of items.[3] Actual items, and frequency distributions or means, are outlined in Appendix A. Questions used to collect information can be obtained from the author. Measures of both academic and social involvement were entered by default in terms of their statistical significance.

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[3] This procedure was followed because given the distributions of responses to various questions, averaging non-standardized scores would have resulted in undue emphasis being placed on certain activities.

The final variable considered in the analysis was racial origin: Black, East Indian, Chinese, 'Other', and European. If statistically significant, this variable was considered last to determine whether or not race had an impact on first year marks once the effects of all other variables had been considered. This procedure is similar to that employed in a stepwise multiple regression analysis on the impact of race on marks at York (Grayson, 1995).

Analysis

Parents' Education

The results of a CART analysis in which the highest education of either parent is the dependent variable and the students' gender, race, and family income are independent variables indicates that highest education of a parent varies with family income. Overall, 33% of students have at least one university educated parent. Among students coming from families with incomes of less than $50,000 per annum, however, only 24% have a parent with a university degree. The figures for students from families with incomes of $50,000 to $99,999 and $100,000 and above, are 39% and 73% respectively.

In the lowest income group further racial origin based distinctions are evident. Among students of Black, East Indian, and 'Other' origins, 38% came from families in which at least one parent is university educated. For students of European origin the figure is only 22%. Lower still is the percentage for students of Chinese origin, only 16% of whom in the low income category have a university educated parent.

Input Variables

The results of the CART procedure in which GPA is the dependent variable are summarized in Diagram 1. Information on students with neither parent having a university degree is presented in Part A of the diagram; students with at least one university educated parent are examined in Part B.

In the diagram, information cells are numbered A1, A2 and so on. The variable name is listed on the line above the cell. Category values/labels for each variable are found to the side of the cell. The number beneath each

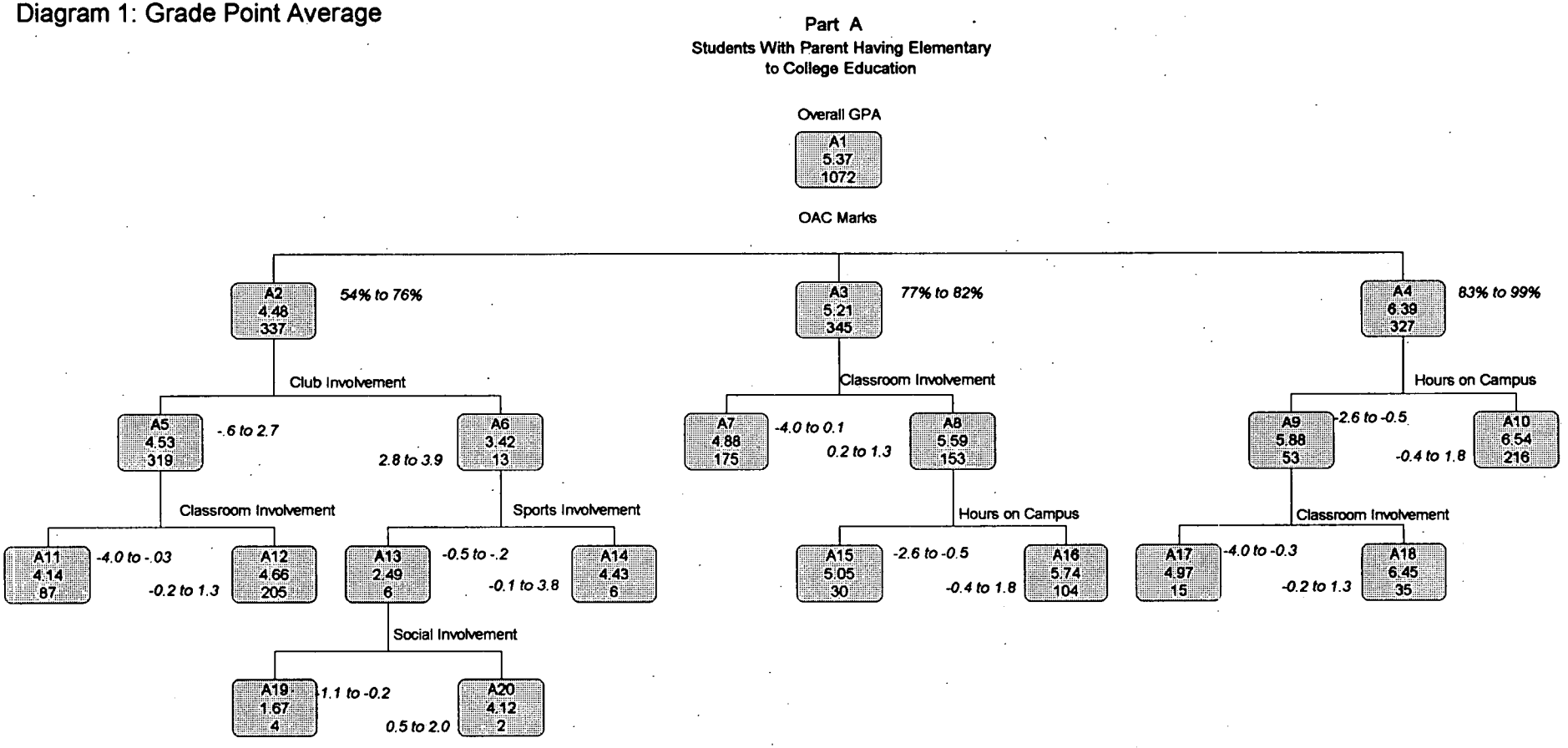
cell number is the GPA for individuals in that category. The number beneath GPA is the number of cases on which the GPA is calculated. Categories themselves are defined by KnowledgeSeeker to maximize statistical significance. For example, the OAC mark categories 54% to 76%, 77% to 82%, and 83% to 99% were chosen by the program in accordance with this principle. Variables are included in the analysis only if they attain a minimal level of significance of .05. Overall, the model depicted in the diagram explains 19% of the variance in GPA.

Input variables are analysed in cells A1 to A4 and B1 to B4 of the diagram. Data summarized in these cells indicates that of all input variables, only the highest education received by a parent, and OAC marks, are statistically significant (gender and family income are not significant and are not included). Moreover, students with at least one parent with a university degree have higher GPAs than students whose parents have from elementary to college education - 5.70 compared to 5.37 (cells A1 and B1). Within each of the parental education categories, however, the higher the OAC marks, the higher the GPA. For example, among students with at least one university educated parent whose OAC marks were in the 54% to 76% range, the average GPA was 4.54 (cell B2). For those whose OACs were between 77% and 82% the GPA was 5.23 (cell B3). Students with OACs of 83% to 99% averaged GPAs of 6.91 (cell B4). A similar progression is evident in the GPAs of students who did not have a parent with a university degree (cells A2 to A4).

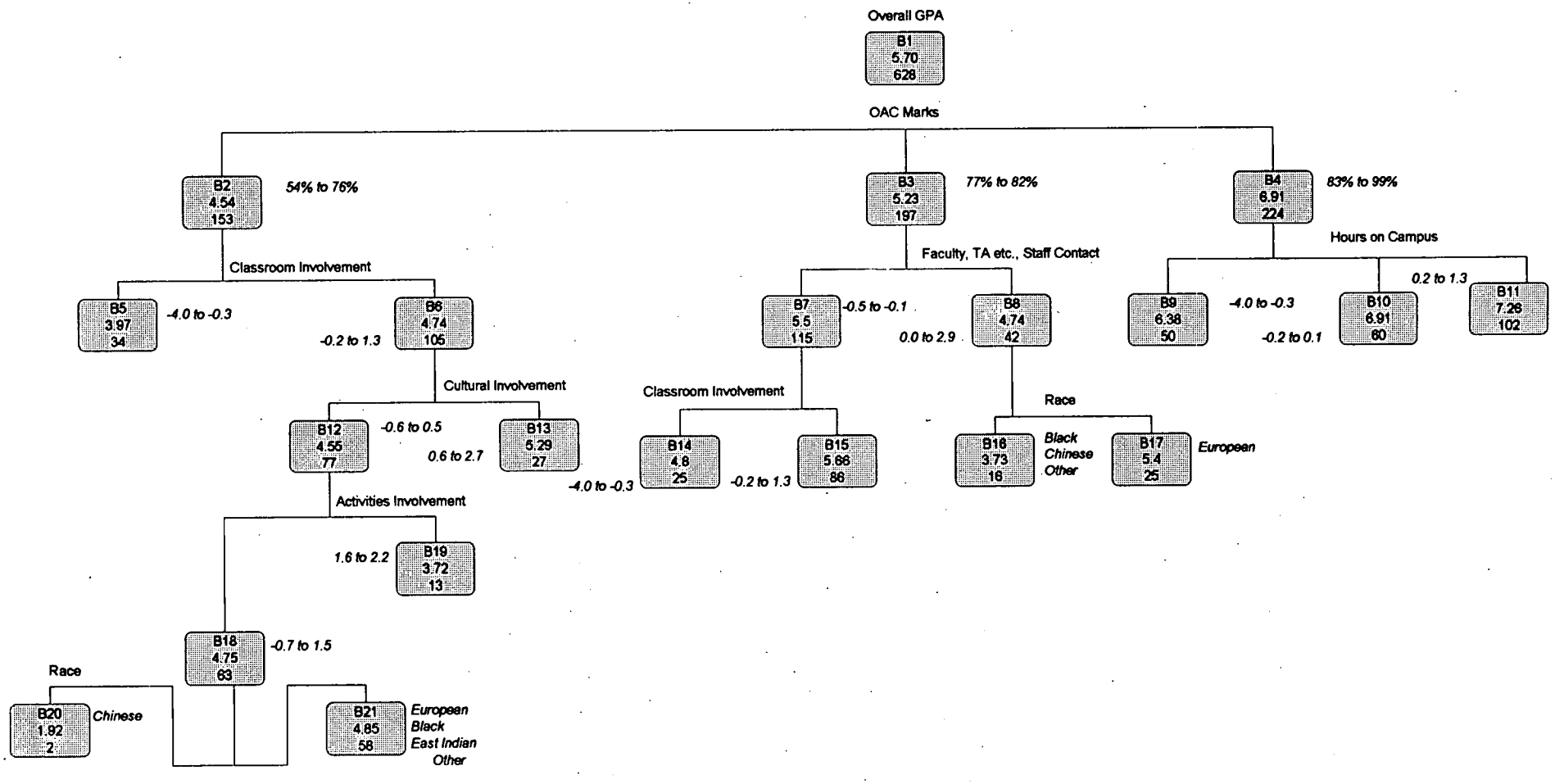
It is worth noting that within each OAC category the GPAs of students with at least one university educated parent are slightly higher than those of students whose parents had elementary to college education. In the highest OAC group (83% to 99%) students with a parent who had a university degree scored 6.91 (cell B4) while for students in the same OAC group who did not have a university educated parent the score was 6.39 (cell A4). A multiple range test (not shown in the diagram) indicates that these differences are statistically significant. While differences for other OAC categories are not as large, and are not statistically significant, they follow the same pattern. This finding suggests that any benefits associated with having at least one university educated parent are experienced most by students with the highest OAC marks.

Overall, the data in rows 1 and 2 indicate that students from families with at least one university educated parent do achieve higher first year GPAs

Diagram 1: Grade Point Average



Part B
Students With Parent Having University Education



than other students. Within each parental education category, however, the higher the OAC marks, the higher the first year GPA. Moreover, for each OAC category, students with at least one university educated parent score higher than students whose parents have from elementary to college education. The overall impression left by the information in the first two rows of Chart 1 is that having a parent with a university education does lead to slightly higher first year GPAs, particularly among students whose OAC marks are 83% and more.

Environmental Variables

Students With No University Educated Parent

OAC Marks 54% to 76%

The impact of environmental variables is summarized in rows 3 to 5 of Diagram 1. Because various involvement scores were often based on responses to more than one question, in Diagram 1, involvement measures are categorized in terms of z-scores. Z-scores have a mean of 0 and, for most purposes, high and low values of 3 and -3 respectively. Scores beyond these limits are possible but infrequent.

Among students with no university educated parent whose OAC marks were in the 54% to 76% range, those whose club involvement was in the -.7 to 2.7 range have GPAs area higher than those in the 2.8 to 3.9 range (cells A5 and A6). In this instance involvement does not result in higher GPAs. It might be hypothesized that among this low OAC group club activities absorb time that would be better spent on studying.

Among students with low club involvement, the figures in cells A11 and A12 indicate that individuals with classroom involvement of -4.0 to -.3 score lower GPAs than those with involvement in the -.2 to 1.3 range -- GPAs of 4.14 and 4.66 respectively. Whereas club involvement contributes to low GPAs, classroom involvement has the reverse effect.

While the absolute number of cases in cells A13 and A14 are low, they nonetheless suggest that for low OAC students with high club involvement, high sports involvement contributes positively to GPA. For students with sports involvement of -.5 to -.2 GPAs are only 2.49. For individuals whose sports involvement is -.1 to 3.8 GPA is 4.43 (cells A13 and A14). Furthermore, as indicated by cells A19 and A20, students with low sports

involvement but high social involvement are likely to have higher GPAs than those with low social involvement. In essence, the effects of low sports involvement may be offset by high social involvement; however, as cell counts are low, these findings must be treated with caution.

Overall, for low OAC students from families where neither parent has a university degree, club and organizational involvement detracts form GPA. By way of contrast, classroom, sports, and social involvement contribute positively to first year grade point averages.

OAC Marks 77% to 82%

For students with marks in the 77% to 82% range, those with classroom involvement between -4.0 and .1 have lower GPAs than individuals with classroom involvement between .2 and 1.3. As can be seen from cells A7 and A8, the respective grade point averages are 4.88 and 5.9. Among students with high classroom involvement, it is evident from cells A15 and A16 that those with relatively few hours on campus (between -2.8 and -.5) have lower GPAs than individuals with many hours on campus (scores between -.4 and 1.8). The GPAs of the former are 5.05 (cell A15); of the latter, 5.74 (cell A16). Overall, for students with OAC marks of 77% to 82% classroom involvement and hours on campus contribute positively to GPA.

OAC Marks 83% to 99%

In this high mark category, the number of hours spent on campus is related to grade point average. Those with an hours on campus z-score of -2.6 to -.5 have grade point averages of 5.88 (cell A9). Individuals with z-scores of -.4 to 1.8 have GPAs of 6.54 (cell A10). Moreover, among students who spend relatively little time on campus, those with high classroom involvement (-.2 to 1.3) receive higher grades than students with low classroom involvement (-4.0 to -.3). The actual GPAs of these two groups are 6.45 and 4.97 respectively. In essence, high classroom involvement may offset the effect of spending relatively few hours on campus.

Students With At Least One University Educated Parent

OAC Marks 54% to 76%

By and large, Diagram figures, with some exceptions, indicate the same overall relationship between various forms of involvement and GPA as found when students with no parent with a university education were

analysed. For the low mark group, high classroom involvement results in higher GPAs than low classroom involvement (cells B5 and B6). In addition, those students with high classroom involvement who also have high levels of cultural involvement receive higher grades than students with low cultural involvement: 5.29 (cell B13) compared to 4.55 (cell B12). By way of comparison, however, among students with low cultural involvement, those who have relatively high activities involvement also have relatively low GPAs: for those with high activities involvement GPAs are 3.72 (cell B19); those with low activities involvement score 4.75 (cell B18). Finally, among individuals with low activities involvement, those of Chinese racial origin have lower GPAs than students of European, Other, East Indian, or Black origins - 1.92 and 4.85 respectively. Although these differences are statistically significant, the reader is cautioned that the number of cases on which GPAs are based are small. Also, students in these categories represent a very small portion of the student body.

OAC Marks 77% to 82%

Among this OAC group the number of contacts with faculty, TAs etc., and staff varies inversely with GPA. Individuals reporting contacts of -.5 to .1 have marks of 5.5 (cell B7) while those with contact scores of .1 to 2.9 have grade point averages of only 4.74 (cell B8). What these figures may reflect is that students with problems likely seek contacts to a greater degree than students who are doing relatively well.

Of students with low numbers of contacts, not surprisingly, those with high classroom involvement enjoy higher GPAs (5.66, cell B15) than students with low classroom involvement (4.80, cell B14). Among students with high numbers of contacts, the information in cells B16 and B17 indicate that students of European origin obtain higher grades (5.40) than students of Other, Black, or Chinese origin.

OAC Marks 83% to 99%

For students in the high OAC mark group, the relationship between classroom involvement and GPA is monotonic. Students with relatively low classroom involvement score 6.38 (cell B8); those with middle level involvement score 6.91 (cell B10); and individuals with relatively high involvement have grade point averages of 7.26 (cell B11).

Table 2: Involvement by Highest Education of Parent

	LT University	University	Sig. F	Percentile Point Difference
Cultural Involvement	-.07	.11	.00	7
Hours Week on Campus	-.03	.09	.02	5
Activities Involvement	-.06	.06	.01	5
Club Involvement	-.05	.07	.03	5
Social Involvement	-.01	.04	.17	2
Classroom Involvement	.01	.03	.47	1
Contacts Faculty Etc.	-.06	-.05	.77	0
Sports Involvement	-.01	-.01	.97	0
Services Involvement	-.01	.01	.60	0

Involvement

The foregoing clearly indicates that some forms of involvement, such as classroom involvement and hours spent on campus, are associated with relatively high marks. For club and activities involvement there is a negative association with GPA. As involvement has implications for GPA it is important to know if involvement varies by parental education.

Answers to this question are summarized in Table 2. The left-hand column lists the specific involvement under consideration. The columns labelled Less Than (LT) University, and University, contain the z-scores for each type of involvement. The final two columns contain information on the significance of F and the percentile point difference between the scores of students who do not have, and have, at least one parent with a university degree.

Relying on the percentile point difference as the criterion, it is clear that the greatest difference between the two groups of students is in the area of cultural involvement. Students with at least one university educated parent score higher on this dimension than other students. In descending order, they also score higher in terms of hours per week on campus, activities

involvement, and club involvement. While under circumstances described in Diagram 1 cultural involvement and hours per week on campus have positive implications for GPA, the reverse is true for activities involvement and club involvement.

For none of the remaining forms of involvement listed in the table is there a statistically significant difference between the scores of students with differing parental education. The fact of no difference is particularly important for classroom involvement: as was seen in Diagram 1, high GPAs were frequently associated with this variable.

Are students from families without a university educated parent at a disadvantage in terms of involvement? Not really. They are lower in terms of hours per week on campus and cultural involvement and each of these contribute to high GPAs; however, they are lower on activities and club involvement, each of which detract from GPA. In terms of classroom involvement, there is no difference based on parental education. It must be cautioned, however, that GPA is the reference point for this discussion. To the degree that involvement is a valuable experience in itself, students from families with no university educated parent are slightly disadvantaged.

Conclusions

Data on students analysed in this article suggest a number of things. First, in terms of first year GPA, there is a certain advantage that accrues to high scoring OAC students with at least one parent who has a university education.

Second, different forms of involvement, particularly classroom involvement, contribute positively to GPA. It is important to note, however, that different forms of involvement appear to work for different groups of students. For example, while cultural involvement may positively affect the GPAs of certain students who had OAC marks in the 54% to 76% range with at least one university educated parent, it appears to be of no consequence for other students. In addition, some forms of involvement, in particular utilization of campus services and the number of new friends, are of no consequence for GPA. Even more important is that club and activities involvement actually had negative implications for the GPAs of certain groups of students.

Third, under certain conditions, one form of involvement may compensate

for the absence of another. For example, among students with OACs in the range 83% to 99% who have no parent who graduated from university, compensation for relatively low numbers of hours on campus is provided by relatively high classroom involvement.

Fourth, for a small group of students, differences in GPA in some way appear to be associated with racial origins; however, the data indicate that it is not the same racial group(s) that are consistently disadvantaged in terms of marks.

Finally, while there are a number of areas in which the involvement of students with no university educated parent is lower than that of other students, it is unlikely that the involvement of students from such families affects GPA to a great extent. More problematic is the fact that for some students participation itself, independent of its impact on GPA, can be viewed as a lost positive aspect of the university experience.

To return to the main purpose of this article as articulated in the Introduction, it can be argued that even when input characteristics are held constant (in this case only OAC marks were relevant), a certain advantage does accrue to students with at least one university educated parent. This said, independent of parents' education, and OAC marks, different forms of involvement contribute to the GPAs of distinct groups of students in various ways.

In terms of policy implications, perhaps the one finding that stands out is that it pays to go to lectures, and to attend seminars, and to go to the library. While this may seem self evident, as half-full lecture halls and poorly attended tutorials demonstrate, students may not be aware fully of the fact. Measures that might bring this reality home could have demonstrable consequences for academic achievement.

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Appendix A: Variables in CART Procedure

Highest Education of Parent

	Percent
Elementary	8.4
Some HS	8.2
Completed HS	13.2
Some Tech	10.8
Some Col or Univ	9.3
College	13.2
University	37.0

Gender

	Percent
Male	35.4
Female	64.6

Family Income

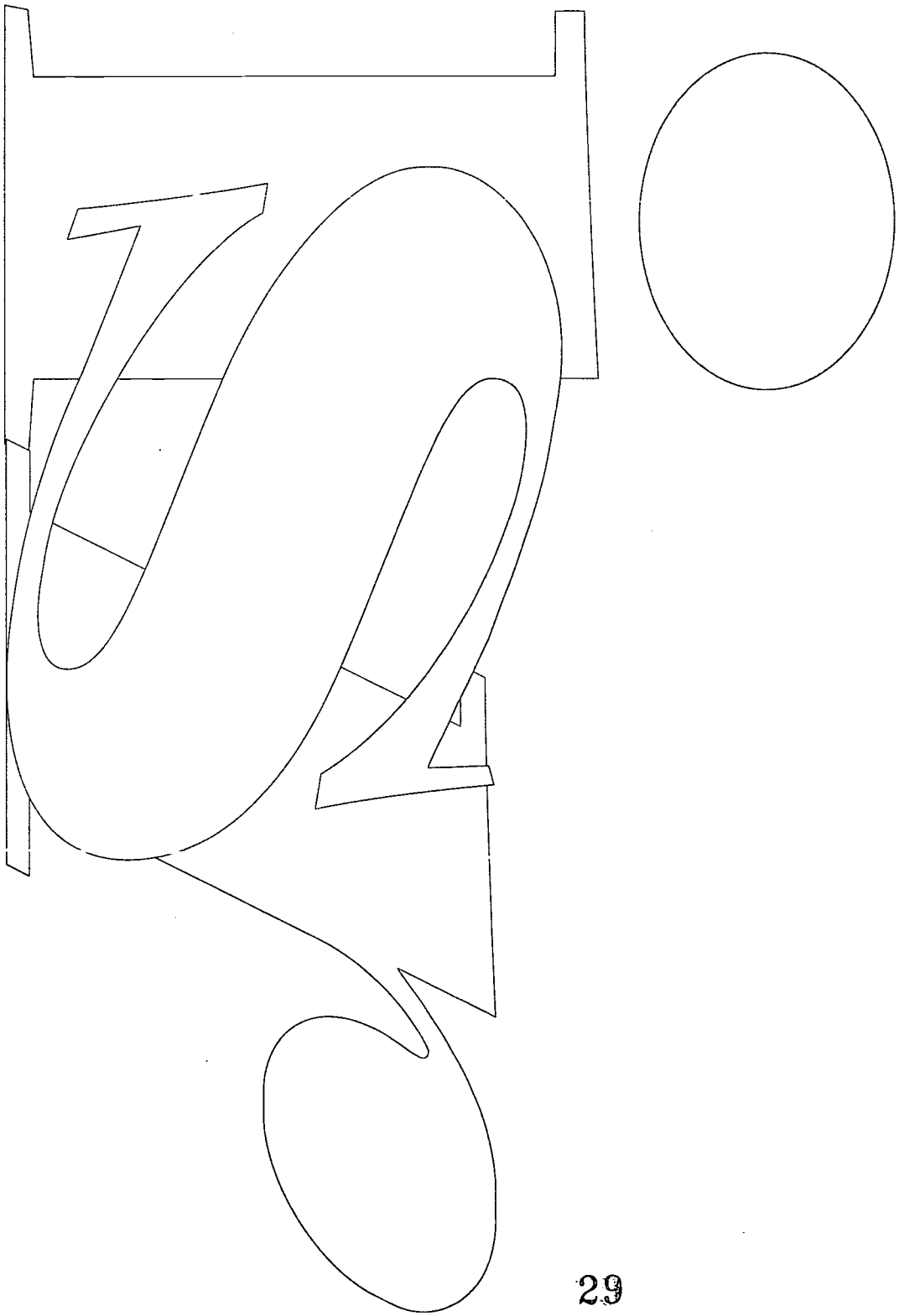
	Percent
To $25,999	19.3
$26-49,999	29.8
$50-74,999	25.4
$75-99,999	12.0
$100-124,999	6.8
$125-149,999	2.9
$150-174,999	.9
$175-199,999	1.0
$200,000 and above	1.8

Race

	Percent
Black	5.1
East Indian	2.4
Chinese	9.6
Other	10.7
European	72.2

	Mean	Std Dev
Contacts	-.05	.64

	Mean	Std Dev
Involvement		
Sports	-.01	.76
Social	-.01	.77
Services	.00	1.00
Activities	.00	1.00
Club	.00	1.00
Culture	.00	.87
Hrs on Campus	.00	1.00
Class	.01	.67
GPA	5.30	1.77
OAC	79.00	6.30



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