How Do Different Parental Beliefs and Parenting behaviors Affect Students' College Academic Performance?

A Comparative Study of Asian American and Caucasian American College Students

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Abstract

I examine the differences between Asian Americans and Caucasian Americans with respect to parental beliefs, parenting behaviors, and college academic achievement. The results suggest that 1) there is a strong causal effect of study time on college performance, 2) parental strictness and emphasis on education distinguish Asian American students from Caucasian American students in their choice of a major, study effort, and self-motivation, all of which determine college GPA, and 3) an expanded list of parental control measures and self-motivation measures should be introduced in future research to effectively explain the ethnicity effect on study effort and college academic outcomes.

JEL Classification: J10, J15, J22, I2

Kerwords: Academic Achievement, Asian, Education Economics, Instrumental Variables Regressions, Study Time.

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Section I. Introduction

A large number of studies have shown that children's educational achievement has a positive correlation with family socioeconomic status (SES), as determined by parents' educational attainment, household income, and family size (Becker & Tomes, 1976; Duncan & Brook-Gunn, 1999; Haveman & Wolfe, 1995; Loken, 2010; Plug & Vijverberg, 2005). These findings have inspired many scholars from sociology, psychology and economics domains to research the effects of different parenting styles and parental attitudes in various cultures on children's academic performance. Comparing school-age children from African American families with those from Caucasian families, Davis-Kean (2005) found that parents' education and income indirectly affected children's academic achievement through parents' beliefs and behaviors in both ethnic groups. The process of this indirect effect can be described as: parental perception of educational outcomes and parental practices, which are shaped by the family's socioeconomic status, determine parent-child relations and the way the child is brought up.

Another minority group in the United States, Asian Americans, has gained increasingly stronger presence in higher educational institutions. Asian parents, when compared with Caucasian parents, are often considered stricter, more controlling, more authoritarian, and more academically oriented (Chao, 2001; Kao, 1995, 2004). Therefore, many studies placed emphasis on the cultural characteristics and parenting styles of Asian families in order to find possible explanations for the academic success of Asian Americans. However, most studies selected young school-age children instead of college-age students as the target group. In order to more fully understand the discrepancies in college academic performance between Asian American and Caucasian American students

and possible explanations, I focus on exploring how different parental behaviors and parental beliefs affect children's college academic activities and other aspects of college life. Important distinguishing factors such as parental practices at home and parents' attitudes toward college grades, majors, and graduate study are examined to discover if these factors have a similar effect on Asian American and Caucasian American students' educational development.

Unlike previous studies conducting interviews or surveys on regional samples or using data targeting younger children, I rely on a relatively recent and comprehensive survey, the National Longitudinal Study of Freshmen (1999-2004). This large longitudinal dataset allows for detailed analyses on the hypothesized explanation of minority college achievement in 28 selective schools across the U.S. using a set of throughout survey questions on students' academic, social, and family life before and after enrollment to college. In my model, I control for the indicators of SES in the two sample groups, such as family income, parents' education, and number of siblings, and test the hypothesis that students' college academic outcomes are determined either directly or indirectly by parenting styles and parental beliefs. While some family factors directly determine GPA, others affect grades indirectly through mediating students' decision-making in college, the most fundamental component of which is study effort (R. Stinebrickner & T. Stinebrickner, 2007). In this paper I examine the nature and level of the effects of parental practices and perception of academic achievement on study time, and therefore college grades by using an Instrumental Variables (IV) approach with the logarithm of study time as the endogenous regressor.

My Instrumental Variable estimate of the causal effect of study time on graduation GPA is both statistically and quantitatively significant, suggesting that study effort does matter to academic performance. An additional 30% (about one unit of standard deviation) increase in study time causes a 0.19 increase in GPA, equivalent to about 0.51 units of the standard deviation of GPA. I also find that students' decisions on study effort are influenced not only by their areas of study, but also by their cultural background. The level of strict parenting and emphasis on education distinguish Asian families from Caucasian families; thus students in the two ethnic groups differ in selection of college major, self-motivation, and study time. While study time is included in the representative NLSF data, a more sufficient set of parental control measures and students' self-motivation measures should be developed in future research to generate a more accurate estimate of the ethnicity effect on college performance.

Section II summarizes the previous studies on the effect of family SES on children's academic development, and discusses the role this study plays in filling the gap of existing research. To help readers gain a better understanding of Asian parental styles, Section II also introduces reputational studies that compared Asian families and Caucasian families.

Then, Section III introduces the National Longitudinal Study of Freshmen (NLSF) used in this paper, and the procedure and measures employed to analyze the data. The rationale behind building an Instrumental Variables Two Stage Least Square (2SLS) model rather than an Ordinary Least Square (OLS) along with a thorough analysis plan is then explained in detail. A comparative analysis of parental behaviors, college time input, and

perception measures between the two ethnic groups based on the comprehensive table of descriptive statistics is also conducted in this section.

Section IV that immediately follows discusses the results of the regression and the implication of the findings. Finally, Section V draws a conclusion, followed by a list of works referenced and the appendices.

Section II. Literature Review

a. The Direct and Indirect Influences of Socioeconomic Status on Children's Academic Development

1. How Parents' Educational Attainment Matters?

Studies have found that parents' education, an important indicator of the family's SES, plays an important role in predicting children's academic achievement at a young age (Ermisch & Francesconi, 2001; Haveman & Wolfe, 1995). While parents with better educational background can certainly help their children with homework and provide them with appropriate cognitive stimulation, more attention of researchers should be paid to important factors like parents' beliefs and behaviors that may function as important determinants of children's academic development. Children in the same age group whose parents have different beliefs and behaviors may have different perceptions of their intellectual abilities, choose different activities, and have different goals. For example, some children invest most of their time developing their intellectual skills while others devote themselves to building athletic or artistic skills. According to Davis-Kean's findings (2005), parents of moderate to high educational level tend to hold higher expectations for their children's academic success. This finding was consistent with

previous research suggesting a strong association between parental beliefs and achievement outcomes (Aunola, Nurmi, Niemi, Lerkkanen, & Rasku-Puttonen, 2002; Hoover-Dempsey & Sandler, 1997; Okagaki & Sternberg, 1993).

In addition, she found that for both African American and Caucasian American families, parents' years of schooling affected children's academic development indirectly through the family environment and parental expectations. As she suggested in the same study, the expectation that a child would graduate high school versus graduate college had important implications for the parent-child interaction at home as well as the types of stimulation provided in the family. Parents who place greater emphasis on higher education are more likely to create a positive learning environment at home, motivate children to pursue better educational outcomes at school, and adjust children's selection of daily activities to help them achieve academic success. The achievement-oriented beliefs and expectations lead to higher amounts of achievement-related in-home activities (i.e. reading, games/puzzles, math games, etc.) as well as more positive perceptions of achievement by the children (Halle, Kurtz-Costes, & Mahoney, 1997). In other words, positive changes in children's academic development is a function of parents' creating a motivating and cognitively stimulating family environment where children are taught to strive for excellence.

Davis-Kean's emphasis on parental expectations and practices inspired me to conduct further research on how these family factors may be different between Caucasian Americans and the "model minority" in the United States—Asian Americans (Peterson, 1966). Moreover, since few studies actually explored the level of significance of different parenting styles and parental expectations in determining students' college academic

achievement and how exactly the link between family background and academic outcomes differed by ethnic group, this study examines the potential effect of cultural background on children's behaviors and developmental outcomes.

2. How Family Income Matters?

Davis-Kean (2005) reported that family income had less impact on children's academic development than parents' educational attainment. Many other scholars also disagreed with the argument that family income served as a sufficient causal factor of children's academic outcomes. Factors such as mental health, practical abilities, and attitudes toward success may cause individuals' low income and obstruct their children's personal development (Yeung, linver, Brooks-Gunn, 2002).

Although the size of the income effect was shown to be relatively modest and insignificant after controlling for a wide range of relevant socio-demographic characteristics, Yeung et al. (2002) suggested that income mattered for children's development from the two major perspectives: (1) the investment perspective, and (2) the family process perspective.

According to the investment perspective, family income enables families to invest in cognitively stimulating materials and experiences, thereby providing a better learning environment, such as better schools, nicer houses, and safer neighborhood, better medical care, all of which serve as valuable resources for children's development (Becker, 1981). Therefore, children's success is affected not only by the transmission of biological endowment from their parents but also by the available resources that their parents invest in them. Less economically advantaged families have reduced access to funds to purchase

cognitively stimulating materials and experiences; therefore their children have fewer resources available for their growth in the critical developmental periods of their lives.

The family process perspective, on the other hand, places much more emphasis on parents' psychological well-being and parenting practices. The association between household income and children's development is mediated by the family context. Career failures, job loss, low income or other economic hardships have a negative impact on children's school performance, school engagement, and behavior through affecting parents' mental health and psychological well-being, which shape parent-child interaction in the home (Conger, Patterson, & Ge, 1995; McLoyd, 1990). For example, if parents live under increasing economic pressures such as the inability to pay their credit card bills, afford children's medical care, or to sponsor family activities, there may be conflict between the two parental units and children may be neglected, harshly scolded, or even physically punished when they irritate their parents. Parents' disruptive child-rearing behaviors in the situation with economic pressures are likely to have adverse consequences for their children's development.

Many studies on how family income affects children's development evaluated students during their pre-school or early primary school years. However, there is limited research on how money matters for high school or college age children. Therefore, it is necessarily to include family income in the structural model, and examine the significance of family income as a predictor for students' college performance.

b. Asian and Caucasian Parenting

Parents' attitudes and perceptions about child rearing serve as an important

determinant of their behaviors, thus affecting children's developmental outcomes (Belsky, 1984). Cultural variations in parental perceptions of educational outcomes and parenting practices can be found between Asian American and Caucasian American families. Parents of Chinese origin, for example, tend to hold on to their traditional cultural values and raise their offspring with stronger parental control and greater emphasis on achievement than Caucasian American parents (Lin & Fu, 1990). Another study by Julian, McKenry and McKelvey (1994) on a similar topic also suggested that Asian American parents were more involved in their children's academic activities, such as reading and doing homework, and placed more importance on self-discipline and academic achievement. Chinese, Japanese, Korean, Indian, Singaporean, Vietnamese and other Asian subgroups, however, have unique cultural characteristics. Therefore, diversity in beliefs and behaviors can be expected within Asian American families based on the different reasons for and conditions of immigration, economic status, and educational background (Staples & Mirande, 1980). Due to the sharing belief in Confucian philosophy and the similar characteristics of the social system, such as filial piety, emphasis on family, and respect for parents especially the patriarch in the family, these ethnic groups nevertheless share certain commonalities (Chao, 1994; Rao, McHale, & Pearson, 2003). Broad generalizations in parental practices can be reasonably made in spite of the potential within-group diversity.

Asian parents' special attention to training children to perform well in school should not only be explained by the broad notion of "cultural values" but also the reasons for immigration and the challenges experienced in adapting to new ideologies, cultural norms, and social order. For example, the 1965 U.S. Immigration and Nationality Act granted visas to foreign scientists, technicians, and information technology professionals

(Deepak, 2005). This group of highly educated Asian successfully migrated to the U.S. mainly because they held an advanced degree in natural sciences, computer science, engineering, or mathematics. Therefore, the stricter control of Asian parents is likely to be the result of their similarly high expectations for outstanding academic achievement in science-related areas for their offspring as well as the perception that their children are likely to face more challenges from the society as a minority group. As a result, parents intervene in children's lives actively so that the children can grow to be socially desirable and culturally approved, an important measure of which is how well the children perform in school (Wu & Tseng, 1985).

When studying Asian parenting style, it is worth noting that a higher score on measures of parental control and strictness may have very different implications for Asian than for Caucasian families. A certain level of strictness and control could be equated with parental concern, caring, or involvement rather than hostility, mistrust, or aggression (Chao, 1994). Asian parents keep strict rules at home to create a family environment where self-discipline, self-motivation, filial duty, and academic achievement are modeled by the parents and expected of the children.

c. Major Selection, Study Effort and Academic Performance in College

When studying college students' academic performance, variation in GPA is expected given that requirements and grading standards of majors vary, as does individual study effort. In addition to study effort and selection of majors, cultural background also plays a role as an important determinant of GPA (Betts & Morell, 1999). While associations between family background and college performance have been found, the

question of how individuals choose a college major and how much effort is put into studying should be asked before analyzing determinants of academic performance.

What kind of information students consider when choosing majors? Large differences in financial return across majors were found in previous studies (Arcidiacono, 2004; Daymont & Andrisani, 1984; Finnie & Frenette, 2003). Besides interest, college students choose their majors by comparing the anticipated earnings. If the present value of the future earnings stream of one major is perceived to be higher than another, an individual is more likely to choose the one with higher present value (Berger, 1988). Although students are the ones actually declaring their majors, their decisions may be influenced largely by family background and parental attitudes. As mentioned above, ethnic differences in parental emphasis on academic outcomes also play an important role in shaping students' academic-related decision making. Asian students, compared to their Caucasian counterparts, experience more pressure from their families in the selection of a major. Overrepresentation of Asian Americans in the natural sciences, computer science, engineering and mathematics majors and underrepresentation in humanities majors were documented by Glick and Song (2004). A comparison on the selection of majors between the two ethnic groups is replicated in this paper using the newer longitudinal study to capture possible changes over the past decade.

Another important part of students' college life, sometimes considered as the fundamental activity in college, is study effort. In education production function, study time input increases GPA by a substantial amount (R. Stinebrickner & T. Stinebrickner, 2007). Specifically, R. Stinebrickner and T. Stinebrickner suggested that an additional hour of study per day increased the semester GPA by 0.360 at 5% significance level. Their

research is one of the few studies that explore the relationship between study effort and grade performance. The consideration of using Instrument Variable approach in their study inspires me to employ a similar approach but include cultural values as instruments in order to explore the direct or indirect relationship between graduation GPA and cultural characteristics.

Based on the overview of the literature, this study seeks to (1) explore what specific parental beliefs and parenting styles distinguish Asian American from Caucasian American families, (2) test the hypothesis that cultural variations in parental control and emphasis on academic outcomes distinguish Asian students from American students in their decisions regarding study time, selection of a major, and attitudes towards academic success, all of which are demonstrated to be the major determinants of college GPA.

Section III. Data Analysis

a. Data Introduction

Comprehensive data from a national study of college students, the National Longitudinal Study of Freshmen (NLSF), are used in this paper. The NLSF followed a group of first-time freshman at 28 colleges and universities through their undergraduate life starting from the year of 1999. The 28 schools include liberal art colleges, public research universities and private research universities, all of which are relatively academically selective (see Appendix 1 for a list of participating schools and detailed sampling frame). The survey consists of data on equal numbers of Caucasians and Asians (959 Asians, 998 Caucasians and participants from other ethnic groups) sampled at each of the 28 participating schools. The response rate of 86% was relatively high compared to

other similar surveys. The six waves of the study interviewed students on background information with respect to their economic, social, and demographic characteristics, and recorded their academic progress, attitudes, aspiration, campus activities, and future plans throughout the course of their college education. College dropouts and transfer students were retained in the survey by follow-up interviews to eliminate selection biases. Only U.S. citizens or resident aliens were included in the study. Last but not least, the NLSF is particularly useful because that it includes one of the key pieces of data—each student's study time, which is an essential variable needed to test my theoretical model.

b. Measures, Comparison and Procedures

1. Measures

I focus on ethnic differences between Asian and Caucasian Americans in parental behaviors, parental beliefs, study effort, and academic outcomes. Family income, parents' educational attainment and the number of siblings are of great importance because these factors not only shape parental beliefs and behaviors, but also affect students' academic outcomes.

Family and Student characteristics. Two variables are used to represent the students' demographic characteristics: gender and ethnicity. A variable called "Male" was generated to be 1 if the participant is male, and 0 if female. Only Asian American (Asian=1) and Caucasian American (Asian=0) observations are studied in this research. Family annual income is included in the data as a variable with values ranging from 1 (under $3,000) to 14 ($75,000 or more). The highest level of schooling in the family is recorded from 1 (grade school) to 7 (graduate or professional degree) (see Appendix 2 for

detailed classification). I created high/low family income dummy variables and high/low parental educational level dummy variables after carefully reviewing the distribution of each variable.

Parenting behaviors measures. When socioeconomic status is controlled, the extent and pattern of the unique cultural variations in parenting behaviors can be analyzed to identify the effects of different kinds of parenting styles. A series of items were designed in the NLSF to assess parent-child interaction at the age of six, thirteen, and senior year in high school. Certain items were selected according to their relevance to this study as well as their correlation with final GPA. Parent-child interaction in the last year of high school (one year before the first wave study was conducted) was selected instead of at age 6 and age 13 because participants are more likely to recall an accurate picture of the family environment at a later age.

The parental control measures were composed of questions such as, "How often did your parents check if you'd done your homework?" "Talk with your friends?" "Punish you for bad grades?" and "Limit your TV watching?" Response options for the questions ranged from 1=never to 5=very often. High (high=1) and low (low=0) dummy variables were created after carefully reviewing the mean of each item so that the marginal effects of the specific measures would be more accurately estimated.

Parental expectations (beliefs). Students' attitudes towards college were reported in the NLSF data with questions that asked them how important each of the following considerations was for them: "I don't want to embarrass my family" and "I need grades to get into graduate or professional school." Parents' attitudes toward college were identified by questions such as "It is important to my parents that I get good grades in college", "Go

on to graduate or professional school", and "Study something practical". Similar high/low score dummies were created.

College activities. Students invest different amount of time in different activities on campus, including studying, socializing, partying, working part-time, volunteering, etc. To effectively measure students' time allocation to different types of activities per week, activities were divided into three categories: study, leisure, and work/volunteering. The average amount of time spent per week on each category was generated using the data from all the semesters. Observations with apparently false reports were excluded in both the regression and the descriptive statistics table. For example, some students had self-reported study time exceeding 168 hours (24hrs*7 days) per week. The number of such observations, however, is less than 0.1%. I use the logarithm of study time to take into account that the marginal benefits of studying is likely decreasing in the amount of study time.

Academic achievement measures. Students self-reported their first major, Grade Point Average (GPA) for each course and the cumulative GPA upon graduation in the NLSF surveys. I divided majors into three groups: natural science/engineering/mathematics (major1), economics/social science/business (major2), and humanities/others (major3). Appendix 3 provides a detailed classification of majors reported by the NLSF participants. To minimize the effect of potential disparities in grading system and criteria between different schools in GPA, a set of dummy variables specifying students' schools was created and so school fixed effects were controlled in the regression analyses. Since students did not have access to rank in class, which serves as a more accurate indicator of students' relative performance in school, I utilized the best

information on academic performance available—self-reported cumulative Grade Point Average (GPA) upon graduation. Although self-reported GPA is subject to self-report bias without independent validation from college administrative records, this is still a good measure of students' academic achievement in college.

2. Parental control, attitudes and study effort comparisons

Table 1 presents the descriptive statistics consisting the means, standard deviations, and ranges for all the instruments, control variables, and regressors of interest and the t-test results indicating the significance of difference for each variable between Asian Americans and Caucasian Americans.

Results of this study are mostly consistent with previous findings reported by Lin and Fu (1994), Chao (1990), and McKenry and McKelvey (1994). The t-tests comparing the two target groups' scores on parental control measures indicate that Asian parents score significantly higher than Caucasian parents on strict parenting measures such as punishing children for bad grades and limiting TV watching (see the last column of Table 1 for the p-value of each t-test). Meanwhile, the evidence here does not show that Caucasian parents checked if their children finished homework more often ($p = 0.26$). Caucasian parents were more likely to talk with their children's friends according to the test. The reason may be that often times Asian parents do not share the same approach of talking to children's friends as Caucasian parents when they show concern for their children or inquire about their activities and progress in school. Instead, they choose to impose strict control on their children at home early on for the purpose of training their children to be self-disciplined, academically oriented, behave well in school, and follow certain household rules. Due to

the control of their strict parents, Asian students form the habit of finishing homework on time, knowing that not doing so can potentially irritate their parents. Therefore, a mutual understanding of the importance of finishing homework between Asian students and parents may explain the lower average score on this measure in the Asian sample.

A few other hypothesis tests are used to find out whether Asian parents score significantly higher on the standard measures of parental expectations. Asian families, not surprisingly, appear to place more emphasis on academic success than Caucasian families. Asian fathers and mothers are significantly more likely to expect their children to get good grades in college and go on to graduate or professional school. In addition, they prefer their children to choose a more practical area of study. From a sociocultural context shared by most Asian families, "practical" majors usually refer to those that are more career-oriented or related to science/engineering/mathematics. The reasons are as follows: first, most of the parents from this ethnic group successfully obtained citizenship or permanent residency in the United States after pursuing graduate degree in these areas of study, and most likely to currently work in related fields. Second, the Asian community shares the idea that studying these "practical" subjects can better distinguish Asian students from others academically in school. Third, the word "practical" also means a higher level of expected income post-graduate, which, as far as this group of parents is concerned, can lift their children's social status, avoid being socially and financially vulnerable as minorities, and secure them a higher living standard. As previous studies suggested, large monetary return existed for college graduates majoring in natural sciences and business related fields (Arcidiacono, 2004). Pressure from parents and exposure to science-related academic materials in childhood can be the potential explanation of the finding shown in Table 1 that

Asian students are more likely to graduate with Major1 ($p < 0.05$) and much less inclined to complete a degree in Major3 ($p < 0.001$).

The strong emphasis on studying is shared among parents and students in the Asian group. Looking at the reported attitudes toward college education of participants themselves, Asian students report being more concerned with grades in school because they do not want to embarrass their families, they need to show their academic capabilities in graduate school applications, or they simply hope to achieve academic success in college.

Last but not least, the number of hours spent studying per week significantly differs by race. Asian students self-report studying 3.14 hours per week (7.7%) more than Caucasian students. However, Caucasian students have an average final GPA of 3.40, higher than an average of 3.38 Asian students get, but the difference is not statistically significant ($p = 0.31$). Since grading criteria in different schools or even majors in the same school are rarely perfectly identical, no conclusions should be made only based on these statistics. A structural model that I present in the next section draws a better picture of how each family background measure, college major and study effort influence students' academic performance in college.

TABLE 1
Descriptive Statistics for All Variables of Interest

Variables	Asian				White				T-test Results
	Mean	Standard Deviation	Max	Min	Mean	Standard Deviation	Max	Min	P-value
Family and Student Characteristics									
Household income	12.95	1.90	14.00	1.00	13.30	1.52	14.00	1.00	$p < 0.001$
Highest education in household	5.93	1.50	7.00	1.00	6.19	1.22	7.00	1.00	$p < 0.01$
Number of siblings	2.06	0.85	6.00	1.00	2.25	0.92	6.00	1.00	$p < 0.001$
% Male	45%				48%				
Parental Behavior									
Check If You'd Done Your Homework?	2.07	1.06	5.00	1.00	2.15	1.08	5.00	1.00	$p = 0.26$
Talk With Your Friends	2.94	0.97	5.00	1.00	3.44	0.94	5.00	1.00	$p < 0.001$
Punish You For Bad Grades?	1.80	1.06	5.00	1.00	1.50	0.87	5.00	1.00	$p < 0.001$
Limit Your TV Watching?	1.91	1.05	5.00	1.00	1.58	0.87	5.00	1.00	$p < 0.001$
Respondents' Attitudes									
I don't want to embarrass my family.	5.66	3.06	10.00	0.00	4.75	2.99	10.00	0.00	$p < 0.001$
I need grades to get into graduate or professional school.	7.51	2.47	10.00	0.00	6.64	2.79	10.00	0.00	$p < 0.001$
Parents' Attitudes									
Get good grades in college?	8.54	1.68	10.00	0.00	7.58	1.78	10.00	0.00	$p < 0.001$
Go on to graduate or professional school?	7.07	2.67	10.00	0.00	5.10	2.69	10.00	0.00	$p < 0.001$
Study something practical?	7.64	2.36	10.00	0.00	5.80	2.75	10.00	0.00	$p < 0.001$
Hours Per Week Spent on Activities									
Studying	44.02	13.35	99.67	14.33	40.88	12.91	95.50	0.00	$p < 0.001$
Leisure Activities	59.24	23.07	160.50	15.67	60.23	22.74	153.33	0.00	$p = 0.49$
Working/Volunteering	7.08	6.78	47.50	0.00	6.75	7.08	51.67	0.00	$p = 0.44$

Academic Achievement									
Major1 (Natural Science/Engineering/Mathematics)	0.39	0.49	1.00	0.00	0.32	0.47	1.00	0.00	$p < 0.05$
Major2 (Economics/Social Science/Business)	0.39	0.48	1.00	0.00	0.36	0.48	1.00	0.00	$p = 0.33$
Major3 (Humanities/Others)	0.22	0.44	1.00	0.00	0.32	0.47	1.00	0.00	$p < 0.001$
Final GPA (4.0 Scale)	3.38	0.38	4.00	1.90	3.40	0.37	4.00	1.96	$p = 0.31$

3. Procedures

- Ordinary Least Square (OLS) and Instrumental Variables (IV) approach

As R. Stinebrickner and T. Stinebrickner (2007) pointed out in their study, the existing literature had not provided strong evidence about the relationship between the amount of study and GPA or a successful approach to determine the potential association (Schuman, Walsh, Olson, & Etheridge, 1985). The two major difficulties scholars may face are 1) the omitted variable bias associated with estimates of study time reduces the accuracy of the results, and 2) the variable study time in the NLSF is subject to sizable measurement error as evidenced by some students reporting more study time than there are hours in the day. Most of the previous studies used Ordinary Least Square (OLS) approach to test the potential effect of study time (Michaels & Miethe, 1989; Plant, Ericsson, Hill, &Asberg, 2004). Considering that the traditional OLS model cannot remove the bias brought by the measurement error and regressor endogeneity and thus reduces the preciseness of the estimates, a new approach using the theory of Instrumental Variables is employed to effectively identify more accurate estimations (Durbin, 1954; Wright, 1928).

- The Endogeneity Problem and the Simultaneous Causality Bias

In the Ordinary Least Square (OLS) regressions that previous literature used, the existing endogeneity problem and the possible two-way causal effects problem were left unsolved. R. Stinebrickner and T. Stinebrickner (2007) explored the causal effect of studying on academic performance by introducing an Instrumental Variables method to replace the inconsistent OLS model, which builds the foundation for the development of my structural model. Since study time is also included as an endogenous regressor in my

study, similar problems arise. First, there is the possibility that the causality runs on both directions, from the amount of study to GPA and vice versa. For example, students with poor GPAs to date or have difficult classes that tend to have tough grading criteria are more likely to spend a larger amount of time studying in order to catch up with peers in the school. Second, another factor that creates bias in the estimates of the causal role is the endogeneity of the variable "study time". The amount of effort students make may be correlated with some omitted variable such as efficiency and ability of the individuals. These factors differ by person and are unobserved in the data. To test the endogeneity of this regressor in my model, a Durbin-Wu-Hausman test is performed (Wu, 1973; Hausman, 1978; Greene, 2011). The result ($p < 0.05$) indicates that study time is not exogenous[ii].

Therefore, under the influence of the endogeneity problem and the simultaneous causality bias, it is nearly impossible for OLS to provide unbiased estimates to evidence the causal role of studying effort. To replace the inconsistent OLS model, Instrumental Variables regressions are often considered as a more effective alternative that can help researchers focus on the variation in the independent variable that is uncorrelated with the error term and obtain a consistent estimator of the coefficients of the regression even if the regressor is endogenous (Stock & Watson, 2010).

- Instrumental Variables Regression

To test my hypothesis that some parental behaviors and parental beliefs influence children's college academic performance indirectly through affecting the amount of study

[ii] In this Durbin-Wu-Hausman test, the null hypothesis that the regressor is exogenous or the endogeneity does not affect the OLS estimator is rejected at a 5% significance level.

effort the students make while others directly determine GPA, I select a set of variables as instruments and others as exogenous regressors. My equations of interest in both first (1) and second stage (2) of the Instrumental Variables regression and a list of control variables, regressors, and instruments included are as follows:

$$GPA_i = \beta_0 + \beta_1 logStudy_i + \beta_2 W_{1i} + \beta_3 W_{2i} + \cdots + \beta_{13} W_{12i} + College\ FE + u_i \quad (1)$$

$$logStudy_i = \pi_0 + \pi_1 Z_1 + \pi_2 Z_2 + \pi_3 Z_3 + \pi_4 W_{1i} + \pi_5 W_{2i} + \cdots + \pi_{15} W_{12i} + v_i \quad (2)$$

$W_{1i}, \cdots, W_{12i}$ include the control variables and other exogenous regressors.

Z_1, Z_2, Z_3 are the three instruments.

$logStudy_i$	The logarithm of study time per week
	Major1—natural science/engineering/mathematics (omitted in the models)
W_{1i}	Major2—economics/social science/business related majors
W_{2i}	Major3—humanities/others
W_{3i}	Asian—Asian=1, Caucasian=0
W_{4i}	Male—Male=1, Female=0
W_{5i}	Relatively high parental educational attainment
W_{6i}	Relatively high family income
W_{7i}	Number of siblings
W_{8i}	SAT scores prior to admission
W_{9i}	"My parents checked if I had done my homework relatively often."
W_{10i}	"My parents punished me for bad grades relatively often"
W_{11i}	"My parents limited my TV watching relatively often."
W_{12i}	"Not embarrassing my family is relatively important to me."
Z_1	"Obtaining good grades to get into graduate school is relatively important to me."
Z_2	"Getting good grades in college is relatively important to my parents."
Z_3	"Going on to graduate school is relatively important to my parents."

To enhance the reliability of the empirical results using the Instrumental Variables approach, a set of valid instruments is required. In order for the three instruments in my structural model to be valid, they have to be both exogenous and relevant.

- Checking Instrument Validity

Checking for instrument relevance. The three instruments show parents' or students' attitudes toward grades in college. Intuitively, the more emphasis students place on college academic outcomes, the more likely they will invest a larger amount of time in study so as to get better grades in classes. Since I only have a single endogenous regressor, the first stage F-statistic is sufficient in checking for weak instruments according to the Stock-Yogo test theory. The robust F (3, 1005) is 12.26, which exceeds the benchmark 9.08[iii]. Therefore, the instruments are relevant to the variation in the endogenous regressor.

Testing for instrument exogeneity. The instruments are not exogenous if they are correlated with the unobserved characteristics of students, such as efficiency in studying and academic ability prior to admission. Students' and parents' perceptions about GPA and going to graduate schools do not play a meaningful role in helping or hurting students' efficiency and ability unless these factors can be changed by attitudes, which seems unlikely. However, how much students learned in high school or extracurricular activities prior to college is potentially important. Whether the students have learned related materials before college influences how efficient the students are in studying for college courses and how capable they are as compared to their peers. Parents who value education

[iii] Given that there is one endogenous regressor and three instruments in the model, a formal test for weak instruments suggests that for the bias of the 2SLS estimator to not exceed 10% of the bias of the OLS estimator, the first stage F-statistic should not be smaller than 9.08 (Stock & Yogo, 2002). The instruments in my model pass the test.

tend to expose their children to a wide variety of subjects and urge them to study more than high schools actually teach. Students who think a lot about grades are likely to be those who study the most for the course so as to participate more actively in class and perform better in exams. While getting detailed information about students' high school and extracurricular learning is impractical, the introduction of a control variable SAT scores can help eliminate part of the bias.

Given that I have more instruments (3) than endogenous regressor (1) (see equation 1), the test of overidentifying restrictions is helpful in checking for instrument exogeneity (Stock & Watson, 2010). Under the null hypothesis that all three instruments are exogenous, the J-statistic $J = 3F$[iv] has a chi-square distribution with 2 degrees of freedom, χ^2_2. I find $J = 1.03$ with a p-value of 0.60. I cannot reject the null hypothesis. Thus the test indicates that the three instrumental variables are indeed exogenous.

- Considerations in the Selection Process of Instruments and Exogenous Regressors

I select independent variables that affect GPA only through $logStudy$ as instruments. This selection strategy leads me to choose the three expectations and beliefs measures as instruments while parental control measures as exogenous regressors.

Table 2 shows the first stage regression results of the IV equation (2) presented in Section III. Column 1 in Table 3 provides the estimates for equation (1), and contrasts it with an OLS model (see column 2), an IV model without controlling for college major (see column 3), and an IV model without major fixed effects and school fixed effects (see column 4). While the regression in column 1 is the main structural model used in this

[iv] Here 3 equals to the number of instruments in my model.

paper, the OLS model as well as the other two IV models shows certain interesting features worth discussing.

The OLS regression in column 2 includes the instrumental variables (Z_1, Z_2, Z_2) as regressors, and shows that considering high GPA/graduate study as relatively important either by participants or parents (Z_1, Z_2, Z_3) does not appear to have a significant effect on GPA. However, in the first stage IV regression reported in Table 2 in which the three independent variables serve as instruments, their effects on study time are each individually significant (Z_1 and Z_2 are significant at 0.1% while Z_3 is significant at 5%). Therefore, Z_1, Z_2 and Z_3 should be included as instruments in the model. In addition, although W_{9i} (whether parents checked if their children had done homework relatively often) matters statistically in both OLS and the first stage IV regression, selecting it as a regressor rather than an instruments along with the other three improves the estimates of the model as it increases the first stage F-statistic from 11.46 to 12.26.

As for the selection of the other exogenous regressors, the process is more straightforward. W_{10i} and W_{12i} have no significant association with $logStudy$, however they are directly correlated with GPA. Even though one exogenous regressor (W_{11i} – parents limited their children's TV watching relatively often) does not reach the statistical significance standard, including it still makes practical sense because it improves the instrument validity, therefore helps the model generate more accurate estimates.

Section IV. Results and Discussion

Regardless of the different number of variables included, findings from the four regressions presented in Table 3 show several common features. First, $logStudy$ is

statistically significant in all four models. The biased estimated coefficient of study time in the OLS model is much smaller compared to the other three IV models. Second, selection of majors matters to students' graduation GPA. Natural science/engineering/mathematics majors have significantly lower grades than economics/social science/business and humanities majors. Third, none of the three indicators of family socioeconomic status turn out to be significant in any of the four regressions.

1. Comparing OLS and IV estimates of study time effect

The OLS estimates are shown in the second column of Table 3. The estimated effect of study time is small, only less than 1/3 the size of the corresponding IV estimate in column 1. According to the model, a 30% (about one unit of standard deviation) increase of study-time per week only raises final GPA by slightly more than 0.053, equivalent to about 0.14 units of the standard deviation of final GPA. Although the effect is statistically significant at a 0.1% significance level, it does not appear to matter quantitatively. But does the amount of effort really matter that little? As shown in the first column of Table 3, the IV results indicate that an additional 30% increase in study time causes a 0.19 increase in GPA, equivalent to about 0.51 units of the standard deviation. The estimated coefficient of $logStudy$ in column 1 ($\beta_1 = 0.635$) is more than three times as large as that in column two ($\beta_1 = 0.175$). According to R. Stinebrickner and T. Stinebrickner (2007)'s results, an additional 1.63 hours (one unit of standard deviation) increase in study time per day increases GPA by 0.59, equivalent to over 0.90 standard deviations. The estimated effect of study time in my model is smaller compared to theirs. Nevertheless, my results still provide strong evidence showing the substantial effect of study effort given that the IV

method provides an unbiased estimate under the presence of regressor endogeneity problem and measurement error. Therefore, from this point on, only the first stage regression as well as the second stage IV results will be discussed.

2. First Stage Results

In the first stage regression of the IV model shown in Table 2, the results indicate that parents' and students' emphasis on academic outcomes matters in a statistically and quantitatively important manner with respect to the amount of study effort, supporting the hypothesis that the academically oriented beliefs resulting from cultural background are determinants of the study time. As expected, those who score higher on the survey item "I think having good grades to go on to graduate schools is important" are reported to study about 10% more than the others, equivalent to about 4.3 hours per week above average, and to have a higher than average GPA (0.06 increase from the average GPA). The difference in study time between those whose parents expect them to go on to graduate or professional school and those who do not as much is approximately 5%. Surprisingly, the estimated coefficient for the other instrument "whether parents think getting good grades is relatively important in college" suggests a negative effect on study effort. Additionally, the joint effect of parents' perception about obtaining a graduate degree in the future and getting good grades in college on $logStudy$ is -0.016. A possible explanation of the negative joint effect may be that students in our sample are either self-motivated or motivated mostly by their parents, assuming that unmotivated students are likely to be excluded from the NLSF sample due to the relatively high admission standards of the 28

selective schools. Once parents are not physically around in college, those who are not self-motivated decide to study less.

As presented in Table 1, Asian students in the NLSF sample are more likely to choose natural science/engineering/mathematics majors while Caucasian students are more likely to choose humanities majors. This observed difference is similar to general expectations and previous studies (Glick & Song, 2004; Sue & Okazaki, 1990). Therefore, differences in grading criteria and the amount of effort required across majors are much worth analyzing in order to answer my research question. As shown in Table 2, students in humanities study 14% less than those in natural science/engineering/mathematics. This finding does not necessarily indicate that they have lower grades as a result of less study time, for the reason that less strict grading patterns may be found in this type of majors. The empirical result in the first column of Table 3 suggests that humanities majors receive grades 0.18 higher than those in natural science/engineering/mathematics. In summary, when accounting for the effect of shorter study time, students studying humanities/others gain GPA about 0.09 higher than those studying natural science/engineering/mathematics.

Another interesting finding from the first stage regression is that on average Asian students report studying about 5% more than their Caucasian peers, even after controlling for major, college attended, parental strictness and emphasis on study measures. This indicates that apart from the observed cultural variations in the parental strictness and emphasis on study considered in the model, there are still some unobserved cultural factors that drive Asian students to make more effort in college. The ethnic differences appear to only influence GPA through study time because the ethnicity effect is insignificant in the second stage regression ($\beta = -0.039, p = 0.14$). Possible omitted variables such as self-

motivation and peer effects are not quantitatively measured in the NLSF data. In addition, the parental beliefs and behaviors measures in this study cannot thoroughly cover all the cultural variations in parenting. For example, Asian parents may be strict in other ways that are tied to the self-motivation level of their children so that they enjoy studying, or they train their children to be so academically oriented that they are naturally inclined to study when they have free time. Another explanation can also be that the level of peer pressure among Asian children is higher than that of Caucasian children, causing Asian students to make more effort in college just to catch up with peers. The significant ethnicity effect on study effort found in this paper provides an interesting window into the differences between Asian and Caucasian students. Although a firm conclusion on the ethnic discrepancy in effort still cannot be given in this paper, prospective researchers can consider measuring and controlling these omitted factors in their models, and explain the change in ethnicity effect on study time/effort.

3. Second Stage Results

As shown in Table 3, the second stage regression in column 1 provides various interesting findings, some similar to and some different from existing literature. The three important socioeconomic factors—family income, parents' education and family size—are not significant individually or as a group in determining college GPA when variables such as SAT scores, school and major are taken into account[v]. The lack of statistical significance may indicate that these SES factors influence intellectual development only at the earlier years of a child's life, which is then captured in SAT scores. To investigate this

[v] The p-value for joint significance of the three SES indicators is 0.69.

idea, Table 4 presents a regression in which I replace the original dependent variable (college GPA) with the SAT score and only include students' demographic characteristics and parental behavior measures. Similar to previous studies, parents' education and family income turn out to be statistically and quantitatively significant in determining students' SAT scores prior to enrollment to college. Once SAT is controlled for in the IV model, other parental influences matter more than the SES factors to students' college academic achievement.

Returning to column 1 in Table 3, the results regarding parental control measures indicate that parental behaviors prior to college affect final grades directly. Two of the items appear to reduce a student's GPA. For example, the more often parents checked if students had done their homework, the lower the GPA ($\beta = -0.079, p < 0.01$). The same direction and similar scale of effect are observed for the item "parents punished students for bad grades relatively often" ($\beta = -0.073, p < 0.01$). At first glance, the results suggest that these two parenting behaviors, which can often be observed in families with strict parents, can hurt a student's academic performance in college. The direction of effects is the opposite of what was found in previous studies[vi]. For example, the concept of "Tiger Mother", albeit unpopular among Western parents, has often been considered to be a major explanation of Asian academic success (Chua, 2011a). Practicing math problems for hours, staying away from TV and computer games, and living under the pressure of parents' extremely high standards for academic success are common among Asian families (Chua, 2011b). Asian children are trained from early on by their parents to strive for

[vi] Some may suspect that the effects of parental behaviors differ by ethnic group. To test this hypothesis, the dummy variable "Asian" was interacted with each parental behavior variable. The interaction terms were found to be neither individually nor jointly significant ($p = 0.36$). Therefore, the effects of strict parenting practices do not differ by ethnicity.

academic success. But do my results really show a change in the direction of the effects of strict parenting methods?

To answer this question, one has to look deeply into the characteristics of the student body of the NLSF sample and the specifics of the measures. Considering the relatively high standards of admission to the 28 selective schools in the NLSF dataset, it is reasonable to assume that the students included in the sample are either self-motivated or motivated/controlled by their parents. Students who often failed to finish homework on time or had bad grades in high school would have been unlikely to gain admission to any of the 28 academically selective institutions had their families not had effective parental control over their commitment to schoolwork. The high admission bar creates selection bias in the sample that cannot be neglected.

If the child was self-motivated and always finished homework on time in high school, his/ her parents would not need to punish him/her for not finishing schoolwork. Similarly, if the student always got good grades in school because of his/her commitment to school, the parents would not be rated as "punishing the student for bad grades relatively often" because they never really had to. Therefore, for self-motivated students, the scores on these strict parental control measures are artificially low while they are more likely to be the better performers in the class because they genuinely enjoy studying or they pay more attention to class (suggestive of negative coefficients). On the contrary, for those who are not self-motivated, strict parental control works only prior to college, when parents could monitor what and how the students were doing in school and motivate/force them to strive for better academic outcomes. Once the students themselves can control the allocation of their time, energy and attention to different activities, they are likely to be

more committed to activities other than study, some of which may be harmful to their college performance. This implication explains the negative coefficients of the two strict parental control items.

Thus, leaving out the important factor—self-motivation—creates an omitted variable bias (OVB) that overestimates the negative effects of the parental strictness measures. I expect the scale of the negative effects to be smaller, or the sign of coefficients to become positive once self-motivation is taken into account. In summary, a tough parenting approach does not necessarily hurt students' college performance. It is the level of self-motivation that determines one's college academic outcomes. Again, it is important that future studies design an effective measure of self-motivation level to examine the effect of this factor on grades and the cultural variations in motivation, and to improve the accuracy of the estimates of other parental beliefs and behaviors without the omitted variable bias.

TABLE 2
First Stage Regression

	$logStudy$
Instruments	
I need grades to get into graduate or professional school.	0.096***
	(0.000)
Parental expectation—get good grades in college?	-0.070***
	(0.001)
Parental expectation—go on to graduate school?	0.054*
	(0.012)
Control Variables and Other Regressors	
Major2 (Economics/business/social science)	-0.123***
	(0.000)
Major3 (Humanities/others)	-0.141***
	(0.000)
Asian (dummy)	0.048*
	(0.017)
Male (dummy)	-0.070***
	(0.000)
Parents with relatively high educational attainment (dummy)	0.044*
	(0.028)
Relatively high household income (dummy)	-0.060*
	(0.012)
Number of siblings	0.009
	(0.398)
SAT	0.000
	(0.369)
Check If You'd Done Your Homework?	0.049*
	(0.018)
Punish You For Bad Grades?	-0.030
	(0.150)

Limit Your TV Watching?	0.026 (0.200)
I don't want to embarrass my family.	0.015 (0.450)
Constant	3.640*** (0.000)
R^2	0.120
N	1047

* Significant at 5 percent.
** Significant at 1 percent.
*** Significant at 0.1 percent.

TABLE 3
Structural Model Results

	(1)	(2)	(3)	(4)
	Dependent Variable: Graduation GPA			
	IV	OLS	IV	IV
$logStudy$	0.635**	0.175***	0.590**	0.587**
	(0.001)	(0.000)	(0.002)	(0.002)
Major2 (Economics/social science/business)	0.140***	0.083**		
	(0.000)	(0.001)		
Major3 (Humanities/others)	0.180***	0.115***		
	(0.000)	(0.000)		
Asian (dummy)	-0.039	-0.023	-0.051	-0.059*
	(0.140)	(0.332)	(0.065)	(0.034)
Male (dummy)	0.002	-0.029	-0.025	-0.030
	(0.938)	(0.205)	(0.357)	(0.263)
Parents with relatively high educational attainment (dummy)	0.019	0.039	0.029	0.032
	(0.498)	(0.103)	(0.279)	(0.231)
Relatively high household income (dummy)	0.021	-0.006	0.008	-0.002
	(0.503)	(0.843)	(0.808)	(0.951)
Number of siblings	-0.004	-0.000	-0.003	-0.005
	(0.728)	(0.985)	(0.811)	(0.696)
SAT	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Check If You'd Done Your Homework?	-0.079**	-0.057*	-0.083**	-0.073*
	(0.005)	(0.020)	(0.004)	(0.011)
Punish You For Bad Grades?	-0.073**	-0.088***	-0.075**	-0.086**
	(0.007)	(0.000)	(0.006)	(0.002)
Limit Your TV Watching?	-0.036	-0.024	-0.031	-0.032
	(0.163)	(0.302)	(0.226)	(0.205)
I don't want to embarrass my family.	-0.060*	-0.055*	-0.051*	-0.054*
	(0.014)	(0.016)	(0.037)	(0.026)

I need grades to get into graduate or professional school.		0.029 (0.247)		
Parental expectation—get good grades in college?		-0.031 (0.208)		
Parental expectation—go on to graduate school?		0.049 (0.056)		
College Fixed Effects	Y	Y	Y	N
Constant	0.148 (0.843)	1.829*** (0.000)	0.490 (0.486)	0.490 (0.486)
R^2	0.100	0.161	0.086	0.013
N	1047	1047	1047	1047

* Significant at 5 percent.
** Significant at 1 percent.
*** Significant at 0.1 percent.

TABLE 4
How Socioeconomic Factors Affect Students' SAT Scores?

	SAT
Asian (dummy)	22.18**
	(0.005)
Male (dummy)	47.14***
	(0.000)
Highest education in household	44.47***
	(0.000)
Household income	33.98**
	(0.001)
Number of siblings	-3.25
	(0.444)
Check If You'd Done Your Homework?	-21.38*
	(0.012)
Talk to Your Friends?	-29.50***
	(0.000)
Punish You For Bad Grades?	-36.52***
	(0.000)
Limit Your TV Watching?	-1.04
	(0.899)
Constant	1313.0***
	(0.000)
R^2	0.124
N	1047

* Significant at 5 percent.
** Significant at 1 percent.
*** Significant at 0.1 percent.

Section V. Conclusions

This study adds to the literature on the ethnic differences in the influences of parental beliefs and behaviors in several important ways. First, using a longitudinal study covering a large number of college students, I document clear cultural variations in parenting styles and parental attitudes toward college education. Consistent with previous research, Asian parents in this sample tend to have higher ratings on the level of strictness and emphasis on academic success than Caucasian parents. This pattern confirms that the traditional cultural values and characteristics, such as emphasis on hard work, filial piety, and academic success, as well as active parental involvement in the child's intellectual development, still have a remarkable impact in the shaping of parent-child interaction in Asian families in the present day. Not surprisingly, the trend of Asian students choosing natural science/engineering/mathematics majors over humanities/others still remains in these schools. This persistent phenomenon is closely related to parents' attitudes toward and intervention in children's selection of college majors and even career decisions. Asian parents, as compared to Caucasian parents, prefer their children to choose a "practical" area of study, which in a sociocultural context shared by the Asian group means natural science, engineering, mathematics, or other career-oriented majors.

Second, the structural Instrumental Variables (IV) model is suggestive of a strong causal relationship between study effort and graduation GPA. The positive effect of studying on college academic outcomes is very substantial according to the IV model in this paper. As significant determinants of study time, students' and parents' attitudes toward college performance, college major, and race indirectly affect college GPA through influencing study effort.

Parental expectations have a mixed indirect effect on academic performance. While emphasizing graduate study by parents increases college grades by raising students' amount of study time, parents' caring about GPA decreases students' study time. The latter finding is surprising given that previous research suggested a positive effect of parental emphasis on education on academic performance. It is possible that the direction of the effect changes as the child gets to college age. Apparently, when students have more control over their commitment to different activities, self-motivated students are more likely to make more effort to excel in college than those who need external disciplinary force. Meanwhile, a significant correlate of their study time is the emphasis on grades placed by students themselves, as those who value grades more make more effort in school.

The effect of college major on study effort is very notable in my empirical results. One of the reasons why Asian students on average study more than Caucasian students are that they are more likely to major in natural science/engineering/mathematics. These majors require more study hours in order to get the same outcome as other humanities or economics/social science/business majors because of the tougher grading criteria associated with these majors.

However, even after controlling for parental control measures, emphasis on education measures and college major, I still find that Asian college students spend more time studying than their Caucasian peers. Given that the parental control and parental beliefs items in this study are far from sufficient in capturing all dimensions of cultural background, it is important for future studies to include other indicators of strict parenting that can better explain the ethnicity effect on study effort.

Third, even though several findings in my study contribute to the current academic literature on similar topics, not all results can be generalized to a broader population. One of the strongest limitations is the sample bias of the NLSF data. Students who have low level of self-motivation and do not benefit academically from strict parental control are likely to be excluded from the sample due to the high admission standards of the 28 selective schools. Therefore, without a bigger sample covering a wider variety of colleges and universities and/or a legitimate measure of the omitted variable self-motivation, a firm conclusion on the actual nature and scale of the effect of strict parenting cannot be reached.

In summary, this thesis has demonstrated that there are ethnic differences in parental beliefs, parenting styles, selection of college majors. These factors determine students' college achievement either indirectly through influencing the amount of their study effort, or directly influencing their final GPA. Cultural variations in parental expectations and parental behaviors are found to distinguish Asian students from Caucasian students in their areas of study and effort. Although negative effects of strict parenting are found in this paper, it is important for future studies to explore the relationship between parental control and children's self-motivation, which is potentially an important determinant of college academic outcomes. In cross-cultural studies of the relation between parental influences and college academic achievement, it is important to recognize the cultural values and characteristics behind the differences in parent-child interaction among ethnic groups and their impact on students' academic development. The comparisons in this study have given readers some possible explanations of cultural variations in parenting, parental expectations, and college activities without suggesting any type of child rearing practices or college major/activity selection.

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Appendices

Appendix 1
National Longitudinal Study of Freshmen Sample Overview

List of Participating Institutions

Liberal Arts Colleges (9)
Barnard, Bryn Mawr, Denison University, Kenyon, Oberlin, Smith, Swarthmore, Wesleyan, Williams

Private Research Universities (14)
Columbia, Emory, Georgetown, Miami University (OH), Northwestern, Princeton, Rice, Stanford, Tufts, Tulane, University of Pennsylvania, Notre Dame, Washington University, Yale

Public Research Universities (4)
Penn State, University of California-Berkeley, University of Michigan-Ann Arbor, University of North Carolina-Chapel Hill

Historically Black Colleges (1)
Howard University

Sample and Sample Framing

According to the NLSF website:

"The institutions we chose to sample mirror those examined by Bowen and Bok (1998) in their College and Beyond Survey. Our principal modification was the addition of the University of California at Berkeley, which is not only a large and selective institution (currently rated as number one among public universities by US News and World Report), but also a school that recently abandoned its historical commitment to affirmative action (as a result of Proposition 209, which was approved by California's voters in 1995). The other modification was to include historically black colleges and universities.

We initially asked 35 schools to participate in the survey. The sample was stratified by the relative size of the black student body. Institutions with relatively large black student populations (1000+) were assigned a target sample size of 280 respondents (70 in each of four racial/ethnic groups); those with black student populations of 500-1,000 got a target size of 200 interviews (50 in each group); those with 100-500 black students had a target size of 80 respondents (20 in each group), and those with fewer than 100 black students were assigned a quota of 40 interviews (10 in each group). The historically black schools were given a target of 70 interviews per institution.

Although most schools were enthusiastic about participating, five schools declined the invitation outright (Duke, Vanderbilt, Wellesley, Hamilton, and Xavier). A major disappointment, however, was the response received from four historically black institutions we had targeted for study. Although only Xavier declined to participate outright, we were only able to secure a sample of freshmen in one historically black institution. Despite the fact that the Presidents of both Morehouse and Spelman agreed on behalf of their institutions to participate, the Registrars Offices at both colleges could not provide a list of freshmen from which we could draw a sample. This left only Howard University to represent historically black institutions.

The final institutional participation rate was 80%. The loss of seven institutions out of 35 cut our expected sample size from a planned 4,160 to only 3,550 students. To make up for the lost cases we increased the number of interviews conducted at other institutions. In all, we approached 4,573 respondents across 28 institutions. Of these, 3924 completed the survey, for an overall response rate of 86%, which by the standards of survey research is very high, particularly for a long (2+ hours) face-to-face interview that for all intents and purposes was unpaid (respondents received a token payment of $15 for participating). The final sample included 959 Asians, 998 whites, 1,051 African Americans, and 916 Latinos. In order to be eligible for inclusion in the sample, a respondent had to be enrolled at the institution in question as a first-time freshman and be a U.S. citizen or resident alien. Foreign and returning students were excluded from the sample."[vii]

Appendix 2
Detailed Classification of Family Income and Parental Education

Family Income	
1	Under $3,000
2	$3,000 - $3,999
3	$4,000 - $4,999
4	$5,000 - $5,999
5	$6,000 - $6,999
6	$7,000 - $7,999
7	$8,000 - $8,999
8	$9,000 - $14,999
9	$15,000 - $19,999
10	$20,000 - $24,999
11	$25,000 - $34,999
12	$35,000 - $49,999
13	$50,000 - $74,999
14	$75,000 OR MORE

Highest Educational Attainment in Household	
1	Grade School
2	Some High School
3	High School Graduate
4	Some College
5	College Graduate
6	Some Post-Graduate
7	Graduate Or Professional Degree

[vii] Retrieved from http://nlsf.princeton.edu/about.htm.

Appendix 3
Detailed College Major Classification

Major1 (Natural Science/Engineering/Mathematics)	Major2 (Social Science/Business)	Major3 (Humanities/Others)
Aerospace Engineering	Advertising /Public Relations	African-American Studies
Architecture	Business/Finance/ Accounting/Hotel Management	American Studies
Actuarial Science	Criminal Justice	Anthropology/ Classical Civilization/ Archaeology
Agriculture/Botany	Economics	Art/Art History/Fine Arts
Bio-Chemistry	Geography	Asian Studies
Bio-Engineering	Health/Health Care Policy	Communications/ Telecommunications
Biological Basis Of Behavior	Human Resource Management/ Management /Labor Industry/Organizational Leadership	Culinary Arts/Cooking
Biology	International Relations/Politics/ Diplomacy/Foreign Relations	Education
Chemical Engineering	Law/JD	English/English Literature
Chemistry	Marketing	Exercise/Sports Science/Kinesiology
Civil Engineering	Political Science/Public Policy/Government	Family Studies
Computer Science/Information Science/Computer Engineering	Psychology	Foreign Language
Electrical Engineering	Sociology/Social Science/Social Policy	General Studies
Engineering, Other or unspecified		History/Social Studies
Environmental Science/Engineering/ Policy/Ecology		Human Development Studies
Geology		Interdisciplinary Studies

Material Science		Journalism
Math/Statistics		Military Science
Mechanical Science		Music/Dance
Medicine		Philosophy
Neuroscience		Physical Therapy
Nursing		Radio/Television/ Film/Theatre/Drama
Occupational Therapy		Religion/Theology
Pharmacy		Rhetoric
Physics		Speech/ Pathology/ Linguistics/Language
Pre-dentistry/Dental/ Orthodontist		Symbolic Systems
Pre-Med		Urban Studies
Pre-Vet/Veterinary		Women's Studies/Feminist
Other Science		
Zoology/Wildlife Science		