

The Role of Field Choice on Racial Differences in College Completion Rates

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Previous researchers have looked at how initial major choice affects college completion. However, a high percentage of students change majors within their first year of college (NCES 2001). Economic returns to a college education differ across fields (Berger 1988; NCES 2001) and so changing majors can affect the probability that one will continue with their schooling because the costs and benefits to pursuing postsecondary education may be different for the new field. In this paper I argue that occupation-specific social capital among Asians contributes to their higher college completion rates and that their achievement and probability of success varies by field of choice.

Social capital is important for the educational process because it provides access to information, resources and insider knowledge otherwise not generally available or easily attainable. Coleman argues that it is through social capital that parent's human capital is translated into children's educational outcomes (1988). There must be strong relations between children and parents for the transfer of information and expectations to occur and this exchange is not limited by parent's education. He gives an example of Asian immigrant mothers purchasing an extra copy of textbooks so that they can learn the material to help their children do well. Immigrant youth have less access to social capital but they benefit more from these social connections than native-born youth (Kao and Rutherford 2007), highlighting the importance of access to strategic information needed for educational achievement.

Zhou and colleagues document how immigrant parents make use of social structures to help their children achieve academic success (2006; 2007). Ethnic specific after-school programs designed to develop young people's academic and extracurricular skills ensure that high school students are well-prepared for the next phase of schooling. Even though the Chinese and Korean parents in her study did not attend high school or college in the United States, through social interactions with co-ethnic parents, they learn and subsequently are able to provide their children with the tools necessary for success, resulting in high school completion rates and acceptance to prestigious colleges in disproportionately large numbers. Most, if not all, academic tutoring and enrichment as well as college preparatory programs run by co-ethnic members are focused on primary and secondary schooling, with an apparent paucity of resources and information on postsecondary issues. Asian American immigrant parents' lack of knowledge and experience with the American postsecondary educational system suggests that Asian students are not any better positioned to navigate the college system than other youth who come from immigrant or non-college educated family backgrounds (Ceja 2006; Lee 1994). If access to information is

critical to Asian immigrant youth's success in high school and college admittance, what then explains their continued success in postsecondary education?

The Role of Field Choice

One way to understand racial disparities in educational attainment is to examine the different decisions they make in college. While I recognize that within group ethnic differences exist among Asians, especially with respect to ability, resources and expectations (Goyette and Xie 1999; Lee 1994), the factors that have steered Asians toward a limited set of fields are common across ethnic groups (Sue and Okazaki 1990; Xie and Goyette 2003) and so I consider Asians as a single racial group. Field of study is a clear way that Asians differ from other racial groups, where Asian students have greater significant differences with non-Asians in choice of majors than whites have with non-whites (Simpson 2001). Asians, as an aggregate group, are more likely to be concentrated in a limited range of majors, such as engineering, math, and physical and biological sciences (Suzuki 1988). Field of study determines college curriculum and oftentimes structures occupational opportunities and earnings trajectories (NCES 2001). It also affects persistence and completion rates (Leppel 2001).

One reason why field of study may contribute to higher rates of college completion among Asians is because of differences in the economic returns to a degree. Average starting salaries and long term earning trajectories differ widely by field (NCES 2001) and have been found to play a strong role in student choices (Cebula and Lopes 1982). Expected earnings are positively related to investment in schooling (Ferber and McMahon 1979), where students choose majors in fields with the highest stream of earnings (Berger 1988). Given the same cost of schooling, those in the field with the highest earning streams have the highest rate of return for degree completion. In general, science and technical fields have higher internal rates of return than humanities and social science fields (Altonji 1993). If individuals in the fields with higher rates of return are also more likely to graduate, then when cost to schooling is held constant, we may see that Asians have higher college completion rates simply because they are more concentrated in the science and technical fields with high expected earnings returns.

Another reason why field of study may matter is that racial or ethnic groups may differ in their levels of preparedness for, and their perceptions about succeeding in different fields. High school students oftentimes must choose a major when applying to a bachelor's degree granting institution, but many of these students actually make this decision with little to no experience in the discipline or understanding of the curriculum associated with the desired major. In contrast, individuals following in the occupational footsteps of their parents or other adult mentors are more likely to have a model for the types of classes to take and the skills needed to achieve in that field.

Sue and Okazaki argue that Asian Americans concentrate in certain fields because of relative functionalism (1990). That is, the constrained opportunities for upward mobility among Asians in non-educational areas (i.e., entertainment, sports and politics) and educational ones (i.e., humanities and social sciences) lead them to see education as *the* means to mobility and to select majors that require more technical and quantitative skills rather than English competency. This educational focus of early immigrants is reflected in the high proportion of Asian adults in

engineering, medicine, and science occupations and can serve as an indication to the next generation of occupations where they are more likely to be successful (Xie and Goyette 2003; Xie and Shauman 1997).

Parental pressure and the high numbers of co-ethnic peers are the common explanations for why Asian youth are more likely to choose engineering, and science and math majors (Zhou and Kim 2006). However, the greater availability of older immigrants in professions related to these fields can also serve as a source of social capital providing information, guidance, and support making it easier for younger Asian immigrants to succeed in these fields compared to ones where the role models are few and far between. The accumulated wealth of experience in this set of fields can also provide the next generation with the cultural capital essential to navigate the college system more efficiently and easily. If this is the case, then I expect that Asians in engineering, and science and math fields to be more likely to graduate than other ethnic groups in these fields as well as being more likely to graduate than their co-ethnic peers in other fields.

In this paper, I examine to what extent the higher completion rates of Asians in postsecondary schooling compared to whites, blacks and Hispanics is due to differences in choices of field of study. Xie and Goyette (2003) find that Asian students' expectations of being in professional or technical occupations explain their higher college enrollment rates and concentration in high payoff fields compared to whites. However, we know very little about the academic performance of Asian students in non-science fields such as the humanities and social sciences. These students may actually fare worse than their white counterparts because they know very little about these fields, may struggle with selecting courses and lack a direct link between their college degree and future occupation. This paper is part of a larger project that examines how coursetaking patterns and academic progress over the college career affect racial differences in educational attainment, where students may use grades as a signal of ability in a field, which affects their perceptions of future occupational success.

A preliminary analysis of data from the National Education Longitudinal Study (NELS) suggests that both compositional and racial differences in field-specific completion rates may contribute to greater educational attainment among Asians. Table 1 shows that racial differences in choice of first major exists, such that Asians choose engineering, and science and math majors at higher rates than non-Asians and in Table 2, we see that the completion rates of Asians in engineering, and science and math majors are significantly higher than those for white, black and Hispanic students and were among the highest completion rates among Asians in all fields.

Data and Methods

I use data from the NELS: 1988 – 2000, which followed a nationally representative cohort of 8th graders in 1988 every two years up to 1994 and surveyed them again in 2000. The NELS is ideal for this analysis for several reasons. The longitudinal design contains a wealth of information related to college planning for respondents when they were in the 12th grade and prior. Measures of student's educational and occupational expectations, values, tested proficiency as well as parental expectations and support allow me to examine selectivity into field of choice and to what extent college completion is due to demographic background,

previous academic ability, and decisions made in college. Another strength of using this national data set is that I am able to determine if there are systematic differences related to completion rates between white, black, Hispanic and Asian students across different institutions, which demonstrates that ethnic differences are not specific to only one institution. And most importantly, because the 2000 follow-up obtained respondent's postsecondary education transcript records, which have only recently become available for analysis, I am able to model the probability of college completion as a function of sequential decisions students may make about field of study.

I start with a logistic regression model of college completion to determine if field choice mediates racial differences, controlling for ability, expectations, social and cultural capital and background variables. I use student's major at their first institution to determine field choice. I code major choice into 15 fields: agriculture and forestry, biology, business and management, economics, education, English and journalism, engineering, home economics, liberal arts/humanities, mathematics and statistics, nursing and other health technologies, physical and earth sciences, psychology, social sciences, and other. This allows for more detailed description of how racial groups differ in their preferences and probability of success in college fields of study. I also test to what extent more parsimonious versions of this variable produce similar results. In addition to the additive effects of field choice, I include interactive effects between race and field to determine if the higher probability of college completion among Asians is limited to only certain fields.

If college completion rates do vary by field, such that completion rates are highest in fields with high economic payoffs, then race differences in academic achievement may not be reflected in the probability of completion. I introduce grades into the model as a measure of academic achievement. Others have argued that grades are an indicator of ability for academic achievement and ability to adapt to new academic standards (Pascarella and Terenzini 1991; Tinto 1987) affecting student persistence and completion (Adelman 2006; Stinebrickner Stinebrickner 2003; Temple and Polk 1986). Since grading standards and GPA distributions vary by field, I consider an interaction between GPA and field.

Low grades may signal to students that they are not well-suited for certain fields, prompting them to switch fields. Since changing fields also changes the economic returns to a college degree and in turn may affect the costs and benefits of pursuing postsecondary education compared to being in the labor market, I include a variable for self-reported major change. We can expect that the effect of major change would be strongest for students who switch majors from a high economic payoff field to a low economic payoff field. At the same time, if there is an interaction between race and field, such that Asians in engineering, and science and math fields are more likely to graduate, then we may see that Asian students who leave these fields may fare worse than their counterparts who did not switch, regardless of initial field choice. To test for this, I collapse majors into science vs. non-science fields and create a new variable that describes the different paths students may take through college by combining field type with whether the respondent changed majors. There are four paths: 1. starting as a science major, with no switching; 2. starting as a science major and switching to a non-science major; 3. starting as a non-science major, with no switching; and 4. starting as a non-science major and switching to a science major. Adelman (2006) found that changing majors increases time to degree, but has no

significant effects on overall completion, but I propose that the effect of a major change on completion may be contingent on path and race/ethnicity.

This paper makes 3 contributions to the literature on racial differences in college completion by considering: 1. how race affects probability of selecting certain majors; 2. how race, initial major choice and college grades affect probability of changing majors; and 3. how major choice and changing majors affects overall race differences in college completion rates.

References Cited

- Adelman, Clifford. 2006. *The Toolbox Revisited: Paths to Degree Completion From High School Through College*. Washington, D.C.: U.S. Department of Education, 2006.
- Altonji, Joseph G. The Demand for and Return to Education When Education Outcomes are Uncertain. *Journal of Labor Economics*, Vol 11(1): 48-83.
- Berger, Mark. C. 1988. Predicted Future Earnings and Choice of College Major. *Industrial and Labor Relations Review*, 41(3): 418-429.
- Cebula, Richard J., & Lopes, Jerry. 1982. Determinants of Student Choice of Undergraduate Major Field. *American Educational Research Journal*, 19(2): 303-312.
- Ceja, Miguel. 2006. "Understanding the Role of Parents and Siblings as Information Sources in the College Process of Chicano Students. *Journal of College Student Development*, 47(1): 87 – 104.
- Coleman, James. 1988. Social Capital in the Creation of Human Capital. *American Journal of Sociology*, 94: S94-S120.
- Davies, Scott and Neil Guppy. 1997. Fields of Study, College Selectivity, and Student Inequalities in Higher Education. *Social Forces*, 75(4): 1417-38.
- Ferber, Marianne A. and Walter W. McMahon. 1979. Women's Expected Earnings and Their Investment in Higher Education. *The Journal of Human Resources*, 14(3): 405-420.
- Goyette, Kimberly and Yu Xie. 1999. Educational Expectations of Asian American Youths: Determinants and Ethnic Differences. *Sociology of Education*, 72: 22-36.
- Kao, Grace and Lindsay Taggart Rutherford. 2007. Does Social Capital still Matter? Immigrant Minority Disadvantage in School-Specific Social Capital and Its Effects on Academic Achievement. *Sociological Perspectives*, 50(1): 27-52.
- Lee, Stacey J. 1994. "Behind the model-minority stereotype: Voices of high - and low -achieving Asian American students." *Anthropology & Education Quarterly*, 25(4): 413 – 429.
- Leppel, Karen. 2001. The impact of major on college persistence among freshmen. *Higher Education*, 41: 327-342.
- Pascarella, Ernest T., and Patrick T. Terenzini. 1991. *How College Affects Students: Findings and Insights from Twenty Years of Research*. San Francisco: Jossey-Bass.
- Simpson, Jacqueline C. 2001. Segregated by Subject: Racial Differences in the Factors Influencing Academic Major Between European Americans, Asian Americans, and African, Hispanic, and Native Americans. *The Journal of Higher Education*, 72(1): 63-100.

- Stinebrickner, Ralph and Todd R. Stinebrickner. 2003. Understanding Educational Outcomes of Students from Low-Income Families: Evidence from a Liberal Arts College with a Full Tuition Subsidy Program. *The Journal of Human Resources*, 38(3): 591-617.
- Sue, Stanley and Sumie Okazaki. 1990. Asian-American Educational Achievements: A Phenomenon in Search of an Explanation. *American Psychologist*, 45(8): 913-920.
- Suzuki, Bob H. 1988. "Education and Socialization of Asian Americans: A Revisionist Analysis of the 'Model Minority' Thesis." Pp. 155-78 in Russell Endo, Stanley Sue, and Nathaniel Wagner, eds., *Asian-Americans: Social and Psychological Perspectives*, vol. II. Palo Alto, CA: Science and Behavior Books.
- Temple, Mark and Kenneth Polk. 1986. A Dynamic Analysis of Educational Attainment. *Sociology of Education*, 59(2): 79-84.
- Tinto, Vincent. 1987. *Leaving College: Rethinking the Causes and Cures of Student Attrition*. Chicago: University of Chicago Press.
- U.S. Department of Education. National Center for Education Statistics. *From Bachelor's Degree to Work: Major Field of Study and Employment Outcomes of 1992-93 Bachelor's Degree Recipients Who Did Not Enroll in Graduate Education by 1997*, NCES 2001-165, by Laura J. Horn and Lisa Zahn. Project Officer: C. Dennis Carroll. Washington, D.C.: 2001.
- Xie, Yu and Kimberly Goyette. 2003. Social Mobility and the Educational Choices of Asian Americans. *Social Science Research*, 32: 467-498.
- Xie, Yu and Kimerlee A. Shauman. 1997. Modeling the Sex-Typing of Occupational Choice: Influences of Occupational Structure. *Sociological Methods & Research*, 26 (2): 233-261.
- Zhou, Min. 1997. Social Capital in Chinatown: The Role of Community – Based Organizations and Families in the Adaptation of the Younger Generation. In L. Weis & M. S. Seller (Eds.) *Beyond Black and White: New Voices, New Faces in the United States Schools* (pp.181 – 206). Albany: State University of New York Press.
- Zhou, Min and Kim, Susan S. 2006. "Community Forces, Social Capital, and Educational Achievement: The Case of Supplementary Education in the Chinese and Korean Immigrant Communities." *Harvard Educational Review*, 76(1): 1 – 29.

Table 1. College Major Field Choice by Ethnicity, NELS 88:00 (N = 10,086)

Field of Study	Non-Hispanic Whites	Asian Pacific Islanders	Non-Hispanic Blacks	Hispanic	Total
Humanities and Social Sciences	27%	26%	14%	28%	26%
Science and Math	13%	21%	17%	13%	14%
Engineering	6%	9%	8%	7%	7%
Education	14%	5%	10%	11%	12%
Business	15%	16%	18%	14%	15%
Preprofessional	12%	14%	18%	15%	13%
Other Occupationally Specific	14%	10%	16%	12%	13%
N =	7,371	974	811	930	10,086

Table 2. Percentage of Students who Completed College by Field Choice and Race/Ethnicity, NELS 88:00 (N = 6,503)

Field of Study	Non-Hispanic Whites	Asian Pacific Islanders	Non-Hispanic Blacks	Hispanic	Total
Humanities and Social Sciences	73%	83%	73%	48%	71%
Science and Math	75%	83%	52%	62%	73%
Engineering	64%	70%	43%	59%	62%
Education	67%	59%	42%	49%	63%
Business	66%	57%	59%	50%	63%
Preprofessional	59%	84%	32%	43%	57%
Other Occupationally Specific	57%	54%	33%	42%	53%
Average Completion Rate	67%	74%	48%	50%	64%
N =	4,930	723	389	461	6,503