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**SCHOOL-TO-WORK TRANSITION OF COLLEGE GRADUATES IN KOREA:
THE IMPACT OF HIGH SCHOOL TRACK ON COLLEGE PERFORMANCE AND
POST-COLLEGE OCCUPATIONAL OUTCOMES**

A Dissertation in
Workforce Education and Development

by
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ABSTRACT

This study aimed at examining the impacts of high school track on college performance and subsequent occupational outcomes after college graduation. To this end, the Korean Education and Employment Panel (KEEP) data from 2004 through 2010, including 4,000 samples of 12th graders as of 2004 from vocational and general high schools, were analyzed. The differences in the influence of the two high school tracks were also investigated to identify the effect of secondary vocational education.

Regarding college performance, a great gap was found between the two high school track graduates. Even though the majority of the high school graduates advanced to *some college*, considerably fewer samples from the vocational track chose two-year colleges rather than four-year colleges. They are significantly affected by their individual and family backgrounds in determining post-secondary education. In contrast, the graduates from general high schools were significantly influenced only by their academic records and educational aspiration when making a decision on college advancement. These results support the findings of previous research, asserting that students in the vocational track demonstrate lower self-efficacy and disadvantageous socio-economic circumstances in comparison with those in the general track.

High school track had significant relationships with college performance. The vocational high school graduates were less likely to enroll in four-year colleges, less likely to choose a temporary left during college education, and much less likely to complete four-year colleges than those from general high school. On the other hand, high school track did not influence *job relevance to college major* and *job correspondence to*

educational level, when those who were in first-paid employment after college graduation were analyzed. These results imply that high school track has short-term effects, but the impact does not last in the middle- or long-term after the cohorts complete their college education. One noticeable finding is that those who desired four-year college graduation, enrolled in four-year colleges, and chose a temporary stop of college attendance are less likely to be satisfied with their first-paid jobs.

The finding of this study—no differences in post-college occupational outcomes between the two high school track graduates—may suggest that a fundamental transformation of the policies regarding secondary vocational education is essential. The Korean secondary vocational education needs to change its goal from producing middle-level skilled labor to preparing a workforce with transferable knowledge and skills for pursuing some college education. This alteration will inevitably require integrating the vocational curriculum with the academic curriculum at the high school level. Further, given that 50% of the vocational high school graduates enrolled in two-year colleges and demonstrated more satisfaction with their jobs than their peers from general high schools, strengthening post-secondary vocational education could facilitate the college-to-work transition, thereby eventually reducing the high unemployment of college graduates.

With empirical evidence, this study contributes to a better understanding of the behaviors of the vocational high school graduates, with regard to their in-college and post-college outcomes. This study also suggests that differentiating the competencies of college graduates from both tracks could ensure the identity of secondary vocational education. In addition, the findings of the study support that expediting the college-to-work transition should be the goal of the Korean secondary vocational education.

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Chapter 1

Introduction

Historical Perspective

Secondary vocational education is being challenged by the vehement demands of the *skills-employability* paradigm (Gray & Herr, 1998). The rapid social, economic, and technological transformation throughout the world has been requiring fundamental changes in the nature of vocational education and training (VET; Tilak, 2002). Within the past few decades, the main purpose of vocational education at the secondary level has shifted from preparation for immediate entry to the *secondary labor market* to education for higher-skilled occupational opportunities, which is commonly called a change “from vocational education to career technical education” (Offenstein, Moore, & Shulock, 2009, p.2). The occupational status once obtainable with a high school diploma now entails some sort of postsecondary level of education or training (Venezia & Kirst, 2005), and there is a consensus that without a college degree, the access to prestigious status in the occupational world has become implausible (Tinto, 1987). Currently, *education beyond high school* or at least *some college education* is considered as a requisite for the young workforce (Fletcher, 2009; Huges & Karp, 2006; Klein & Green, 2012; Venezia & Kirst, 2005).

Accordingly, today’s career and technical education (CTE) is required to play a dual role of “readying participants for both postsecondary matriculation and career success” (Klein & Green, 2012, p. 130) by providing a seamless transition to postsecondary education. The Organization for Economic Co-operation and Development (OECD) recommended that VET systems in OECD countries should provide generic and transferrable skills to enhance the adaptability and flexibility of the young workforce,

emphasizing that “Many of those now participating in upper secondary vocational programmes do not expect to enter the labour market directly, but instead go on to post-secondary and tertiary education. Vocational programmes at (the) upper secondary level (have) come to fill a dual role” (OECD, 2011, p. 8). In many countries, secondary vocational education is no longer only for *non-college bound* students, such as female or racial minorities, physically or socioeconomically disadvantaged students, and those who possessed lower academic performance (Dow, 2002). For example, in the U. S., the recently reauthorized *Carl D. Perkins Career and Technical Education Improvement Act of 2006* (Perkins Act of 2006 or Perkins IV) renamed *vocational and technical education* to *career and technical education* and removed the limitation, “other than careers requiring a baccalaureate, master’s, or doctoral degree,” in its definition (P. L. 109-270, Section 3[5]). These changes are appraised as a demonstration of the possibility of combining college and career preparation (Bailey & Merritt, 1997). In 2009, President Obama, in his report to Congress, encouraged “every American to commit to at least one year or more of higher education or career training. . . . Whatever the training may be, every American will need to get more than a high school diploma” (Klein & Green, 2012, pp. 123-124).

In Korea, secondary vocational education is getting unattractive to its clientele, and interestingly, the majority of students in secondary vocational track already advance to college instead of entering directly to the labor market (Byun & Kim, 2012; Jung, Jeon, Hong, Lee, & Lee, 2009; Jung, et al., 2004). Originally, secondary vocational education in Korea functioned as an ultimate education for producing a middle level of the professional workforce during the 1960s through the 1980s (Chae, Lim, Chae, & Jung,

2011). In the 1950s, the current secondary vocational education was shaped as 3-year vocational high school education. The two tracks in high school, vocational and academic, systemized a separate operation with different curriculum, drawing dissimilar trajectories in the early 1960s: vocational high school for direct employment and general high school for college advancement. Under this separate system, secondary VET greatly contributed to the nation's phenomenal economic growth along with the nation's industrialization during this period (Chae & Chung, 2009; Kim, 2001; Korea Research Institute for Vocational Education and Training, 1999).

In the mid-1980s, Korea's secondary vocational education confronted new environments: the introduction of the *standardization policy* for high school education and the drastic expansion of college education. Along with the philosophy of "education to develop an integral and balanced human being" (Kim, 2001, p. 4), the traditional secondary VET system, which is disconnected from the academic track, has been no longer able to respond successfully to the shift from a labor-intensive economy to a technology-intensive or knowledge-intensive economy. Furthermore, with traditional reverence for academic knowledge (Jeong, 1995), the negative social attitude toward manual work and traditional inclination for white-color jobs caused secondary vocational schools to have continuously been regarded as a *second-level track* or *second-class education* for those who are academically less competent to advance to college (Chae & Chung, 2009; Grubb, 1985; Tilak, 2002). Failing to recruit high academic achievers from middle school caused secondary vocational schools to experience "losing its effectiveness" (Kim, 2001, p. 14). What is worse is that the overall shrinkage of the school-aged population has led the secondary VET enrollment to decline since the 1990s. Among the

total high school enrollment, 38.2% was for vocational high schools in 1990, but 23% in 2011 (Ministry of Education, Science & Technology, 2012).

In contrast, the number of students advancing to higher education has been increasing regardless of their secondary education tracks. Currently, the majority of vocational high school graduates enroll in college instead of choosing direct entry to the labor market. The vocational high school graduates who enrolled in college first outnumbered those who were employed after graduation in 2003 (Byun & Kim, 2012). In 2010, while 19.2% of vocational high school graduates were employed, 71.1% of them matriculated in college, which is just 10% lower than that of general high school graduates (Byun & Kim, 2012). Jung et al. (2004) reported that 78.2% of teachers in a vocational high school perceived the primary purpose of their program was both employment and higher education, and most of the students desired further study after high school graduation. This phenomenon provoked the controversy surrounding *over education* which results in the high youth unemployment (Goodman, Hatakenake, & Kim, 2009; Kim, Ryoo, Han, Lee, & Jang, 2010; Ryoo, Um, Kim, & Kim, 2012) and relatively low *education premium* of college education compared with those of OECD countries (Kuczera, Kis, & Wurzburg, 2009). As a result, the transition from college to work has been one of the hottest issues since the late 1990s (Kim et al., 2010).

The Problem

Intertwined with the strong educational aspiration and drastic expansion of college enrollment, secondary vocational education in Korea has been confronting several challenges. First, the tendency of vocational high school graduates to choose college education related to their secondary vocational studies (Jung et al., 2009) blurs

the boundaries between the general and vocational education in high school and causes *evading vocational education* or the *identity crisis* of secondary vocational education (Byun & Kim, 2012; Chae & Chung, 2009; Park et al., 2003). Furthermore, due to the growing vocationalism in universities (Grubb & Lazerson, 2009), the traditional postsecondary VET institutions have difficulties differentiating themselves from university education (Chae & Chung, 2009; Grubb, 2006). Therefore, two-year colleges have been losing their “competitive edge” as a postsecondary level of vocational education institution (Goodman et al., 2009, p. 1).

Second, there is the question of whether the demand for secondary vocational education actually exists or not. Regardless of the continuous arguments on the effects of secondary vocational education (Arum & Shavit, 1995; Bishop & Mane, 2004; Fletcher, 2009; Gray, 2004; Lewis & Cheng, 2006; Mane, 1999; Meer, 2007; Rojewski & Yang, 1997), at the very point when Korean students make a decision on general or vocational high school, they choose the vocational track not so much because of their aptitude but mainly because of their academic records in middle school (Jung et al., 2004; Jung & Lee, 2005). Like parents in other countries, Korean parents strongly desire “their children to go to college . . . to prepare for and enter a career or well-paying job” (Scott & Sarkees-Wircenski, 2008, p. 7, as cited in Fletcher, 2009). This negative social culture toward vocational education deepens the identity crisis of the secondary vocational education (Park et al., 2003). Moreover, with the extension of extra-quota in college admission for vocational high school graduates since 2008, vocational high school is often exploited as an advantageous way for college admission in order to circumvent severe competition with general high school students (Byun & Kim, 2012).

Third, high youth unemployment has become a serious problem in OECD countries (Quintini, Martin, & Martin, 2007). Especially, Korea has suffered a severe problem with the oversupply of college graduates. Along with the great social interest on college graduates' transition to the world of work, over-education has been an issue in Korea since the 1990s. Whereas the average youth employment rate is 40% in OECD countries, in Korea, it is 23%, and 10% of the youth are estimated to be underemployed (Kim et al., 2010). Especially, the youth unemployment problem in Korea is serious because most of them are college or university graduates (Kim et al., 2010). This oversupply of university graduates resulted from the drastic expansion of higher education since the 1980s has reduced the signal effect of a college degree and casted a doubt on the quality and job relevance of university education. It is projected that 42% of college graduates are oversupplied, and as a result, the economic loss for them to defer entering into the labor market is evaluated as 1.0% of Gross Domestic Product of Korea (Ryoo et al., 2012). The unemployed youth were estimated to 730,000 in 2010, but among the college graduates, there is difficulty to identify the youth from vocational high school and their dropout and unemployment status (Choi & Kim, 2012).

Lastly, given the high college enrollment rate among the graduates from vocational high school, there should have been investigations on their college performance and the subsequent journey of career paths. Despite the agreement that vocational high school students should also be given a mutually merged preparation for college and occupation relevant to their career objectives (Park, Baek, Chang, Choi, & Kim, 2010), little is known about their college performance and post-college outcomes in the labor market, especially from a longitudinal perspective. Most studies about

vocational-track students have been focused on their direct entry to the occupational world after high school or two-year college completion. In addition, research about college graduates' transition to work has mainly explored the factors determining their employment and the solutions to improve the transition without differentiating whether their secondary educational track was academic or vocational (Kim et al., 2010). That is, the occupational outcomes of college graduates considering their secondary curriculum tracks have yet to be disputed.

Purpose of the Study

The purpose of this research was to determine the effects of the high school track upon its graduates' college performance and subsequent post-college occupational outcomes. Comparing the outcomes of the graduates from general high school and vocational high school, this study sought to recognize the influences of the two tracks on their college performance and subsequent post-college occupational outcomes. In addition, the differences in factors determining the *college-to-work transition* between the two track graduates were analyzed.

Significance of the Study

Higher education has rapidly expanded since World War II throughout the world. As Trow (2007) explained, higher education has evolved "from elite to mass to universal access" (p. 1). Expanded higher education has brought vocationalism into university education. In America, 79.9% of college freshmen answered "the very important reason" for "deciding to go to college" was "to be able to get a better job" and 77.0% answered "to be able to make more money" (Dey, Astin, & Korn, 1991, p. 62). From the perspective of human capital theory, more schooling improves the quality of the

workforce. On the other hand, there is doubt about the increasing human capital by means of college education, referred to as the “naïve human capital perspective” (Grubb, 2002a, p. 299) or *education gospel* (Grubb, 2005; Grubb & Lazerson, 2009).

No matter which side of the arguments serves the unique situation of Korea’s secondary and postsecondary education, the solution to the forementioned problems is believed to be found by accepting their demand for college or university education. Junget al. (2004) asserted that “However, it is impossible, if not inappropriate, to prevent this from happening. It is more advisable to accept this occurrence and to assist the highly educated to develop their vocational competencies” (p. 32). This attitude may avoid their becoming *another forgotten half* who shows low achievements in college and after college completion (Chae & Chung, 2009). Further, the high demand of higher education among vocational high school graduates does not need to be necessarily negative (Byun & Kim, 2012), but can be seen as a condition of producing a highly-skilled workforce is already satisfied. The problem is how to facilitate smooth transitions to work appropriate to their educational level and skills. This approach is also aligned with the current trend of CTE focusing on preparing students for college education as well as a life-long career, along with the *new vocationalism* emphasizing integration of academic and vocational education (Benson, 1997; Bragg, 2001; Dow, 2002; Grubb, 1996a; Grubb, 1996b).

Therefore, it is crucial to understand how the high school graduates from the vocational track move to college, what they accomplish in college, and what outcomes they achieve after college completion. Despite the ongoing increase in college enrollment among vocational high school graduates, there has been little research on how they adapt themselves to college life and what policies are necessary to support (Lim & Kim, 2006).

An examination of the influence of high school tracks on college performance and post-college occupational outcomes is necessary to ascertain the contribution of secondary vocational education and its combined effects with college education to occupational attainments. Especially, an analysis of longitudinal data could provide support for identifying the differences and gaps in educational and occupational attainments between the two high school tracks with regard to college education.

The results are expected to be helpful not only to individual decision making but also national policy making by reaffirming or modifying the mission of secondary vocational education and reorienting students to relevant education. Further, systemizing the vocational education relevantly responding to demand may contribute to enhancing college-to-work transition and accordingly reduce the high unemployment of college graduates. The results of this research could be useful in the policy making of other countries that try to encourage students in the vocational track to enroll in postsecondary education.

Research Questions

1. To what extent does high school track, vocational vs. general, influence college performance?
2. To what extent does high school track, vocational vs. general, influence post-college occupational outcomes?
3. To what extent do high school track and college performance influence post-college occupational outcomes?

Limitations

Given some features of the data utilized in this study, there are several limitations to be acknowledged. First, to serve the purpose of this study, the Korean Education and Employment Panel (KEEP) survey data, a longitudinal dataset designed to investigate the Korean youth's school-to-work transition, was analyzed. Given the longitudinal survey data, this research is inevitably observational and ex post facto, in which independent factors cannot be deliberately manipulated by researchers (Fraenkel & Wallen, 2006; Shadish, Cook, & Campbell, 2002). Consequently, in comparison to experimental or quasi-experimental research, it might have less compelling support in uncovering causal relationships between the predictors and outcome variables.

Second, although the sample of the data used in this study were randomly selected so as not to have systematic differences in respondents' characteristics, selection issues related to confounding factors may arise. There may be preexisting differences between the students of vocational high school and general high school, leading to some difficulties in estimating the causal effects of high school tracks and thus threatening the internal validity of the research (Shadish et al., 2002). This study addressed this issue by engaging a rigorous set of controls in its regression models, including gender, prior academic achievement, educational aspiration, career awareness, parental educational level, and household income. Yet, to a certain extent, it necessarily involves unknown confounding factors so that the interpretation of the results of the analysis should carefully proceed. For example, a considerable number of male cohorts in the sample may still stay at an incomplete status in colleges due to the compulsory military-service

system in Korea, resulting in a probable distortion of the causal relationships between the predictors and the outcome variables.

Third, as a consequence of self-reported measures, the KEEP data has inherent restrictions on reliability of the measurement: Participants tend to reflect positivity by conveying what they regard as desirable responses (Shadish et al., 2002). In this study, this limitation is applicable to the variables regarding one's own belief or opinion, such as *career awareness* and *educational aspiration*. In addition, the information on the respondents' academic achievement in high school was drawn from their responses to the corresponding items, which may be less convincing than the exact scores drawn from the transcript data.

Fourth, the sample and data do not exactly reflect the subgroup proportion of the target population. The KEEP survey recruited the same number of 12th graders from general and vocational high schools (2,000:2,000), albeit the real student proportion is 77:23 (Ministry of Education, Science & Technology, 2012). In addition, as a longitudinal survey, the KEEP data inevitably contains unsystematic attrition and missing data, which may cause less confidence in inferring the results directly to the target population as well as threat internal validity (Shadish et al., 2002).

Lastly, utilizing the multiple regression method as the major analytic methodology, this study may contain multicollinearity issues among the independent variables. High correlation between predictors may reduce the valid predictability of individual predictors, even if the entire set of predictors included in a regression model can still indicate how well it can predict the outcome variables. Another limitation may be the use of listwise deletion, rather than alternative methods that can address missing data.

Definition of Terms

The key terms used in this research are defined below.

Vocational education: Vocational education has been referred to as “education in all forms and kinds which promotes the change of work-related human behavior” (Kim, 2001, p.1). This includes both preparation for an occupational transition and overall education for better performance in the workplace (Chae et al., 2011). The discussion of this research was restricted to secondary and postsecondary levels of education, especially vocational high schools and two- or four-year colleges.

Vocational education and training (VET): Education and training aiming at students or workers to be prepared for employment or successfully carrying out their jobs in the workplace with necessary skills, knowledge, and attitude (Kim, 2001).

High school track: Educational tracking is defined in two forms: *curriculum tracking* and *ability grouping* (Okes, 1987; Rosenbaum, 1980). Curriculum tracking indicates classifying students into different curricula sequences, leading them mostly to the college-prep, vocational, and general track. Ability grouping is implemented by assigning students aligned with their levels of academic abilities (Okes, 1987), which commonly happens in math, English, and science classes. This paper discusses high school track concerning curriculum tracking: General high school and vocational high school are regarded as the two separate high school tracks.

General high school: The most representative formal education institution providing the upper secondary level of academic courses in Korea, mostly aimed to prepare students for college entrance exams (Lee & Jung, 2005).

Vocational high school: The typical secondary vocational education institution in Korea, offering high-school-level of basic academic education as well as occupation-specialized education (Chae & Chung, 2009). Currently, the upper secondary level of VET lasts three years in vocational high school. The vocational high schools offer six different disciplines: agricultural, technical, commercial, fishery & marine, home economics, and comprehensive high school (Ministry of Education, Science & Technology, 2012).

School-to-work transition: Referring to the process of preparing for an occupation while in schooling and achieving employment after the formal schooling (Jung et al., 2004). Whereas this term usually indicates the process of attaining jobs after high school graduation, in this study, it refers to entering the real world of work after completing two- or four-year college education: That is called *college-to-work transition*.

College: A postsecondary education institution administrating two- or three-year courses, or four- or six-year courses (Ministry of Education, Science & Technology, 2012).

College performance: The academic and social attainments during one's college attendance (Lim & Kim, 2006). This study examined three factors related to college performance: college enrollment including type of colleges, stopout and completion.

College stopout: Experience of taking a temporary leave of absence from college (Lim, 2011).

Post-college occupational outcomes: An individual's occupation-related consequences after college graduation, such as employment status, wages, or the quality

of jobs (Chae & Chung, 2009). In this study, job-relevance to major and job-correspondence to one's educational level were selected as outcomes.

Assumptions

The assumptions underlying this study are as follows:

First, this study assumed that the current expansion of college education reflects the *high-skills/high-wage* paradigm (Gray & Herr, 1998). The paradigm implies the needs of some college education to attain an advantageous status in the labor market.

Second, based on the previous studies, it is assumed that students in vocational high schools are characterized with the relatively lower academic achievement, lower socioeconomic status, lower parents' education level, less family income, and less support from parents, when compared with general high school students (Bae, Kim, & Kim, 2011; Byun & Kim, 2012; Jang, 2007; Kim & Ryu, 2008). In assessing the impacts of high school tracks, these factors were selected as control so as to exclude the influence of confounding variables.

Third, based on the previous findings, the graduates of vocational high school are assumed to be situated in an inferior status to choose higher education even after controlling the individual attributes and family background (Byun & Kim, 2012; Chae, 2006; Kim & Phang, 2005), which leads to a lower status in employment and wages after college graduation. This is the reason why this study tried to examine other factors (job-relevance to major and correspondence to education level) as dependent variables instead of employment and wages.

Conceptual Framework

Figure 1.1 illustrates the conceptual framework guiding the entire study designed to address the three research questions mentioned above. Research Question 1 aims to estimate the relationship between high school track and college performance. Previous research has found that gender, parents' educational level, household income, educational aspiration, career awareness, and academic performance in high school are the most determining factors of their college attendance and persistence (Adelman, 2006; Calcagno, Crosta, Bailey, & Jenkins, 2006; Choi, 2009; Choi, 2010; Moore & Schulock, 2009), and the high school curriculum track is also related to college attendance, retention, and completion (Byun & Kim, 2012; Kim, 2008; Lim & Kim, 2006; Swail, Perna, & Redd, 2003). Referring to these studies, college performance is represented by three variables: enrollment including type of colleges, stopout experience, and completion.

Research Question 2 is expected to assess the predictability of high school tracks on post-college occupational outcomes. Whereas there are substantial studies on economic returns of vocational education (Arum & Shavit, 1995; Bailey, Kienzl, & Marcotte, 2004; Baum, Ma, Payea, 2010; Belfield & Bailey, 2011; Bishop & Mane, 2004; Chae & Chung, 2009; Compton, Laanan, Starobin, 2010; Fletcher, 2009; Grubb, 1995; Grubb, 2002a; Grubb, 2002b; Meer, 2007; Silverberg, Warner, Fond, & Goodwin, 2004), very limited findings are suggested on job relevance to college major and job correspondence to the respondents' educational level (Lee, Kim, Yoon, & Ko, 2008). This study attempted to ascertain how much these two variables are related to high school track.

Research Question 3 is intended to explore the impacts of high school tracks on post-college occupational outcomes when the track factor is combined with college performance. Again, since there are very limited studies about the integrated influence of secondary vocational education and college education on post-college performance (Chae & Chung, 2009; Lee et al., 2008), this study is expected to reveal the combined impact of secondary school tracks and college education.

On the other hand, a great deal of studies found that individual attributes and family background are closely related to a student's involvement in the vocational track, college enrollment, completion, and transition to work (Byun & Kim, 2012; Chae, 2006; Choi, 2009; Kim & Shin, 2010; Lim, 2011; Park, 2011; Swail et al., 2003). To control the influence of these factors, this study included a rigorous set of the respondents' demographic and socio-economic background variables, such as gender, academic achievement in high school, educational aspiration, career awareness, parental educational level, and household income.

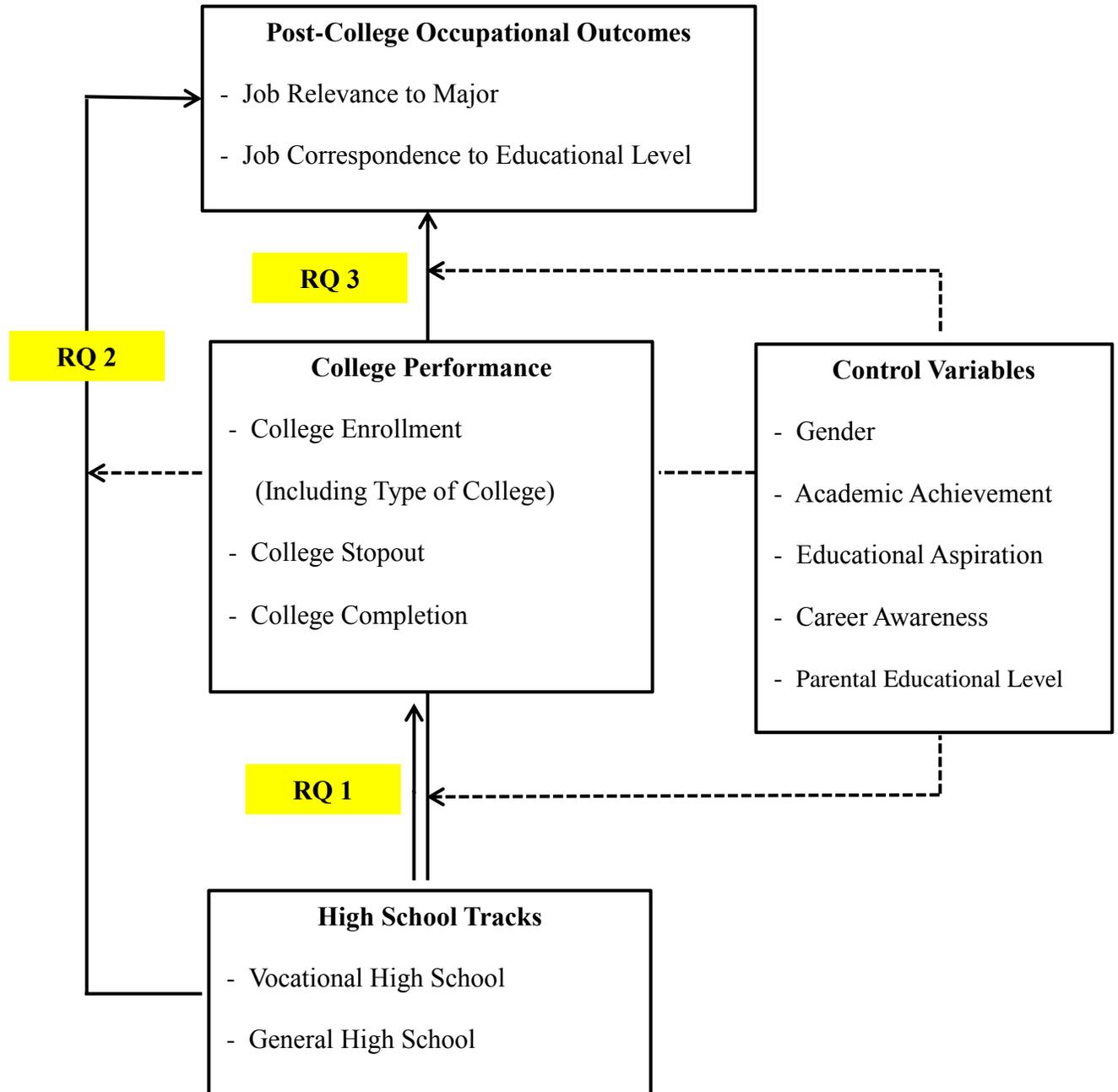


Figure 1. Landscape of the Study.

Chapter 2

Review of Related Literature

The purpose of this study was to examine the effects of the high school track upon its clients' college performance and post-college occupational outcomes and ultimately to identify the benefits of secondary vocational education by exploring the differences in those outcomes from two high school tracks. For in-depth understanding of each research component, the following related literature was reviewed: (a) the history, current situation, and challenges of secondary vocational education in Korea, (b) the philosophical basis and determinants of high school curriculum tracking, (c) the college attendance, retention and completion of general and vocational high school graduates, (d) the issues and factors on transition to work after college graduation, and (e) the effects of secondary vocational education including the related theories.

Overview of Secondary Vocational Education in Korea

Since formally established in the 1950s, Korea's secondary vocational education has developed as one of the main education systems producing the workforce necessary for the nation's economic growth. However, since the 1990s, the decrease in enrollment in vocational high schools and the increase in college attendance among the graduates have caused a crisis of its identity. Along with this challenge, vocational high schools have been required to facilitate students' transition to postsecondary education for highly-skilled manpower.

Brief history. The formal vocational education of Korea dates back to the early 19th century and was limited to areas such as agriculture, fisheries, or commerce. In the 1950s, as the nation established a linear 6-year (elementary school), 3-year (middle

school), 3-year (high school), and 4-year (college or university) schooling system, vocational high schools came to be a type of upper-secondary education providing vocational programs for three years. In this period, vocational high schools emerged as a main source to educate the skilled workforce with an emphasis on *one skill a person* (Kim, 2001).

Korea's vocational education made a remarkable development during the 1960s and 1970s, when the government's initiative for the nation's economic growth began in earnest (Kim, 2001; Korea Research Institute for Vocational Education and Training, 1999). The governmental supports and curriculum revisions along with the related enactments helped establish new vocational high schools, institutionalize national qualification tests, enlarge vocational programs to new areas, and educate teachers qualified for the new programs. In addition, the attractive measures to recruit talented students, such as the exemption from obligatory military service and the privileges for college entrance, were systematically introduced. In this period, secondary vocational education was designed primarily to train the labor force equipped with necessary skills for the nation's industrialization. Thus, secondary vocational education in Korea raised a middle-level skilled workforce for the manufacturing-oriented industry until the 1980s (Chae et al., 2011) and played a pivotal role for the nation's dramatic economic development (Chae & Chung, 2009; Kim, 2001; Korea Research Institute for Vocational Education and Training, 1999).

Meanwhile, the nation's economy shifted from a labor-intensive structure toward a technology-oriented scheme in the 1980s, and there were increasing demands for a highly skilled workforce suitable for the knowledge-based economy and globalization. High

school vocational education came to be recognized as incompetent and inflexible for the new paradigm. In addition, the implementation of the *high-school-equalization* policy moved the focus of high school education to general education which emphasized educating generic skills to raise mature citizens. This policy, which has been in effect since 1974 to lessen the severe competition for the high school entrance exam and the great disparity in students' academic achievement among schools, abolished schools' own entrance exam and implemented automatic student placement according to their residence. In addition, the deepening mismatch between studies in vocational high schools and the demands of the labor market also required the Korean government to reform its secondary vocational education (Chae et al., 2011).

In the 1990s, the public responses were the various efforts to provide seamless occupational education and career development opportunities at the secondary and postsecondary levels. Vocational high schools were renamed *specialized vocational high schools*, and the *2+1 program* (two years of study in high school and one year of on-the-job training in industry) was introduced in technical high schools. The *articulation program* (linking the second and third years of vocational high school curriculum and two years of postsecondary vocational curriculum) and the *customized education program* (which was provided in vocational colleges, reflecting the industry's real demands on the curriculum) were implemented in cooperation with colleges/universities and the business sector (Jung et al., 2004). To encourage selected students to enroll in vocational high schools, in 2004 the Korean government introduced the special-college admission test for students in vocational high school (Kim & Lee, 2003) and in 2008 renamed *vocational high schools* as *professional high schools* (Kuczera et al., 2009).

Current status. In Korea, vocational education and training (VET) is considered job-related training and education: upper secondary and postsecondary level of education, and vocational training for employed and unemployed adults (Kuczera et al., 2009). Currently, the upper secondary level of VET lasts three years in vocational high school. The vocational high schools offer six different disciplines: agricultural, technical, commercial, fishery & marine, home economics, and comprehensive high school (Ministry of Education, Science & Technology, 2012). Unlike those for general high school, vocational high school students may apply to the schools they wish to attend, and admission is decided mainly by the student's academic performance in middle school, or by the school's own entrance exam, or by both (Sandefur & Park, 2007).

The first year of study is taught according to the National Common Basic Curriculum, which is exactly same as that of general high school. The second and third years are committed to the specific vocational curriculum for each discipline (Kim et al., 2010). As of 2011, there were 689 vocational high schools, which were 23% of all high schools, and about 300,000 students, 23% of all high school students, attended vocational high schools (Ministry of Education, Science & Technology, 2012). The completion rate of vocational high school students, 91% in 2008, is the world highest (Kuczera et al., 2009).

Along with the technology advance and the drastic expansion of higher education, vocational education at the secondary level is expected to be responsible not only for specialized-occupational skills but also for nurturing future human resources able to contend with the rapid technology and knowledge development. While 8.3% of vocational high school students enrolled in colleges in 1990, the rate jumped up to 42.0%

in 2000 and 63.7% in 2011 (Ministry of Education, Science & Technology , 2012).

Whether secondary vocational education should focus on employment or postsecondary education became controversial in the mid-1990s (Lee et al., 2008), and the sweeping increase of college enrollments among vocational high school graduates accelerated the controversy on this issue.

Consequently, the main purpose of secondary vocational education shifted from ultimate education for an occupation to continuous education for postsecondary and life-long education (Chae, 2006; Lee et al., 2008). In this regard, secondary vocational education is no longer for *education about occupations* but *education for occupations*, which is compatible with the idea of Dewey and the new vocationalism (Dow, 2002). In 1996, the convert of secondary vocational education to the life-long education paradigm was formally recommended to the Korean government (Lee et al., 2008).

Accordingly, the Korean government has emphasized the integration of academic and vocational education, the reinforcement of basic occupational learning, and the smooth transition to postsecondary level of occupational education (Lee et al., 2008). Privileges for college admission were reinforced, and the distinctive college-entrance exam only for vocational high schoolers was introduced. Incentives and subsidies to encourage employees' participation in vocational education were also institutionalized (Chae et al., 2011). Currently, the secondary vocational education of Korea is characterized as "fairly general," emphasizing generic skills and moral discipline (Tilak, 2002, p. 7), and "the focus of VET has already been shifting from secondary VET to postsecondary VET in the initial VET" (Kim, Ryu, Oh, Lee, & Woo, 2010, p. 1).

Challenges. Korean secondary vocational education has served as an effective solution to reduce youth unemployment, raise the respect of manual work, and supply middle-level skilled laborers for the nation's economic growth just like those of many developed countries. Yet, secondary vocational education has been weakening by the traditional favor of general education for college admission and the recognition that a high school diploma is no longer sufficient in the workplace. The decrease of student population exacerbates this issue. In contrast to the falling enrollment at the secondary-level vocational track, postsecondary vocational education, which is mainly provided by junior colleges running two or three-year programs leading to an associate degree, has expanded rapidly since the 1990s and currently accommodates nearly one-third of the students at the postsecondary level (Kuczera et al., 2009).

A recent OECD report about the postsecondary VET of Korea identified the three megatrends Korea is confronting: (a) the growing demand for the high-level skilled and creative human resource in the labor market, (b) the increasing enrollment in higher education and the subsequent oversupply of college graduates, and (c) the persistently declining birth rates across the country (Kim et al., 2010). As of 2009, 22 out of 100 students who finished their middle school enter vocational high school, and 17 out of these 22 students enter 2 or 4-year colleges after they leave high school. This trend is interpreted as a result of the tendency of Korean society: "People tend to consider (an) academic degree as a means to exchange their ability with a better job in the labor market" (Kim et al., 2010, p. 103).

Educational Tracks in High School

Educational track is defined in two forms: *curriculum tracking* and *ability grouping* (Okes, 1987; Rosenbaum, 1980). This paper discusses high school tracks concerning curriculum track. The Korean vocational high school provides a separate track from general high school, but the high-school-equalization policy and drastic expansion of college enrollment prompted the transformation of vocational high school to focus on academic learning rather than occupational education (Kim et al., 2010). Studies agree that demographic backgrounds and academic performance in middle school are the most influential factors locating students on the vocational track.

Philosophical basis of high school tracks. The philosophical dispute on whether or not to separate vocational education from general education can be dated back to the early 1900s in the U. S., the era of Prosser and Dewey, before the enactment of the Smith-Hughes Act of 1917 (Barabsch & Rauner, 2012). Charles Prosser, greatly influenced by David Snedden, who was a proponent of social efficiency, believed that public education should play a primary role in developing human capital for the industrial society (Gordon, 2003; Kantor, 1986). Prosser asserted that having a track of vocational education separate from that of traditional academic education, which influenced the enactment of the Smith-Hughes Act of 1917, contributed to establishing a dual secondary education system in the U. S.

Meanwhile, John Dewey emphasized that vocational education should prompt the improvement of learning, criticizing that the dual school system could offer the common people a narrowly occupation-specialized education within the industrial mechanism (Gordon, 2003). Dewey advocated combining the system of public high school education

with vocational education and letting professional educators control the system (Gray & Herr, 1998). According to Dewey, vocational education should be incorporated into general education to subscribe to *learning by doing*: “Education through occupations meant for Dewey an activity that engages the intellect in reflection upon actual practical activity—the shared practices of the community that are the roots of human learning” (Wirth, 1992, p.182, as cited in Castellan, Stringfield, & Stone, 2003, p. 245).

Similarly, whether to choose standardization or stratification in public education has long been a controversy, referred to as “the extent and form of tracking that is pervasive in the educational system” (Shavit & Müller, 2000, p. 443). Germany and Switzerland are considered to have a highly stratified system with several characteristics: (a) students make a decision on the separate tracks in their early ages, (b) there are big curricular differences in each track, (c) students are highly likely to continue their secondary educational field at the tertiary level, and (d) the shift between the tracks are inflexible (Shavit & Müller, 2000). In contrast, the Korean vocational education system is relatively close to a standardization system based on the following features:(a) equity is highly valued, (b) generic skills are emphasized, (c) the differentiated curriculum starts quite late (in the 11th grade), and (d) there is a huge weight on the college-preparatory track (Kim, 2001; Tilak, 2002). Nonetheless, the secondary vocational education of Korea is not exactly integrated with academic education, and has been regarded as *second-class education* for those who are not as competitive as college-preparing students (Chae & Chung, 2009), just like in the U.S. However, while the U. S. vocational education is provided in comprehensive high schools as a track of curriculum sequence or a pattern of course-taking (Levesque et al., 2008), in Korea, vocational high schools exist

as a disconnected track from general high schools, having their own recruitment process and running differentiated curriculum for a separate career trajectory. This system was established in the 1950s with the basic school system of six years of elementary school, three years of middle school, and three years of high school.

As the Korean society became democratized in the 1980s, equity in educational opportunity became the most important value. The high-school-equalization policy in the mid-1980s and the dramatic expansion of college enrollment since the 1990s resulted in emphasizing academic learning at the high school level (Kim et al., 2010). Social efforts were made to include the liberal features as well as academic rigors in secondary vocational education and also to facilitate transition to postsecondary education (Brand, 2003; Kazis, 2005, Lewis & Cheng, 2006), which can be summarized as *new vocationalism*: the reaction to the social demand for making public education more pertinent to job-related preparation and more contributing to the nation's economy (Grubb, 1996a). This notion is compatible with Dewey's idea that opposed limiting the young workforce to a distinctive track of vocational education and thus narrowing their opportunities (Grubb, 1996a). That is, Dewey provided a prominent philosophical basis to the new spirit drawing the public attention back to the academic mainstream and emphasizing basic academic skills instead of specific occupational skills (Lewis & Cheng, 2006).

Determinants and effects of high school tracks. There has been substantial research on the factors influencing students' track placements and their consequences. It has been concluded that two factors are the most decisive: a student's ability and his/her demographic background (Ainsworth & Roscigno, 2005; Fletcher, 2009; Lewis & Cheng,

2006; Okes, 1987; Rosenbaum, 1980; Vanfossen, Jones, & Spade, 1987). It has also been found that tracking placement is moderately related to course takings and academic performance (Vanfossen et al., 1987), and grouping students by their ability will lessen the diversity of their needs (Rosenbaum, 1980). Some scholars concluded that the high school tracking decision is made based on three major components: curriculum structure, school culture, and individual actions within the culture and structure (Okes & Guiton, 1995). In contrast, Ainsworth and Roscigno (2005) asserted that gender, race, and social class significantly affect vocational educational placement regardless of prior achievement, and vocational placement even increases the probability of dropout and substantially reduces the enrollment in postsecondary education.

Lewis and Cheng (2006) analyzed the dataset of the National Center for Educational Statistics (NCES) to find out the high school principals' perception toward the vocational education. With 665 samples, the researchers investigated what the vocational education content in high schools was from the principals' point of view, and what factors predicted the track assignment among college-prep, general, and vocational students. They also explored the variables influencing the principals' expectation concerning the career paths of graduates, such as two or four-year college, and employment. In regard to the content, the findings indicated that the principals were greatly concerned about the basic academic skills such as reading, writing, math, and science as the vocational programs, which the researchers interpreted to indicate that "new vocationalism ideas factor into the curriculum thinking of principals" (Lewis & Cheng, 2006, p. 90). The results of multinomial regression analysis also indicated that students' tracking and the principals' expectation were significantly influenced by the

students' demographic factors such as ethnicity and socioeconomic backgrounds. The vocational track was a more practical option rather than the academic track for the schools in rural areas, the ethnic minorities, and students in surroundings of poverty. These demographic factors also significantly predicted the principals' expectation about the probable destination of their high school graduates.

In accordance with these findings, Fletcher (2009) investigated to what extent demographic variables of gender, ethnicity, and socio-economic status (SES) are related to the high school curriculum track. The results from the analysis of the National Longitudinal Survey of Youth 1997 dataset found that females were 1.5 times more expected to choose the college-preparatory track and less likely to choose the dual track than males. Compared with non-black/non-Hispanic students, black students showed a higher likelihood of CTE track participation. Those from a higher household income and with fathers having college-level education were highly likely to be involved in the college-preparatory track.

Researchers have been interested in the effects of school tracking on students' learning. Okes (1987) conducted a profound study on secondary school tracking from a contextual perspective. The study sought the inquiry as to why secondary school tracking has been persisting as a way to work on student diversity despite the substantial amount of empirical evidence proving that it is ineffective and even detrimental. According to the study, there are two primary assumptions for school practitioners: tracking enhances students' achievement and mitigates emotional negativity toward learning. However, the author argued that a bulk of evidence does not support the extensively held belief. Okes noted that some tracking systems turned out to be effective on cognitive development of

high-level ability groups, yet the result is not consistent throughout other educational tracking systems. Rather, Okes argued that tracking systems perform consistently to impede the learning of students not in the highest groups: “Tracking is most often found to work to the academic detriment of students who are placed in low-ability classes or non- college-preparatory groups” (p.134). Correspondingly, Hallinan and Kubitschek (1999) analyzed the National Education Longitudinal Study survey and found that tracking positively affects the learning achievements of the students placed in academic tracks or high-ability groups, but negatively influences those in vocational tracks or lower-ability groups.

These findings are compatible with those about the Korean high school students in vocational tracks. It is generally accepted that compared with general high school students, students in vocational high schools are characterized with the relatively lower SES, lower parents’ education level, less family income, and less support from parents (Bae et al., 2011; Byun & Kim, 2012; Jang, 2007; Kim & Ryu, 2008; Park, Jung, & Kim, 2009). Regarding their career awareness, however, studies have presented incompatible findings: Some research found that students in vocational high schools demonstrate relatively higher career awareness and more likelihood to make their career choices in an early stage (Oh, Bae, Lee, & Jang, 2010; Yoon, Lee, & Kim, 2005), but other studies suggested they possess less maturity of career decision and lower quality of career aspiration compared with those in general high schools (Lim & Kim, 2006). Bae et al. (2011) compared 135 students involved in general, vocational, and Meister high schools (a special kind of vocational high school in Korea) and confirmed that students in vocational high schools had less sense of belonging to school and less satisfaction with

school life than those in general high school. However, when it comes to the school classes and guidance counseling, they hold higher awareness than general high school students (Bae et al., 2011).

Nonetheless, in Korea, the most dominant factor affecting the decision of choosing a general or vocational high school is known as the student's academic records when they were in middle school (Jung et al., 2004; Lee & Jung, 2005; Park et al., 2009). Lee and Jung (2005) analyzed the first round survey of KEEP, which included 4,000 senior-year students from general and vocational high schools in 2004. The results demonstrated that compared with the vocational high school students, those in general high schools were more interested in school classes and had higher educational aspiration. Moreover, more students in general high schools responded that they had a role model. A total of 42.7% of the students in the vocational track selected the academic records in middle school as the reason to choose vocational high school. Jung et al.(2004) surveyed 504 teachers in 81 vocational high schools, and among the respondents, 49.3% answered that "students made these choices based on their previous academic records," and 30.3% replied "because the program seemed to be suited to their aptitude, interest, and learning capacity" (pp. 73-74). Park et al. (2009) asserted that vocational high schools have been struggling with the difficulties in recruiting selected applicants. According to the researchers, vocational high school students hold noticeably a lower degree of academic achievement than their peers in general high schools: "In the national-scale assessment on academic performance, most vocational high school students belong to the category of *below basic level*" (Park et al., 2009, p. 150).

College Performance

Studies have found that students in the vocational track have lower aspiration for college attendance (Stone & Aliga, 2005), and fewer advance to four-year colleges than those in the general education track (Byun & Kim, 2012). In general, gender, parents' educational level, household income, educational aspiration, career awareness, and academic performance are known as the most determining factors of their college attendance and persistence (Adelman, 2006; Calcagno et al., 2006; Choi, 2009; Choi, 2010; Moore & Schulock, 2009).

College enrollment. Postsecondary education has not been a typical choice for high school students involved in the vocational track. As a result, researchers have tried to verify the influence of being involved in vocational programs on the students' educational aspiration (Alfeld, Hansen, Aragon, & Stone, 2006; Harnish & Lynch, 2005; Rojewski, 1997; Stone & Aliga, 2005). Most research agrees that students who participated in the CTE track in high school have lower educational aspiration than those in the general and college-preparatory track.

Recently in Korea, college attendance of vocational high school graduates has been investigated with regard to their career pathways. Most research found that household income and parental education level are the most influential factors (Byun & Kim, 2012; Chae, 2006; Choi, 2009; Kim & Shin, 2010). However, in comparison to students of general high schools, those in the vocational track are still situated in the inferior status to choose higher education even after controlling these factors (Byun & Kim, 2012; Chae, 2006; Kim & Phang, 2005). Through an analysis of the KEEP dataset, which includes the vocational high school students who were 12th graders as of 2004,

Byun and Kim (2012) found that 43.7% of them attended 2-year colleges and 19.9% 4-year colleges, while 20.2% and 65.5% of those from general high schools attended 2- and 4-year colleges, respectively.

Choi (2009) analyzed the KEEP datasets of 2004 and 2007 to figure out the determinants on the high school-to-college transition of vocational high school students. The review of the 2004 data found that the following factors significantly influence the college enrollment of vocational high school graduates: gender, parents' educational level, household income, parents' educational aspiration for their children, private education experience, students' self-efficacy, and their perception of a career goal. This tendency was similar to that of the 2007 dataset. However, differently from the 2004 survey, the 2007 dataset demonstrated the decrease of the influence of these factors. Rather, the factors related to school and school work, such as attitude toward school teachers and perception of their aptitude, turned out to be substantially related to their college attendance. For example, a student aware of his/her aptitude had 1.91 times more likelihood to plan for college attendance than others did. Overall, in vocational high schools, the students' aspiration for college attendance increased as they advanced to the 12th grade. When they were in the 10th grade, 61.1% of them pursued college attendance, but 66.2% in the 11th grade, and 69.5% in 12th grade. On the other hand, the students seeking direct employment after graduation decreased to 21.2% in the 10th grade, 20.5% in the 11th grade, and 16.9% in the 12th grade. Concluding that this change indicates that there has been a qualitative change in their career decision process, the author suggested that proper support is necessary for them to experience the appropriate career guidance.

Byun and Kim (2012) also scrutinized the KEEP dataset from the 2005 through 2011 surveys to determine the factors predicting college attendance of vocational high school graduates. With the factors of socioeconomic background, personal characteristics, and school characteristics, the study examined their influence on direct employment and two-year and four-year college attendance. The study found that household income and private tutoring expenditure are positively related to college attendance, as well as parents' educational level and the educational expectation for their children. Overall, the socio-economic background explains 12% of the probability of college advancement. After adding the personal characteristics, 27% more probability was explained. If a student is male with higher academic achievement, educational aspiration, no discipline experience in school, and less work experience in school years, he/she is more likely to attend college. On the other hand, the school characteristics were not proven as significant determinants on their college advancement.

A study on the sequential career patterns of general and vocational high school graduates was recently conducted with 4,000 graduates from vocational high school and general high school graduates, employing the optimal matching method to identify their sequential career paths from 2004 through 2010 (Choi & Kim, 2012). After clustering the graduates' career paths, the researchers found a difference in their career patterns: While the general high school graduates were found to be (a) floundering after high school graduation, (b) attending college, (c) working after college graduation, or (d) floundering after college graduation, the graduates of vocational high school had one more pattern: a mixed status of attending college and being in an unknown situation.

College retention and completion. College retention (or persistence) and completion have been substantially studied as a topic of college attrition because college attrition has been of major concern in the U. S. higher education. In particular, college persistence is related to the genuine accessibility to higher education for minority students: In the year of 1995-96, less than 50% of Hispanic and African American students who had enrolled in 4-year colleges attained a bachelor's degree within 6 years, whereas 67% and 72% of White and Asian students did in the same period of time, respectively (Swail et al., 2003). The college completion rates vary across the type of colleges: According to the College Board (Baum et al. 2010), in 2002, among first- and full-time students enrolled in four-year colleges, 57% of them completed their studies within 6 years (65% at private non-profit, 22% at private profit, and 55% at public, institutions).

Stratton, O'Toole, and Wetzel (2008) studied the differences in college students' dropout and stopout behaviors. Assuming that the less-than-one year of stopout and more-than-one year of dropout have different reasons, they conducted an analysis on the 1990 Beginning Postsecondary Survey and finally verified the differences. According to the study, 40% of the first-year attrition fell under stopout. Further, deferred registration, financial aid in the first year, and students' marital and parental situations predicted different types of behaviors related to college retention. Work-study aid reduced the probability of dropout more than other types of financial aid, and grant receivers were most likely to enroll continuously. By distinguishing the differences, the researchers asserted that policy-makers need to address these behaviors with differentiated approaches.

In Korea, whereas more than 80% of high school graduates choose college advancement, 22.4% of them suspend their attendance and 4% dropout of their school (Kim, 2008). The biggest reason is known to be the compulsory military service, and that is why male students are more likely to suspend their attendance more than female students, and higher household income and higher parental education level predict the higher probability to leave or transfer their studies (Kim, 2008; Choi, 2010). Moore and Shulock (2009) pointed out that college completion is strongly related to academic preparation in high schools, college enrollment shortly after high school graduation, and full-time students. Interpreting that these factors indicate “traditional students are more successful” (p. 3), the authors emphasized developing policies to foster non-traditional students (Moore & Shulock, 2009).

In addition to demographic characteristics, college persistence is related to various other determinants: academic preparedness, campus climate, educational goals and the institution’s commitment to the goals, and social and academic integration into the college environment (Swail et al., 2003). Kim (1999) asserted that college dropout is often caused by social inequality, such as a family’s SES, race, or teachers’ discriminating responses. Economic situations and the labor market condition are also regarded as factors affecting college dropout, emphasizing the importance of financial aids and grants (Ishitani & Desjardins, 2002). Chu, Cha, and Pyo (2011) recently explored the factors affecting college students’ stopout, focusing on institutional variables of college and academic performance as well as demographic factors and socio-economic backgrounds. The findings confirmed that GPA and satisfaction with college choices are significantly related to students’ stopout. Moreover, professors’ advice and

the location of colleges are statistically significant to predict students' stopout (Chu et al., 2011). Further, Lee and Lim (2011) found that gender, grade, parental career guidance in high school, and support of colleges positively impact college students' academic achievement through an analysis of the factors influencing the college lives of freshmen and junior students, using the third and fifth follow-up survey of KEEP.

Lim (2011) examined the relationship between high school track and college retention. Lim followed 1,778 samples of 12th grade students from 2004 through 2009 based on the KEEP longitudinal survey. To exclude the case of stopout or dropout due to military service, the research restricted the sample only to female students. Like the findings of previous research, stopout or dropout of college attendance were found to be associated with fathers' educational level, household income, students' high school grades, satisfaction with college and major, and attitude toward academics. Interestingly, the study categorized the reasons for leaving or college absence into positive reasons and negative ones: The positive group included preparation for certificates or studying abroad, and transfer to higher-ranked colleges, and the negative reasons contained economic reasons, physical or mental problems, and difficulties in academic work, among others. The analysis confirmed that in four-year colleges, students from vocational high school were more likely to continue without stopout and to choose stopout or dropout for negative reasons than those from general high schools. In two-year colleges, there was no statistically significant difference between the high school types. The findings indicate that parental education level, low academic performance, and graduation from general high school, and four-year colleges in metropolitan areas have positive relationships with stop-out for the positive reasons.

Other studies also found that the high school curriculum track is related to college retention and completion (Kim, 2008; Lim & Kim, 2006; Swail et al., 2003). Kim (2008) identified that students from vocational high schools are associated with higher stopout rates, and four-year college students are more likely to leave their colleges than two-year college students. Almost uniquely, Lim and Kim (2006) compared the college lives of students from vocational high schools and general high schools. With regard to academic achievement, the analysis on the transcripts from 10 universities indicated that, on average, students from vocational high schools had a lower GPA than those from general high schools. The gap became bigger in colleges located in non-metropolitan areas. Moreover, students from the vocational track had less positive attitude toward academic work and studied less than their peers from the general track. The temporary absence rate among vocational high school graduates was higher than that of general high school graduates. Most of the vocational-track students experienced difficulties in basic academics, such as Korean language, mathematics, and English. On the other hand, there was no difference in having good relationships with their friends and satisfaction in the overall college lives. Compared with those from general high schools, the findings demonstrated that students involved in vocational high schools perceived their aptitude less than general high school graduates, and had less clear career goals and lower self-efficacy (Lim & Kim, 2006).

School-to-Work Transition

In this paper, school-to-work transition indicates the transition from college education to the real world of work. Like other OECD countries, Korea has suffered from high youth unemployment since the late 1990s, which is mainly the result from over

education at the college level. To facilitate a smooth transition, studies have found that demographic characteristics, individual abilities and job-preparation, college majors and GPA, and high school track are primary determinants (Jung & Lee, 2005; Kim et al., 2010; Lee et al., 2008; Park, 2011).

Definition of school-to-work transition. Workforce education has two missions: (a) to enhance the individual opportunity for jobs in the labor market and (b) to promote a country's competitiveness by increasing productivity of its workforce (Gary & Herr, 1998). School-to-work transition is located in between the two missions like a bridge. If the bridge successfully connects both sides, youth can smoothly move to the labor market without floundering and wasting several years after graduation due to unemployment or job-mismatch. For a nation, the future to compete in a global market will not be jeopardized by a poorly skilled young workforce and their mismatch between what they learned and what they will do.

According to Stone (1992), school-to-work transition was traditionally referred to as “the movement between the end of formal, secondary or postsecondary education and the acquisition of an entry-level job related to the vocational program; or the continuation of job-related training and education” (p. 7, as cited in Smith & Rojewski, 1993). A modification has added the preparation and acquisition of skills necessary for career paths as well as for entry into the labor market (Stone, 1992, as cited in Smith & Rojewski, 1993). In the Korean context, school-to-work transition is referred to as “searching for career paths in primary and junior high schools, preparing for employment while in high school and colleges/universities, achieving employment after completion of schooling and participating in continuing education and/or training as a worker” (Jung et al., 2004,

p. 13). In this paper, school-to-work transition is referred to as transition to the real world of work after college/university graduation.

Issues on school-to-work transition. As high youth unemployment has become a serious problem in OECD countries (Quintini et al., 2007), establishing the well-lined education system with job requirements within global competition, especially at the tertiary level, has been an issue (Grubb & Lazerson, 2009). As of 2011, in Korea, there are 183 universities with 4-year undergraduate programs and 146 junior colleges with 2- or 3-year programs (Ministry of Education, Science & Technology, 2012).

Meanwhile, the oversupply of university graduates due to the drastic expansion of higher education since the 1980s has reduced the signal effect of a college degree and has cast doubt on the quality and job relevance of university education. It is projected that 42% of college graduates are oversupplied, and 10% of the youth are estimated to be underemployed (Kim et al., 2010), and as a result, the economic loss for them to defer entering the labor market is evaluated as 1.0% of the Gross Domestic Product of Korea (Ryoo et al., 2012). This problem has triggered a great deal of social interest in college graduates' transition to work (Kim et al., 2010). However, among the college graduates, there is difficulty in identifying the youth from vocational high school and their dropout and unemployment status (Choi & Kim, 2012).

In 2009, the Korea Research Institute for Vocational Education and Training conducted comprehensive research on university graduates' transition to work to figure out the solution to the high youth unemployment rate (Kim et al., 2010). According to the research, the oversupply of university graduates started in 1994. Kim et al. asserted that from the perspective of the human capital theory, this oversupply is explained by the high

expectation of economic rewards for a college degree, low interest rate, and low psychological cost of college graduation. Further, the research interpreted that the signal effect of a college degree has become to be generally accepted even in the supply side.

However, the problem is that the number of the very decent jobs everyone desires, such as those in large-scale enterprises, financial business, or the public sector, has not increased as much as that of university graduates. This is the reason why it is generally found that people who have a higher level of educational background suffer more difficulties in employment than those possessing lower educational careers: this situation would be worse as the number of university graduates keeps increasing in the future (Kim et al., 2010). Moreover, almost 40% of university graduates felt a mismatch between their jobs and their studies in the universities (Kim et al., 2010).

Factors affecting college-to-work transition. School-to-work transition cannot be approached with a single model. A noticeable change is that the job-applicants' schooling level has been elevated, and the transition takes much more time than before (Bird et al., 2000). In general, demographic characteristics, individual abilities and job-preparation, and college majors and GPA are expected to influence the employment of college graduates.

In Korea, it is generally found that gender, major, and the National Scholastic Ability Test (Korean SAT) score have significant effects on college graduates' employment (Kim & Ryu, 2011). Jung and Lee (2005) reported that college GPA is a crucial factor for employment in large companies. In addition, individual variables, such as household income and types of high school, and college characteristics, such as the ranking of a college, are found to impact college graduates' employment (Park, 2011).

Interestingly, college graduates from vocational high schools have a stronger tendency to be unemployed or underemployed, which implicates that the drastic expansion of higher education is not sufficiently associated with the appropriate occupational placements in the labor market (Park, 2011).

Through analyzing the Graduates Occupational Movement Survey of Korea Employment Information Service, Kim et al. (2010) also found that individual efforts for spec-piling are over-heated, reducing the effects on job acquirement or career development. On the other hand, it was found that there are many graduates choosing reentry into postsecondary vocational education institutes. For example, in 2009, 17.3% of the junior college enrollment was 2- or 4-year college graduates. This reentry indicates that university education is not job-relevant enough to satisfy the students or industry (Kim et al., 2010).

What is important is that the students involved in vocational high school choose their college majors more related to their high school studies (Kim et al, 2010). The male graduates from the suburbs tended to choose more job-related majors in college instead of academic majors, while their socio-economic backgrounds did not significantly influence their decisions on college majors. It is also found that college majors greatly affected wages: for four-year colleges, the graduates majoring in medical science, education, engineering, and social science were found to earn higher wages. Moreover, graduates from the universities in and around the Seoul metropolitan area were more likely to receive higher wages (Kim et al., 2010).

Lee et al., (2008) examined the career path of vocational high school students, analyzing 5,270 college students who graduated from vocational high schools. Eighty-

seven percent of them enrolled in junior colleges, while 12.8% in four-year universities, with no significant difference in gender. Compared with the college students from general high school, more students from the vocational track answered *vision for their future jobs* for the reason of college advancement. With regard to the reason for choosing their majors, more vocational track students responded that it was the *relevance and vision for employment* than the general track students. Nevertheless, the students from vocational high schools were relatively less likely to have a clear career goal than those from general high schools, and even if they had a goal, the general track students were more likely to achieve career development toward their goals during their college education (Lee et al., 2008).

Effects of Secondary Vocational Education

Vocational effect can be defined as the influence on the successful high school-to-work transition of a student involved in a secondary vocational program (Iannelli & Raffe, 2007). Research has provided conflicting results on the returns of participation in the vocational (CTE) track compared with the general or college-prep track: (a) The secondary vocational track is not effective on the long-term social and economic rewards (Lewis & Cheng, 2006; Rojewski & Yang, 1997), and (b) those who participated in CTE show higher earnings than those from the general track, and CTE is effective in reducing the high school dropout rate (Arum & Shavit, 1995; Bishop & Mane, 2004; Fletcher, 2009; Gray, 2004; Mane, 1999; Meer, 2007; Silverberg et al., 2004).

Regarding the occupational outcomes of college education, the general consensus is that the higher level of education leads to higher economic rewards (Bailey et al., 2004; Baum et al., 2010; Belfield & Bailey, 2011; Campton et al., 2010; Fletcher, 2009; Grubb,

1995; Grubb, 2002a; Grubb, 2002b). However, the findings on the post-college occupational outcomes of vocational high school graduates are conflicting (Chae & Chung, 2009; Lee et al., 2008).

Theoretical analysis of vocational effect

Human capital theory. To conceptualize vocational effect, the following theories are most commonly employed: human capital theory, signaling theory, network theory, and sociological contradiction theory. Human capital theory approaches education as a way of piling up human capital, rooted in the work of British economists, Adam Smith, John Stuart Mill, and Alfred Marshall, during the 1880s and 1890s and developed extensively in the 20th century by American economists, Milton Friedman, Jacob Mincer, Theodore Schultz, and Gary Becker. Becker, a Nobel-prized pioneer in the study of human capital, regarded intangible expenditure in education, training, and medical care as capital: “Economists regard expenditures on education, training, medical care, and so on as investments in *human capital* . . . because people cannot be separated from their knowledge, skills, health, or values” (Becker, 1993, p. 1).

Believing that human capital is inseparably incorporated in people, human capital theory assumes that education improves the economic productivity of human beings, and through the improved productivity, economic wealth will be rewarded to individuals as well as nations. The theory also believes that the best way to stock capital in people is education, suggesting that individuals and society invest in people. Mincer (1958) insisted that “Years of work foregone to pursue education were rationally compensated with higher earnings” (as cited in Sweetland, 1996, p. 345). The theory assumes that a perfectly rational human invests in human capital, which involves both direct costs and

costs in foregone earnings. Workers tend to use a cost-benefit analysis to determine whether investing in education is worth the time, money, and effort. The cost and benefits include the value of training costs and deferred consumption, as well as the attractiveness of future income and consumption streams.

This approach has been used to explain occupational wage differentials. Further, the theory ascribes youth school-to-work transition to individual competency or defectiveness (Rosenbaum, Kariya, Settersten, & Maier, 1990). If an individual fails to possess appropriate academic or occupational skills, this results in ineffectiveness in the entry to the labor market and occupational wage differentials. Thus, from this point of view, secondary vocational education plays a role in providing knowledge and skills demanded in the labor market and may improve the young workforce's human capital and consequently enhance their employability. Further, it has functioned as a conventional wisdom that highly-skilled individuals are less likely to be unemployed and more likely to be employed for highly-waged jobs, which reminds us of the *skills-employability* paradigm (Gary & Herr, 1998). It has also promoted the international development of workforce education in the 1980s and motivated investments in vocational and technical education. In the U. S., the School-to Work Transition Opportunity Act of 1994 was designed with this concept, focusing on investment in education and learning for non-college bound students (Stern, Finkelstein, Stone, Latting, & Dornsife, 1994).

However, some key concepts of human capital theory, such as future income, are difficult to be measured and have been criticized for the reason that not all investments in education guarantee increased income or advanced performance (Grubb, 2002a).

Sociologists criticize human capital theory for assuming perfect competition, perfect information, and free access to the information (Dobbs, Sun, & Roberts, 2008). In reality, sociologists argue, competitions in market have established barriers, information is restricted, and accessibility to the information requires cost. Individuals make decisions within the limitations of imperfect information and incomplete rationality. Consequently, instead of fair rewards from one's investment, people could obtain distorted results by bounded rationality and market imperfection.

Signaling theory. On the other hand, signaling theory hypothesizes that employers hire workers under uncertainty and imperfect information (Spence, 2002). From this perspective, information and the cost of getting good information matter. However, due to the cost of the true information about job-applicants, employers make decisions grounded on obtainable signals (Spence, 2002). In other words, assuming that the potential productivity through schooling is unobservable, a diploma or credentials serve as a signal, which matters as a criterion to be screened by potential employers (Dobb et al., 2008). This theory focuses on specific skills obtained by on-the-job training because “formal education is only a device for screening individuals’ productivity” (Dobb et al., 2008, p. 796).

However, even though signaling theory employs the market mechanism, the theory fails to explain the differences in various kinds of signals: Which signals are most influential with regard to employers’ decision and how those signals are gathered and transmitted (Rosenbaum et al., 1990). Rosenbaum et al. (1990) argued that from signaling theory, employers rely on *statistical discrimination* based on past experience. Further, the study pointed out that the theory overlooks normative restrictions on age, gender, and

race: “These signals have traditionally been influential in hiring decisions” (Rosenbaum et al., 1990, p. 272).

Despite these limitations, some questions on school-to-work transition may be explained by the *signal effect*: What the very signals employers want, whether job-applicants consider the signals for their job preparation, and whether both of them match or mismatch each other. On the other hand, the theory may indicate negative effects of secondary vocational education: “vocational graduates may be stigmatized by employers as less able or less motivated than academic graduates” (Iannelli & Raffe, 2007, p. 49).

In enlargement of signaling theory, *statistical discrimination theory* focuses on the lack of information employers hold. Since there is the deficiency in information about job-applicants, employers rely on statistical estimation on certain demographic groups or visible features that workers possess. Biased by this stereotypical statistics, employers may label individuals and make decisions based on the statistical discrimination (Hwang & Baek, 2008). From this perspective, individual characteristics play an important role in employment, which is prejudiced by the average of the group in which an individual is involved.

Network theory. Disputing that the theories employing market mechanism fail to take into account the social context where signaling originates, Rosenbaum et al. (1990) suggested network theory, assuming that information is conveyed via social networks as well as market mechanisms. Instead of personal networks, the theory put more stress on institutional linkages and trustful context between employers and schools. Since employers are interdependent, if the *good will* is built, employers trust the signals that schools produce (Rosenbaum et al., 1990). Poor school-to-work transition is explained by

the mistrust in the information of the supply-side, and that is why research has revealed that employers do not trust school grades (Rosenbaum et al., 1990).

Network theory contributed to understanding the reasons why employers use or do not use some signals. According to the theory, there exist structurally psychological mechanisms in between the labor market and schools. Which criteria are chosen is decided by this invisible mechanism, and this social belief influences the function of signals. The theory also implicates that if vocational education supports the opportunities for students to access the linkages of employers and schools, secondary vocational education may have positive effect on their school-to-work transition (Iannelli & Raffe, 2007).

Sociological contradiction theory. From the sociological perspective, secondary vocational education has both negative and positive aspects. Fundamentally, secondary vocational education reproduces the lower occupational status embedded in the established social stratification (Hotchkiss & Borrow, 1990). Students involved in vocational education are offered restricted curriculum and less likely to select advanced academic courses by less competitive teachers (Arum & Shavit, 1995). The self-awareness of lower-track students dampens their motivation and ends up making them possess lower occupational aspiration that reflects their gender, ethnicity, or socioeconomic background, which is biased by the social discriminative expectation (Rojewski & Yang, 1997). Attendance in secondary vocational programs prevents the young workforce from experiencing an opportunity for higher education and accessing the more decent occupations, and consequently, more likely leads them to be placed in the lower track of occupational stratification (Shavit & Müller, 2000). In this perspective,

the involvement in secondary vocational education may be interpreted as a negative signal of lower ability, ethnical minority, or inferior status of social class (Shavit & Williams, 1985).

On the other hand, proponents of secondary vocational education argue that the effect of secondary vocational education may be positive: It may help reduce the probability of students' dropping out of high school and increase the chance of their finding employment after graduation (Iannelli & Raffe, 2007; Shavit & Müller, 2000). In this regard, secondary vocational programs play the role of a social *safety net* (Arum & Shavit, 1995). These proponents disagree that the effect of secondary vocational education is judged by the students' academic skills and college attendance, or entering prestigious occupations. Instead, they argue that "it should be evaluated by the extent to which it helps these students avoid unemployment and increases their chances of becoming skilled (versus unskilled) workers" (Arum & Shavit, 1995, p. 188).

From a sociological point of view, *labor market segmentation theory* also contrasts to the free-competition assumption and argues that the labor market is partly functioned by non-market institutions. According to this point of view, the labor market is segmented into the primary and secondary labor markets: The former is characterized by high wages and high stability of employment, and the latter by low wages and unstable employment (Hwang & Baek, 2008). The differences between the two markets are structurally established, and engagement in each market and the subsequent differences in wages are not explained by the individuals' characteristics (Bauder, 2006). Further, the shift between the two different markets is quite difficult (Bauder, 2006).

Outcomes of secondary vocational education. While some researchers cast doubt on the long-term social and economic rewards of secondary vocational education (Lewis & Cheng, 2006; Rojewski & Yang, 1997), the proponents assert that high school graduates who participated in CTE show higher earnings than those from the general track, and CTE is effective in reducing the dropout and unemployment rates and increases the completion rate (Arum & Shavit, 1995; Bishop & Mane, 2004; Fletcher, 2009; Mane, 1999; Meer, 2007; Silverberg et al., 2004).

Arum and Shavit (1995) advocated secondary vocational education, referring to it as a *safety net* which diminishes “the risk of falling to the bottom of the labor queue” (p. 187). In the research, Arum and Shavit tried to reassess the effects of secondary vocational education with respect to students’ employment status and occupational achievements. A thorough investigation on whether students in the vocational track get benefits or whether they are simply on the social exclusion mechanism was attempted, using the High School and Beyond data from 1980 through 1986. The findings indicated that compared with the general track, the CTE programs positively affected employment chances, especially the skilled-class employment chance for male students. In addition, other things being equal, vocational programs significantly reduce unemployment and unskilled-level employment. Further, when it is compared with the general track, the vocational track does not impede the probability of enrollment in college. However, Arum and Shavit concluded that the most effective curriculum is the dual track combining vocational and academic programs, showing significantly positive influence on employment and college attendance.

The National Assessment of Vocational Education found that among those intensively involved in CTE programs in high school, the so-called *occupational concentrators*, 18% of the students enrolled in postsecondary education for a baccalaureate degree, and CTE students increasingly took academic courses compared with a decade ago (Silverberg et al., 2004). However, the gap between the occupational concentrators and non-concentrators still existed. Nevertheless, studies have failed to find evidence that secondary CTE courses contributed to improving students' academic performance in their high school or college enrollment (Silverberg et al., 2004). Rather, research has indicated that high school CTE students were less likely to complete a bachelor's degree course but more likely to complete an associate degree or certificate course (Silverberg et al., 2004). With regard to economic returns, CTE programs were shown to be effective in short-term (one year after graduation) and mid-term (seven years after graduation) earnings at the secondary as well as postsecondary education levels (Silverberg et al., 2004). For example, seven years after high school graduation, the benefit of taking one CTE course was 2% more earnings, which was estimated to be \$450. However, these benefits decreased over time, and the results were mixed on the students who did not enroll in higher education (Silverberg et al., 2004).

Bishop and Mane (2004) tried an international assessment of the impact of high school CTE programs in the high school labor market with regard to completion and afterward earnings. Through an analysis of cross-sectional data, it was found that school attendance rates and completion rates in the nations with higher proportions of secondary vocational school population were significantly higher than those in other countries. With regard to earnings, they found that after controlling attitudes, ability, family background,

and college attendance, involvement in vocational programs for one-sixth of the high school period returned at least 12% more earnings one year after graduation and 8% seven years later. These results were consistent regardless of students' advancing to postsecondary education or not (Bishop & Mane, 2004)

Arguing the idea that high school vocational education is obsolete and plays a role as a *dead-end path* for those who are not likely to attend college, Meer (2007) investigated the economic returns of secondary vocational education by analyzing The National Education Longitudinal Survey of 1988. When Meer divided the vocational track into the technical and business tracks and compared the counterfactual log incomes, it was found that students in the technical track were not more likely to get higher earnings. However, those in a general or non-college preparatory track were more likely to get the economic benefits when they chose the technical education programs. Mentioning that vocational programs in high school have been proven to be effective in preventing dropout, the researcher emphasized that “vocational education should not be stigmatized as a lesser or demeaning option” (Meer, 2007, p. 572).

Fletcher (2009) examined the influence of high school curriculum track on occupational earnings. The results of analyzing the National Longitudinal Survey of Youth 1997 data demonstrated that the curriculum tracks in high school significantly predicted the occupational earnings after high school completion. Compared with their general-track peers, the participants in the CTE track, dual track, and college-preparatory track were significantly likely to have higher earnings.

Research has also examined the influence of being involved in CTE programs on students' career awareness or educational aspiration. Kosine and Lewis (2008) reviewed

the literature on the effects of CTE participation from the perspective of career development theory. They concluded that being involved in CTE programs enhances students' self-efficacy and career awareness. What is interesting is that CTE participation in high school increased the students' readiness of college preparation as well as clearer career goals: Tech prep and career academies also had positive effects on intentional career development (Kosine & Lewis, 2008).

In the research analyzing the National Longitudinal Survey of Youth 1997 transcript and survey data, Stone and Aliga (2005) investigated the relationship between participation in high school CTE/school-to-work programs and education aspiration for a bachelor's degree as well as academic achievement in high school. Four high school curriculum tracks were identified by the authors: general track, academic track, CTE track, and dual concentration track combining academic and CTE tracks. As a result from the analysis, a positive association between the participation in school-to-work programs and academic course-taking was found. However, it was also found that compared with general and academic concentrators, CTE and dual concentrators had lower expectations about four-year college completion (Stone & Aliga, 2005).

In Korea, there are restricted findings on the effects of secondary vocational education, presenting conflicting consequences. Recently, Lee et al. (2008) investigated the percentage of sustaining employment status of high school graduates, utilizing the six-year longitudinal surveys provided by the Korea Employment Information Service. The results presented that for general high school graduates, the percentage of those remaining employed increased every year: Once employed in the first year, 81.3% of the graduates from general high schools remained employed in the second year, and 88.4%,

86.0%, 89.8%, and 91.9% in the consecutive years. It was found that vocational high school graduates retained an employment status generally higher than those from general high schools even though the difference was not very significant: 88.5%, 89.1%, 84.0%, 91.9%, and 88.1%.

On the other hand, Chae and Chung (2009) compared the occupational outcomes of general and vocational high school graduates in Korea with the purpose of verifying the effects of high school vocational education. To that end, they analyzed two longitudinal datasets of the Youth Panel Survey of the Korea Employment Information Service and the Korean Education and Employment Panel (KEEP). Results showed that compared with non-college bound general high school graduates, graduates in the vocational track were not likely to be more employed than those in the general track, showing a 59.6% and 58.5% employment rate respectively. The logistic analysis indicated that male or older graduates have significantly higher probability of employment. Further, whereas household income significantly influenced high school graduates' employment, high school type and fathers' educational level did not. Moreover, with regard to wages, the graduates in the non-college bound general track showed 10% more earnings than vocational track graduates, even though the difference was not statistically significant. Despite the limitation that graduates from general high schools possess different characteristics from those of vocational high school the researchers concluded that the current Korean high school vocational education does not succeed in producing an occupationally competitive workforce or facilitating school-to-work transition (Chae & Chung, 2009).

Occupational outcomes of college graduates. Economic return is a dominant reason for an individual to choose college education. Despite the limitations of human capital theory, the general consensus is that the higher level of education leads to higher economic rewards (Bailey et al., 2004; Baum et al., 2010; Belfield & Bailey, 2011; Compton et al., 2010; Fletcher, 2009; Grubb, 1995; Grubb, 2002a; Grubb, 2002b). Recently, the College Board reported that in 2008, the gap of median earnings between individuals with a bachelor's degree and with a high school diploma was \$21,900, and, among those aged 20 to 24, college graduates were 2.6 times more likely to be employed than high school completers (Baum et al., 2010). Moreover, it was reported that these financial gaps in earnings increased over time (Baum et al., 2010).

Evidence on the economic rewards of college education has been reported. The combinational influences of students' demographic characteristics, program of study, and degree completion on earnings were explored with the samples of several designated career clusters in community colleges: information technology, business, and marketing (Compton et al., 2010). The study confirmed that gender is the most influential factor on earnings in all the three clusters: Women earn less than men. However, according to the degree completion, the impacts varied: The increase in the earnings of females with associate degrees in information technology was greater than that of males in the same condition. In the business cluster, in contrast, the earnings of women with completed degrees were less than that of men without degree completion. In general, the associate degree was shown to have a positive relationship with earnings for the three clusters, but was not significant in business (Compton et al., 2010).

When it comes to the returns of sub-baccalaureate education, Bailey et al. (2004) confirmed that obtaining associate degrees or bachelor's degrees substantially increase the probability of more stable employment and more sustaining earnings regardless of gender difference, through the nationally representative samples of the Beginning Postsecondary Students Longitudinal Study, High School and Beyond, and the National Education Longitudinal Study of 1988. Even though men enjoy higher employment probability and earnings than women in the same level of education, the differences in gender decreases as the educational level elevates. Further, the economic benefits are greater for students in occupational programs of study than those in academic studies. However, among those having an occupational sub-baccalaureate degree, there is no significant difference in earnings between students involved in the high school vocational programs and those not.

Similar to the previous study (Grubb 1995) on the economic returns of sub-baccalaureate education utilizing the National Longitudinal Study of the Class of 1972, Grubb (2002a) concluded that obtaining associate degrees is substantially associated with higher earnings than those associated with just completing high schools. Through analyzing several national datasets, Grubb confirmed these results in many kinds of sub-baccalaureate programs. However, the economic returns of coursework without completing the degree are uncertain. When Grubb analyzed the state Unemployment Insurance wage data, the results also proved substantial economic benefits for postsecondary education (Grubb, 2002b).

In Korea, the earnings of junior college graduates and university graduates were 30-35% and 34-45% higher than that of high school graduates, respectively before 1981;

the economic premium has decreased to 10% and 28-38%, respectively, in the early 2000s (Kim et al., 2010). Interestingly, there are little differences in earnings among different college majors (Jang, 2002; Lee, 2004). Jang (2002) investigated the effect of college majors on the subsequent economic rewards, analyzing the 3rd survey of the Korean Labor and Income Panel Study. The findings confirmed that, except for medical science and pharmacy, there is no significantly big difference of wages in majors. These results are interpreted to indicate that the signaling effect of college degrees is greater than the effect of accumulating human capital through college education (Jang, 2002; Kim et al., 2010).

The impacts of education on occupational outcomes are believed strongest at the initial school-to-work transition (Gerber, 2003). Using the Korean Labor and Income Panel Study data, Sandefur and Park (2007) investigated the labor market entry associated with the educational qualifications of three groups of cohorts in Korea: those who first moved into the labor market (a) between 1960 and 1979, (b) 1980 and 1989, and (c) 1990 and 1998. The researchers intended to verify whether the modernization theory or over-education argument is compatible with Korea's college-to-work transition. According to modernization theory, more schooling guarantees more occupational attainments as a nation's economy becomes modernized. Yet, the over-education argument asserts that as more people participate in college education, the association between education and occupational attainment becomes weaker. That is, the oversupply of college graduates depreciates the *college premium* in the labor market: There was an overall diminution in college education effects on earnings. Interestingly, the relative earnings of men involved in vocational high schools were substantially higher than those

of men from academic high schools among the 1960-1979 cohorts. However, the difference was not found among the latter cohort groups. Further, while a junior-college degree was as much rewarding as a university degree for the first group of cohorts, university-degree returns exceeded a junior college's for the latter two cohorts.

There is little research on the long-term occupational outcomes of vocational high school graduates, especially on their post-college outcomes in the labor market. Chae and Chung (2009) compared employment status, wages, job stability, and length of transition to first employment of junior college graduates who engaged in vocational high schools and general high schools by analyzing the 2004 through 2006 survey of KEEP datasets. The findings demonstrated that the secondary educational track did not affect the employment status after completion of junior college: Among the junior college graduates, 62.4% of those from vocational high schools were employed, while 63% of those from general high schools were employed. The researchers also found that after controlling all other factors, the probability of employment of junior college graduates had a significantly positive relationship with younger age, male, household income, and college located in the Seoul metropolitan area. However, the possibility of employment was not related to the types of high schools.

In the research, Chae and Chung (2009), a logistic analysis estimated the wage difference: The wage of graduates from general high school to junior college was 13 percentage points higher than that of graduates of vocational high school to junior college, which was statistically significant. Further, permanent employment among those from the vocational track was confirmed to be lower (62%) than such employment among those from the general track (64%), even though this was not statistically significant (Chae &

Chung, 2009). They also failed to find any effect of vocational secondary education on transition to first work. Despite the limitation that, generally, the individual capability is different for the two types of high school students, the researchers concluded that when combined with junior college education, secondary vocational education does not affect any positive occupational benefits to their clientele, which is consistent with the findings of previous studies (Chae & Chung, 2009; Park, 2011).

There are findings incompatible with Chae and Chung's (2009) conclusion. Lee et al. (2008) analyzed the Graduates Occupational Mobility Survey data of the Korea Employment Information Service, and reported that when it comes to the initial employment after college graduation, vocational high school graduates were more likely to be employed in full-time (88.2%) and regular (73.2%) jobs than general high school graduates (84.6% and 68.6%, respectively), which indicates the positive influence of secondary vocational education. This difference in job stability was consistent with the current jobs of the two types of college graduates with 93.2% and 81.8% versus 90.5% and 80.4%. With regard to satisfaction with their initial jobs, a student who set his/her career goal in college and achieved the goal had statistically significant higher satisfaction, regardless of the types of high schools. Lee et al. (2008) also explored the relations between the jobs and their field of study in college. In comparison to the graduates from general high schools, those from vocational high schools perceived their initial job required a higher educational level than they had achieved. Rather, with regard to major-match and usefulness to the initial job, vocational high school graduates demonstrated higher points than general high school graduates. In addition, the analysis

of six consecutive years of the panel surveys confirmed that vocational high school graduates are less likely to stay unemployed over time.

Chapter Summary

Secondary vocational education in Korea has confronted a strong challenge of declined enrollment and augmented demands for college attendance, resulting in its *identity crisis*. To identify the benefits of secondary vocational education if the vocational high school graduates advanced to colleges, this chapter reviewed extensive literature related to the effects of the high school track upon its clients' college performance and post-college occupational outcomes.

Studies on the high school vocational track have suggested that students' demographic and socio-economic variables and academic performance in middle school greatly influence their placement in the vocational track. Likewise, their college performance and transition to work after college graduation are still significantly affected by those factors. However, there is a lack of consensus on the genuine effects of involvement in the vocational track during the high school period after controlling those factors. Further, there is little research revealing the post-college occupational outcomes of vocational high school graduates. The next chapter discusses the data and sample analyzed in this study as well as variables and statistical methods to address the research questions, upon the conceptual framework and hypotheses presented in Chapter 1.

Chapter 3

Methodology

The purpose of this research was to determine the effects of the high school track upon its graduates' college performance and subsequent post-college occupational outcomes. To that end, this study analyzed the in- and post-college outcomes of the graduates from general high school and vocational high school. Specifically, a thorough examination was conducted to address the following three research questions: (a) To what extent does high school tracks, general vs. vocational, influence college performance?, (b) to what extent does high school tracks, general vs. vocational, influence post-college occupational outcomes?, and (c) to what extent do high school tracks and college performance influence post-college occupational outcomes? In accordance with the conceptual framework presented in Chapter 1, this chapter outlines the in-depth information on the data and sample, variables, and statistical methodology employed for data analysis.

Secondary Data Source

Data. To determine the linkages between the involvement in secondary vocational education and the occupational consequences after college education, this study utilized secondary data from the KEEP datasets of 2004 through 2010. The KEEP survey employs the nationally representative data-collection method, administered by a government-supported research center, Korea Research Institute for Vocational Education and Training. The KEEP survey was designed to fulfill the increasing needs of examination of youth's educational experience, effects of education, and their subsequent transition process to the occupational world.

The KEEP survey selected 6,000 students as its sample who were in 9th and 12th grade as of 2004. To obtain more extended evidence on the sample students' transition to college and post-college occupational status, the analytic sample of this study was restricted to the 4,000 sample students who were in the 12th grade as of 2004. The KEEP survey recruited the same number of 12th graders (4,000) from general and vocational high schools (2,000:2,000), albeit the real student proportion is 77:23 (Ministry of Education, Science & Technology, 2012).

This longitudinal survey was initiated in 2004 and has followed the sample cohorts once a year. The most recent round of the survey (the 7th wave), conducted in 2010, is available online. As longitudinal data, the KEEP data embraces both features of time-series and cross-sectional data, usually adapted to uncover predictors through repeated observations on the same samples over time. The survey employs three sampling weights methods: unequal selection probability compensation, non-response compensation, and post-stratification compensation. This study maximized the advantages of the longitudinal data-collection to determine the long-term effects of the secondary educational track.

Target population and sample. This study targeted the 12th graders as of 2004: 411,431 students from 1,295 general high schools, and 155,200 students from 631 vocational high schools. The KEEP survey adapted the stratified random sampling method in the following three steps. First, all the general high schools were stratified into the 15 administrative regions across the country: 100 general high schools were selected by the ratio of the number of students in each region. Second, vocational high schools were stratified into three school types, and a total of 100 schools were selected by the

ratio of the number of students in each school type: technical schools (41), commercial schools (38), and others (21). The *others* included household, business, marine/fisheries, and comprehensive high schools. Third, from each school, four classes were chosen, and five students were selected from each class. Through this process, 4,000 representative samples of general and vocational high schools were selected throughout the country: 2,000 general high school 12th graders, and 2,000 vocational high school 12th graders as of 2004. Tables 3.1, 3.2, and 3.3 illustrate the sampling design of students and general and vocational high schools, respectively.

As abovementioned, the analysis of this research was restricted to the data of the 4,000 students who were in 12th grade in 2004. More specifically, this study included only the samples having provided valid information about their college advancement. It was expected that they had experienced up to five years of employment after two-year college graduation or three years of employment after four-year college graduation. However, the available information about their college and post-college performance was quite limited due to sample attrition over time. Other factors, such as compulsory military service and college stopout/dropout or reentry, might yield variations in their career pathways. Further, to generalize the findings of the data analysis to the target population, this study employed longitudinal weights on the samples.

Table 3.1

Number of Sample Students by General and Vocational High School

School Type	No. of Samples
2004 12 th Graders of General High Schools	2,000
2004 12 th Graders of Vocational High schools	2,000
Total	4,000

Note. Adapted from “Sample & Weight,” by Korean Education & Employment Panel, 2012, retrieved from http://eng.krivet.re.kr/eu/eg/prg_euFBADs.jsp.

Table 3.2

Sampling Design of General High School

Region	No. of Survey Population		Ratio of No. of Students by Region (%)	No. of Sample of Schools by Region
	No. of Schools	No. of Students		
Seoul	204	94,686	23.01	23
Busan	81	29,755	7.23	7
Daegu	56	24,416	5.93	6
Incheon	49	21,709	5.28	5
Gwangju	45	13,601	3.31	3
Daejeon	33	14,601	3.55	3
Ulsan	25	10,287	2.50	2
Gyeonggi	229	80,688	19.61	20
Gangwon	63	11,380	2.77	3
Chungbuk	43	11,638	2.83	3
Chungnam	70	16,279	3.96	4
Jeonbuk	83	16,096	3.91	4
Jeonnam	78	14,660	3.56	4
Gyeongbuk	112	22,958	5.58	6
Gyeongnam	117	28,677	6.97	7
Total	1,295	411,431	100.00	100

Note. Adapted from “Sample & Weight,” by Korean Education & Employment Panel, 2012, retrieved from http://eng.krivet.re.kr/eu/eg/prg_euFBADs.jsp.

Table 3.3

Sampling Design of Vocational High School

School Type	No. of Survey Population		Ratio of No. of Students by School Type (%)	No. of Sample of Schools by School Type
	No. of Schools	No. of Students		
Technical	202	63,059	40.63	41
Commercial	194	59,279	38.20	38
Others	235	32,862	21.17	21
Total	631	155,200	100	100

Note. Adapted from “Sample & Weight,” by Korean Education & Employment Panel, 2012, retrieved from http://eng.krivet.re.kr/eu/eg/prg_euFBADs.jsp.

Variables

This study aimed to analyze the differences in the impacts of high school tracks on college performance and post-college occupational outcomes. Accordingly, *high school track* served as the major independent variable, and *college performance* and *post-*

college occupational outcomes were of interest as dependent variables. The variables composing individual attributes and family background were selected as *controls*.

However, for Research Question 3, *college performance* was placed into the independent variable group predicting the combined effects with *high school track*.

Dependent variables. Dependent variables were ascribed to two groups (a) college performance and (b) post-college occupational outcomes. In this study, college performance consisted of college enrollment, stopout, and completion. Post-college occupational outcomes included *job relevance to college major* and *job correspondence to educational level*.

College performance. Building on the previous literature, college performance included the following three variables: enrollment, stopout, and completion. The information on what and how the survey measured each variable is provided below.

College enrollment: There were six responses in the survey on the *type of college* the respondent attended: two-year-course college, three-year-course college, four-year university, five-year-course university, six-year-course university, and others. Following the previous research on the type of colleges (Byun & Kim, 2012; Chae & Chung, 2009; Choi & Kim, 2012), these responses were collapsed into two categories: two-year college (including three-year- course college) and four-year college (university and beyond). The most recent information was utilized to maximize the respondent's college enrollment (Byun & Kim, 2012). In cases when both two- and four-year colleges were provided by a respondent, the information on the four-year college was analyzed. Four-year college was coded as 0, two-year college as 1, and no college enrollment (reference category) as 2.

College stopout: College stopout experience indicates whether the respondent had ever temporarily left school or not regardless of the reasons. This dichotomous variable was dummy coded: yes as 0 and no (reference category) as 1.

College completion: College completion denotes whether the respondent had earned a college degree, which is measured by the respondent's *current academic background*. The survey created eight responses: dropped out of middle school, graduated from middle school, dropped out of high school, graduated from high school, dropped out of a 2-3 year-course college, graduated from a 2-3 year-course college, dropped out of a 4-6 year-course college, and graduated from a 4-6 year-course college. Since the interest of this study is whether or not to complete a two- or four-year college, the categorical responses were collapsed into three subgroups: graduated from a four-year college (and beyond) was coded as 0, and graduated from a two-year college was coded as 1. No college completion (reference group) was coded as 2. When more than two colleges were provided by a respondent, the highest one (four-year-college) was selected.

Post-college occupational outcomes. Substantial studies have shed light on employment status and earnings (wage) in identifying occupational outcomes of secondary or postsecondary vocational education (Arum & Shavit, 1995; Bailey et al., 2004; Baum et al., 2010; Belfield & Bailey, 2011; Bishop & Mane, 2004; Chae & Chung, 2009; Compton et al., 2010; Fletcher, 2009; Grubb, 1995; Grubb, 2002a; Grubb, 2002b; Lee et al., 2008; Meer, 2007; Silverberg et al., 2004). However, there are extremely limited findings related to the variables that might be influenced by high school tracks: job relevance to college major and correspondence to educational level (Lee et al., 2008). This study attempted to ascertain the extent to which the two variables (*job relevance to*

college major and *job correspondence to educational level*) are related to high school tracks. In order to avoid the variation in the respondent's employment status since graduating from a college, only the cases of first-paid job workers were selected, and the most recent information obtained from respondents was analyzed.

Job relevance to college major: This variable was measured by an item: Do you think your current job is suitable to their college major? The original responses were scored on a five-point Likert-type format: completely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, and completely satisfied. These ordered response options were recoded to 3 levels: satisfied=1, neither satisfied nor dissatisfied=2, dissatisfied (reference category) =3.

Job correspondence to educational level: This factor was measured by an item rating of how the respondent felt about the educational level required in their workplace in comparison with their educational level. The response was originally made on a five-point Likert-type format: much higher than that which I possess, higher than that which I possess, similar to that which I possess, and much lower than that which I possess. Those responses were recoded to three groups: similar to what I possess=1, higher/lower than what I possess=2, and much higher/much lower than what I possess (reference category) =3.

Independent variables. Drawing on prior research (Arum & Shavit, 1995; Bishop & Mane, 2004; Fletcher, 2009; Kim, 2008; Lee et al., 2008; Lim & Kim, 2006; Mane, 1999; Meer, 2007; Silverberg et al., 2004; Swail et al., 2003), this study involved two main sets of independent variables which might predict the differences in college and post-college performance of the sample: (a) high school track and (b) college

performance. The details regarding college performance (enrollment, stopout, and completion) for Research Question 3 were presented in the dependent variable section.

High school track. High school track indicates in which kind of high school the respondent was involved, represented by two levels: general high school and vocational high school. Each track respondents answered based on different questionnaire types. In this study, vocational high school was coded as 0. General high school was coded as 1, serving as the reference category.

Controls. Previous studies mostly agree that household income and parental educational level are the most critical determinants on college attendance, completion, and school-to-work transition (Byun & Kim, 2012; Chae, 2006; Choi, 2009; Kim & Shin, 2010; Lim, 2011; Park, 2011). Further, a student's self-efficacy, perception of a career goal, and academic preparedness are also found to have significant impacts on college enrollment and persistence (Choi, 2009; Swail et al., 2003). Although these demographic and socio-economic backgrounds were not of primary interest in this research, the following variables were included as control factors: gender, academic achievement in high school, educational aspiration, career awareness, parental educational level, and household income. All measures of these control variables were drawn from the initial year (2004) of survey data.

Gender: Gender is a dichotomous indicator measured by the respondent's sex. Female was coded as 0. Male, serving as the reference category, was coded as 1.

Academic achievement: The respondent's academic achievement in math and English were reported by the respondents, scored on a five-point Likert-type scale: very low = 1, low = 2, an average level = 3, high = 4, and very high = 5. The scores on the two

items were averaged and recoded into two subgroups: average or high = 0 and low (reference category) = 1.

Educational aspiration: Educational aspiration was based on an item reflecting the highest level of education that the respondent planned to complete. The original responses were measured by a five-level scale: high school, two-year college, four-year university, graduate school, and Ph.D. Following previous research (Byun & Kim, 2012), the responses were re-categorized into two subgroups: four-year college (& beyond) = 0, two-year college or high school (reference category) = 1.

Career awareness: Career awareness refers to *vocational self-identity*, indicating that an individual is aware of his or her own traits and thinks what to do to fulfill their career goals (Lee & Jung, 2005). In this study, career awareness of students was measured dichotomously by whether the respondent had decided his or her future job or not: yes = 0 and no (reference category) = 1.

Parental educational level: The highest level of education of parents was used. The level was originally collapsed into nine levels. Following Byun and Kim (2012), this study re-categorized the levels into three groups: two- or four-year college (and beyond) = 0, high school = 1, and middle school (reference category) = 2.

Household income: Household income was represented by the average monthly income of the respondent's family. To ensure the normality of the data, the raw data was transformed into natural-log values and utilized as a continuous type of data.

Data Analysis

Descriptive statistics and correlation. The KEEP data from 2004 through 2010 were entered utilizing SPSS (Statistical Package for the Social Sciences) 20 software.

Descriptive statistics, given that the majority of variables of this study were represented by a nominal scale of measurement, frequencies and proportion (percent) were identified to briefly provide the information regarding the distributions of the data (descriptive statistics). Household income was stated in a natural log value with mean, standard deviation, and minimum and maximum value. To determine whether or not and how much the independent variables are correlated with each other, Pearson's correlation coefficients were examined with the t-test results.

Analytic strategies. Three analytic strategies were implemented corresponding to the three research questions created on the outset of this study. Each strategy involves separate analyses on the divided sample (general vs. vocational high school graduates) and pooled sample. The details of the analytic strategies are shown below.

Research question 1. To what extent does high school track, general vs. vocational, influence college performance? This question was addressed by examining the following details: (a) the differences in the control variables' explanation of college performance of the students in each track, (b) the extent of high school tracks' explanation of college performance of the sample without being adjusted by the control variables, and (c) the extent of high school tracks' explanation of college performance after controlling for the control variables.

To address Research Question 1 about the predictability of high school tracks on college performance, ordinary least squares (OLS), binary and multinomial logistic regression analyses were conducted for each dependent variable, corresponding to their scales. In detail, in examining the relationship between high school track and household income, linear regression analysis was implemented. For college enrollment, stopout, and

completion, binary and multinomial logistic regression analysis was employed as an appropriate method of data analysis. Multinomial logistic regression allows estimating the effects of independent variables on a polytomous dependent variable. Further, using this method, we can assess odd-ratios adjusted for possible covariates between independent variables (Long & Freese, 2006; Tabachnick & Fidell, 2007).

For each dependent variable, both divided and pooled samples were used separately. That is, to identify the differences in the strength of predictability of the control variables between the two groups of high school track, the sample from vocational high school students (2,000) and that from general high school students (2,000) were separately analyzed. Subsequently, the pooled sample (4,000) data was analyzed with two models: Model 1 included high school track, and Model 2 added all of the control variables to Model 1 to scrutinize whether high school track differences in the variance of college performance still existed after controlling for the individual and family background variables.

Research question 2. To what extent does high school track influence post-college occupational outcomes? This question was addressed by examining the following details: (a) the differences in the control variables' explanation of post-college occupational outcomes of the students of each track, (b) the extent of high school tracks' explanation of post-college occupational outcomes of the sample without adjusting for the control variables, and (c) the extent of high school tracks' explanation of post-college occupational outcomes after controlling for the control variables.

To test Research Question 2 regarding the predictability of high school tracks on post-college occupational outcomes (relevance to major and correspondence to education

level), multinomial logistic regression analysis was conducted for each dependent variable. Similar to the analysis of Research Question 1, the control variables were examined with each group of high school tracks to present the straightforward relationship in varying patterns of post-college performance. With the total sample, two models were tested: The dependent variables were regressed on Model 1 comprising high school track to discern the probable role of high school track in explaining the differences in post-college performance. Model 2 contained all the control variables to determine the influence of high school track on post-college performance after controlling for the individual background variables.

Research question 3. To what extent do high school tracks and college performance influence post-college occupational outcomes? This question was addressed by examining the following details: (a) the extent of explaining post-college occupational outcomes by high school track and college performance of the sample students without adjusting for the control variables, and (b) the extent of explaining post-college occupational outcomes by high school tracks and college performance after controlling for the control variables.

Concerning Research Question 3 on the combined effects of high school track and college performance on post-college occupational outcomes, the two dependent variables of post-college occupational outcomes (*job relevance to college major* and *job correspondence to education level*) were analyzed by multiple regression analysis with the total sample, using three models: (a) Model 1 with high school track was tested first, (b) Model 2 added all of the variables representing college performance to Model 1, and (c) Model 3 with all of the control variables was added. The purpose was to ascertain to

what extent each set of independent variables explained the variations in post-college occupational outcomes. Beforehand, each sample for each high school track was also tested by Model 2 and Model 3. In each regression analysis, log-likelihood statistics and pseudo- R^2 were examined to assess the overall fit of each model.

Table 3.4 *Description of Variables*

Variables	Description	Measurement Scale	Analysis Method
Dependent variables			
College Performance Enrollment	4-year college=0/2-year college=1/no college enrollment=2	Nominal (3 Levels)	Multinomial Logistic Regression
Stopout	Yes=0/No=1	Nominal (dichotomous)	Binary Logistic Regression
Completion	4- year college=0/2-yr college=1/no completion=2	Nominal (3 Levels)	Multinomial Logistic Regression
Post-College Outcomes			
Job Relevance to Major	Satisfied=1/ neither satisfied nor dissatisfied=2 /dissatisfied=3	Nominal (3 Levels)	Multinomial Logistic Regression
Job Correspondence to Educational Level	Similar to what I possess=1/higher or lower than what I possess=2/much higher or much lower than what I possess=3	Nominal (3 Levels)	Multinomial Logistic Regression
Independent Variables			
High School Track	Vocational high school=0/general high school=1	Nominal (dichotomous)	
Controls			
Gender	Female=0/male=1	Nominal (dichotomous)	
Academic Achievement	Average or high=0/low=1	Nominal (dichotomous)	

Table 3.4 (continued)

Variables	Description	Measurement Scale	Analysis Method
Educational Aspiration	4-year college (& beyond)=0/2-year college or high school=1	Nominal (dichotomous)	
Career Awareness	Yes=0/no=1	Nominal (dichotomous)	
Parental Educational Level	2- or 4-year college (& beyond)=0/high school=1/middle school=2	Nominal (3 Levels)	
Household Income	Average monthly income of the family (natural-log value)	Ratio	

Chapter 4

Results

This chapter delineates the findings of analyses on the three research questions and provides the descriptive statistics and correlations of the variables. First, the descriptive statistics are outlined, providing the primary information on the frequency of each variable. Since most of the variables were measured on a categorical scale, the number of valid cases and their proportions to the total samples are mainly reported, except natural-logged household income. Furthermore, Pearson's correlations between high school track and the control variables are depicted. Second, in terms of exploring the predictability of high school track on college performance (*college enrollment*, *college stopout*, and *college completion*; Research Question 1), the results and interpretation of multinomial logistic regression analyses are presented. Third, the findings of multinomial logistic regression analyses are detailed in examining the influence of high school track on post-college occupational outcomes (*job relevance to college major* and *job correspondence to education level*; Research Question 2). Lastly, the outcomes of the analyses are described to address the question of to what extent high school track and college performance influence job relevance to college major and job correspondence to education level (Research Question 3).

Descriptive Statistics

The data used for this study originally consisted of 4,000 12th graders in general and vocational high schools (2,000:2,000) as of 2004. The valid cases used for the analyses decreased because each analysis was performed after excluding missing data. To

maximize the valid cases, this research included 4 datasets having different numbers of samples as shown in Table 4.1.

Table 4.1

Four Datasets Used in This Study

Dataset	Character	N
1	Parental educational level/income/enrollment missing excluded	3,382
2	+ no enrollment excluded	2,920
3	+ completion missing excluded	1,262
4	+ no completion, job_major/job_edu missing excluded	867

Table 4.2 presents the frequencies of control variables by high school track, using Dataset 1. The number of valid cases was 3,382 (N = 3,382). Both tracks included the similar proportion of male students (54.7% in the vocational track and 55.7% in general track). The majority of the students in vocational tracks considered their academic achievement as under the average level (69.2%), which is 10% higher than what the majority of the general track students considered their level to be. In terms of educational aspiration, however, 9 out of 10 general track students desired going to a four-year college, whereas just half of the vocational track students chose high school graduation or two-year college advancement for their future goals regarding education. The students of both tracks possessed relatively high career awareness, but it was found that the general track students became more aware of their future career goals than did the students from the vocational track (73.0% and 61.2%, respectively). Regarding the educational level of their parents, only 9.9% of the parents whose children were involved in the vocational track had two- or four-year college degrees, while 32.1% of the parents of the general track students had graduated from two- or four-year colleges. The average of monthly household income was approximately \$2,800 (= exp [5.62]) for the general track household and approximately \$1,900 (= exp [5.23]) for the vocational track.

Table 4.2

Frequencies of Control Variables by HS Track (Dataset 1)

	High School Track		Total N (%)
	Vocational N (%)	General N (%)	
Gender (N=3,382)			
Female	742 (45.3%)	773 (44.3%)	1,515 (44.8%)
Male	895 (54.7%)	972 (55.7%)	1,867 (55.2%)
Academic Achievement (N=3,382)			
Average/High	504 (30.8%)	724 (41.5%)	1,228 (36.3%)
Low	1,133 (69.2%)	1,021 (58.5%)	2,242 (63.7%)
Educational Aspiration (N=3,382)			
4-year College (& beyond)	750 (45.8%)	1,588 (91.0%)	2,338 (69.1%)
High School/2-year College	887 (54.2%)	157 (9.0%)	1,044 (30.9%)
Career Awareness (N=3,382)			
Yes	1,002 (61.2%)	1,274 (73.0%)	2,276 (67.3%)
No	635 (38.8%)	471 (27.0%)	1,106 (32.7%)
Parental Education (N=3,382)			
2- /4-year College (& beyond)	162 (9.9%)	560 (32.1%)	722 (21.3%)
High School	836 (51.1%)	925 (53.0%)	1,761 (52.1%)
Middle School (& below)	639 (39.0%)	260 (14.9%)	899 (26.6%)

Note. Percentages (%) were rounded to one decimal place.

Table 4.2-1

Frequencies of Household Income by HS Track (Dataset 1)

	N	Mean	Std. Deviation	Min	Max
High School Track					
Vocational	1,637	5.23	.62	2.71	7.31
General	1,745	5.62	.58	2.56	7.60
Total	3,382				

Note. Household income was stated in a natural log value. The values were rounded to two decimal places.

As the number of cases decreased from datasets 1 through 4, there were remarkable changes in the descriptive statistics of some variables, especially for students in the vocational track. Tables 4.3 through 4.5-1 delineate these trends. After the students who were not enrolled in colleges were excluded (Dataset 2), the males from vocational the track increased by 5 % (Table 4.3). Educational aspiration of the vocational track students became higher: 6% more students chose four-year colleges, whereas the students in the general track increased by only 1.2%. The students in the vocational track who answered that their parents had a college degree slightly rose by 2%. As the students who did not have valid answers on college completion were omitted (Dataset 3), the number of male students drastically dropped: 40% from the vocational track and only 25.4% from the general track (Table 4.4). This trend continued after the students who did not complete college and the missing cases of two post-college variables were deleted: 28.5% from the vocational track and only 14.7% from the general track were male students.

As the valid cases lessened, the gaps between the two tracks became narrower for some control variables. For example, in Dataset 3 (Table 4.4), 32.1% of the vocational track students and 36.3% of the general track students felt their academic achievement was average or high, which was 30.8% and 41.5%, respectively, in Dataset 1 (Table 4.2). Further, 9.8% of the vocational high school students and 22.1% of the general high school students in Dataset 4 (Table 4.5) responded that their parents held a college degree in dataset 4, which was 9.9% and 32.1%, respectively, in Dataset 1 (Table 4.2). The minimum value of the monthly household income of the vocational high school students changed from \$150 (= exp [2.71]) in Dataset 1 to \$499 (= exp [3.91]) in Dataset 4 (see Table 4.2-1 and 4.5-1).

Table 4.3

Frequencies of Control Variables by HS Track (Dataset 2)

	High School Track		Total N (%)
	Vocational N (%)	General N (%)	
Gender (N=2,920)^a			
Female	499 (40.3%)	755 (44.9%)	1,254 (42.9%)
Male	738 (59.7%)	928 (55.1%)	1,666 (57.1%)
Academic Achievement (N=2,920)			
Average/High	415 (33.5%)	720 (44.0%)	1,135 (38.9%)
Low	822 (66.5%)	963 (56.0%)	1,785 (61.1%)
Educational Aspiration (N=2,920)			
4-year College (& beyond)	643 (52.0%)	1,625 (92.4%)	2,198 (75.3%)
High School/2-year College	613 (48.0%)	128 (7.6%)	722 (24.7%)
Career Awareness (N=2,920)			
Yes	776 (62.7%)	1,233 (73.3%)	2,009 (68.8%)
No	461 (37.3%)	450 (26.7%)	911 (31.2%)
Parental Education (N=2,920)			
2- /4-year College (& beyond)	148 (12.0%)	551 (32.7%)	699 (23.9%)
High School	660 (53.4%)	890 (52.9%)	1,575 (53.1%)
Middle School (& below)	434 (34.7%)	242 (14.4%)	671 (23.0%)

Note. Percentages (%) were rounded to one decimal place.

^aStudents who were not enrolled in college were excluded.

Table 4.3-1

Frequencies of Household Income by HS Track (Dataset 2)

	N	Mean	Std. Deviation	Min	Max
High School Track					
Vocational	1,237	5.33	.59	3.00	7.31
General	1,683	5.63	.58	2.56	7.60
Total	2,920 ^a				

Note. Household income was stated in a natural log value. The values were rounded to two decimal places.

^aStudents who were not enrolled in college were excluded.

Table 4.4

Frequencies of Control Variables by HS Track (Dataset 3)

	High School Track		Total N (%)
	Vocational N (%)	General N (%)	
Gender (N=1,262)^a			
Female	397 (59.1%)	440 (74.6%)	837 (66.3%)
Male	275 (40.9%)	150 (25.4%)	256 (33.7%)
Academic Achievement (N=1,262)			
Average/High	216 (32.1%)	214 (36.3%)	430 (34.1%)
Low	456 (67.9%)	376 (63.7%)	822 (65.9%)
Educational Aspiration (N=1,262)			
4-year College (& beyond)	299 (44.5%)	510 (86.4%)	809 (64.1%)
High School/2-year College	373 (55.5%)	80 (13.6%)	453 (35.9%)
Career Awareness (N=1,262)			
Yes	433 (64.4%)	455 (77.1%)	878 (69.6%)
No	239 (35.6%)	145 (22.9%)	384 (30.4%)
Parental Education (N=1,262)			
2- /4-year College (& beyond)	66 (9.8%)	139 (23.6%)	205 (16.2%)
High School	357 (53.1%)	340 (57.6%)	697 (55.2%)
Middle School (& below)	249 (37.1%)	111 (16.5%)	360 (28.5%)

Note. Percentages (%) were rounded to one decimal place.

^aStudents who were not enrolled in college were excluded. The missing data of college completion were excluded.

Table 4.4-1

Frequencies of Household Income by HS Track (Dataset 3)

	N	Mean	Std. Deviation	Min	Max
High School Track					
Vocational	672	5.31	.56	3.40	6.91
General	590	5.54	.60	2.56	7.60
Total	1,262 ^a				

Note. Household income was stated in a natural log value. The values were rounded to two decimal places.

^aStudents who were not enrolled in college were excluded. The missing data of college completion were excluded.

Table 4.5

Frequencies of Control Variables by HS Track (Dataset 4)

	High School Track		Total N (%)
	Vocational N (%)	General N (%)	
Gender (N=867)^a			
Female	313 (71.5%)	366 (85.3%)	679 (78.3%)
Male	125 (28.5%)	63 (14.7%)	188 (21.7%)
Academic Achievement (N=867)			
Average/High	141 (32.1%)	168 (39.2%)	309 (35.6%)
Low	297 (67.9%)	261 (60.8%)	558 (64.4%)
Educational Aspiration (N=867)			
4-year College (& beyond)	200 (45.7%)	375 (87.4%)	575 (66.3%)
High School/2-year College	238 (54.3%)	54 (12.6%)	292 (33.7%)
Career Awareness (N=867)			
Yes	289 (66.0%)	327 (76.2%)	616 (71.0%)
No	149 (34.0%)	102 (23.8%)	251 (29.0%)
Parental Education (N=867)			
2- /4-year College (& beyond)	43 (9.8%)	95 (22.1%)	138 (15.9%)
High School	235 (53.7%)	249 (58.0%)	484 (55.8%)
Middle School (& below)	160 (36.5%)	85 (19.8%)	245 (28.3%)

Note. Percentages (%) were rounded to one decimal place.

^aStudents who were not enrolled in college and who did not complete college were excluded. The missing data of college completion, job relevance to college major, and job correspondence to education level were excluded.

Table 4.5-1

Frequencies of Household Income by HS Track (Dataset 4)

	<i>N</i>	Mean	Std. Deviation	Min	Max
High School Track					
Vocational	438	5.33	.52	3.91	6.91
General	429	5.50	.59	2.56	7.60
Total	867				

Note. Household income was stated in a natural log value. The values were rounded to two decimal places.

Table 4.6 provides the frequencies of the five outcome variables used across datasets 1 through 4. Regarding college enrollment, a majority of the students in both tracks, 75.6% in the vocational track and 96.5% in the general track, advanced to two- or four-year colleges. With regard to college type, however, an overwhelming number of the general track students (76.0%) advanced to four-year colleges, while only 25.2% of the vocational track students chose to go to four-year colleges. In addition, while nearly half of the students from the vocational track enrolled in two-year colleges (50.4%), only 20.5% of the students from the general track chose to enroll in two-year colleges. Among the students enrolled in colleges, more than half had experienced temporary leaves from the college education, answering with 53.0% from the vocational track and 59.7% from the general track. Relatively, the frequencies of the vocational track students who had stopouted their college studies were similar to the proportion of those who had not, by 53:47. As for college completion, however, there was a noticeable difference between the two tracks: While the general track students showed similar college-completion rates between two- and four-year colleges (42.5% and 43.4%, respectively), those from the vocational track marked much less completion rates in four-year colleges (10.4%) than two-year colleges (65.0%). Further, while 24.6% of those in the vocational track who

enrolled in colleges did not complete their college studies, the proportion was 14.1% in the general track.

This study measured post-college occupational outcomes by two variables: *job relevance to one's college major* and *job correspondence to one's educational level*. To obtain the frequencies of these two outcomes, only the cases that had completed at least two-year colleges were selected. Accordingly, the number of valid cases decreased because the samples who obtained jobs among those who had completed colleges were much smaller than the original samples. In addition, the cases of first-job paid workers were selected in this research, and all the cases that had validly responded to the questions measuring the outcome variables at least once were gathered to maximize the valid cases. Finally, 867 valid cases for the two items were used for the analyses.

The question for *job relevance to college major* originally had 5-point Likert-type responses (completely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, and completely satisfied), which was re-categorized into three levels (satisfied, neither satisfied nor dissatisfied, dissatisfied). Table 4.6 demonstrates that similar numbers of the college graduates who graduated from the vocational track (N = 438) and general track (N = 429) in their high school responded to the question: Do you think your current job is suitable to your college major? This indicated that the college graduates from the vocational track had had a similar probability for having a job to those from the general track. In addition, the frequencies of the variable implied that there were few differences regarding job relevance to major between the two-track college graduates: 60.3% of the vocational-track respondents felt satisfied, and 57.8% of those from the general track chose the same category (the

proportion of the vocational track respondents slightly higher than that of the general track respondents). Similarly, as to choosing the dissatisfied category, there was no big difference between the two tracks (vocational track: general track= 15.3%: 16.1%).

Job correspondence to one's education level was measured by a question of how the respondents felt about the education level required for their jobs in comparison with their actual education level. This variable had originally had five levels but was recoded into three levels: similar to what I possessed, lower or higher than what I possessed, and much lower or much higher than what I possessed. There were 867 valid cases on this variable, responding at least once on the question. The frequencies on the recoded job correspondence to one's educational level are presented in Table 4.7. Compared with job relevance to major, the college graduates from the vocational track showed a little higher satisfaction with their jobs in terms of their educational level than those from the general track: 82% of the vocational track and 77.2% of the general track college graduates answered that they felt their educational level was similar to what their job required. While 1.9% of the college graduates involved in the general high school felt their job required much lower or much higher educational levels than they possessed, 13.7% of those from the vocational track felt in the same way. In contrast, 21.0% of respondents from the general track considered that their job required a lower or higher level of education than they possessed, whereas 16.7% of the vocational track respondents chose the same category. These frequencies implied that regarding *job correspondence to education level*, the college graduates who had been involved in vocational high school chose polarized answers: The majority of the college graduates from the vocational track felt satisfied with their educational level regarding their jobs, but still more people from

the vocational track felt their jobs demanded higher education level than they possessed, compared with those from the general high school.

Table 4.6

Frequencies of Outcome Variables by HS Track (Datasets 1 through 4)

	High School Track		Total N (%)
	Vocational N (%)	General N (%)	
College Enrollment (N = 3,382)^a			
4-year College (& beyond)	412 (25.2%)	1,326 (76.0%)	1,738 (51.4%)
2-year College	825 (50.4%)	357 (20.5%)	1,182 (34.9%)
No Enrollment	400 (24.4%)	62 (3.6%)	462 (13.7%)
College Stopout (N = 2,920)^b			
Stopout	656 (53.0%)	1,005 (59.7%)	1,661 (56.9%)
No Stopout	581 (47.0%)	678 (40.3%)	1,259 (43.1%)
College Completion (N = 1,262)^c			
4-year College (& beyond)	70 (10.4%)	256 (43.4%)	326 (25.8%)
2-year College	437 (65.0%)	251 (42.5%)	688 (54.5%)
No Completion	162 (24.6%)	83 (14.1%)	248 (19.7%)
Job Relevance to College Major (N = 867)^d			
Satisfied	264 (60.3%)	248 (57.8%)	512 (59.1%)
Neither Satisfied nor Dissatisfied	107 (24.4%)	112 (26.1%)	219 (25.3%)
Dissatisfied	67 (15.3%)	69 (16.1%)	136 (15.7%)
Job Correspondence to Education Level (N = 867)^d			
Similar	359 (82.0%)	331 (77.2%)	690 (79.6%)
Higher/lower	73 (16.7%)	90 (21.0%)	163 (18.8%)
Much higher/much lower	6 (13.7%)	8 (1.9%)	14 (1.6%)

Note. Percentages (%) were rounded to one decimal place.

^aDataset 1_Missing data of college enrollment were excluded.

^bDataset 2_Students who were not enrolled in college were excluded.

^cDataset 3_Missing data of college completion were excluded.

^dDataset 4_Students who were not enrolled in college and who did not complete college were excluded. Plus, missing data of job relevance to college major and job correspondence to education level were excluded.

Correlations

Before analyzing the relationships between the independent variable of interest (i.e., high school track) and dependent variables (i.e., college performance and post-college outcomes), the correlations between high school track and control factors were examined to address the potential multicollinearity problem: making it difficult to identify the unique variance of the predictor variable on the dependent variables (Urdan, 2010). Furthermore, if the independent variables were correlated with one another to a high extent, this would imply redundancy and could mislead the analysis results (Tabachnick & Fidell, 2007). This study addressed this issue by examining the Pearson's correlations, the most common method to detect whether or not and to what extent a variable is correlated to another variable (Tabachnick & Fidell, 2007; Urdan, 2010).

Table 4.7 presents the results of Pearson correlation analysis between high school track and the control variables, using Dataset 1. Except gender, all the control variables had statistically significant relationships with high school track. However, most of the correlations were weak or moderate, ranging from $0.1 < r < 0.5$ or $-0.5 < r < -0.1$. This result indicated that multicollinearity was not an issue in this study. What was interesting is that all the control variables were negatively correlated with high school track, except gender. Since the vocational high school track was valued as 0 and the general as 1, the negative correlations indicated that the samples involved in the vocational track revealed lower levels of academic achievement, educational aspiration, career awareness, parental educational level, and household income than those in the general high school.

Educational aspiration showed the most highly negative relationship with the high school track ($r = -.489, p < 0.01$). A negative association between parental education and household income is due to the scale of parental education (0 = 2 year college and above, 1 = high school, 3 = middle school or less). On the other hand, there were positive relationships between the control variables except gender: high school academic achievement, educational aspiration, career awareness, parental educational level, and household income. These results confirmed the past findings that vocational high school students tend to have lower levels of educational achievement and are more likely to come from disadvantaged backgrounds in comparison with the general high school students (Byun & Kim, 2012; Chae & Chung, 2009; Chae & Kim, 2012).

Table 4.7

Pearson Correlation Matrix between HS Track and Controls (Dataset 1)

	1	2	3	4	5	6	7
HS Track (1)	–						
Gender (2)	.010	–					
HS Academic Achievement (3)	-.111**	-.022	–				
Educational Aspiration (4)	-.489**	-.047**	.161**	–			
Career Awareness (6)	-.126**	.089**	.070**	.095**	–		
Parental Edu Level (7)	-.335**	-.012	.140**	.278**	.056**	–	
Household Income (8)	-.302**	-.006	-.132**	-.275**	-.045**	-.458**	–

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Predictability of High School Track on College & Post-College Outcomes

This section presents the outcomes of binary and multinomial logistic regression analyses to determine whether or not and how much high school track predicted college and post-college performance. The analysis results are reported primarily in coefficients (natural log of odds) and odds ratios. The odds ratio can be interpreted as the difference in odds of a category in comparison with the reference category when the predictor variable (when it is a continuous variable) changes by one unit (Tabachnick & Fidell, 2007). To identify the effect size for a model, Pseudo R^2 s are provided (and Cox & Snell R^2 s are, too).

Three main analyses were implemented. First, in examining how much high school track explained the variance of college performance, the regression analysis of high school track on college enrollment, college stopout, and college completion were performed (Research Question 1). The analyses were conducted with divided samples of each high school track as well as a pooled sample of both tracks. In the analyses with the pooled sample, Model 1 had only high school track, and Model 2 included control factors, to measure the changes of the predictability. Second, to what extent high school track predicted the post-college occupational outcomes was explored by presenting the results of multinomial regression analyses on job relevance to college major and job correspondence to education level of the pooled sample (Research Question 2). Model 1 and Model 2 were applied to the analyses in the same way of Research Question 1. Lastly, the combining influence of college performance and high school track on post-college occupational outcomes (job relevance to college major, job correspondence to education level) was investigated (Research Question 3). High school track was regressed on the

outcome variables in Model 1, college performance variables were added as predictors in Model 2, and control variables were applied in Model 3. Each analysis was performed with the pooled sample.

Research question 1. Tables 4.8 and 4.9 present the results of binary and multinomial logistic regression analyses on the control factors influencing college enrollment of each high school track graduates. In the vocational track, almost all the controls significantly affected the college performance of its graduates (Table 4.8). Gender significantly predicted college enrollment: Female students were 70% and 57% less likely than male students to go to four-year colleges and two-year colleges, respectively (odds ratio = .29 and .43, $p < 0.001$). Academic achievement significantly influenced two-year college enrollment: Students who felt their academic achievement in high school was in an average or high level had 50 % higher possibility to go to two-year colleges, compared with those who did not enroll in any colleges (odds ratio = 1.53, $p < 0.01$). On the other hand, educational aspiration more significantly explained four-year college enrollment: The odds of being in four-year colleges were 9.5 times for students who wanted to go to four-year colleges when they were in high school than for students who wanted to go to two-year colleges (odds ratio = 9.56, $p < 0.001$), and those who wanted to go to two-year colleges were 1.3 times more likely to go to two-year colleges (odds ratio = 1.35, $p < 0.05$), in comparison with those who did not enroll in any colleges. Career awareness also significantly affected college enrollment, with the odds ratio of 1.64 for four-year college ($p < 0.01$) and 1.37 for two-year college ($p < 0.05$), respectively. Parental educational level was a significant determinant on college enrollment of vocational high school students. Compared with students whose parents

graduated from middle school, those whose parents graduated from two- or four-year colleges were 2.8 times more likely to go to four-year colleges (odds ratio = 2.81, $p < 0.01$), and 2.4 times more to go to two-year colleges (odds ratio = 2.38, $p < 0.01$). Household income was another significant predictor of college enrollment among vocational high school graduates: 2.78 odds ratio for four-year colleges and 2.37 odds ratios for two-year colleges ($p < 0.001$). In conclusion, gender, educational aspiration, and household income were the most influencing factors for vocational high school graduates in determining their college enrollment, and career awareness and parental educational level were the second most determining predictors. Academic achievement significantly influenced only two-year college enrollment. The pseudo R^2 of this model was .145, representing that these control factors explained approximately 15% of variance in college enrollment of the vocational track students.

On the other hand, for the general track, only academic achievement and educational aspiration significantly predicted college enrollment both for two- and four-year colleges (see Table 4.9). Gender significantly influenced only two-year college enrollment. The pseudo R^2 of this model was .18, indicating that the control factors explained 18% of variance in college enrollment of the general track students. Female graduates were 3 times more likely to go to four-year colleges rather than no college enrollment, in comparison with male graduates (odds ratio = 2.95, $p < 0.001$). Higher academic achievement and higher educational aspiration suggested more probability to go to colleges: Students having a high academic achievement were 9.5 times more likely to go to four-year colleges, and 4.57 times more to go to two-year colleges, compared with students who had a low academic achievement (odds ratio = 9.51 and 4.57, $p <$

0.001). The students who desired four-year college enrollment after high school graduation had 27.81 times higher likelihood of going to four-year colleges and 2.14 times higher probability to go to two-year colleges than the ones who had wanted two-year colleges or just high school graduation for their future education (odds ratio = 27.81 and 2.14, $p < 0.001$). Household income was significantly related only to going to four-year colleges (odds ratio = 2.57, $p < 0.001$). In conclusion, in the general high school track, people who thought their academic achievement was fairly high and who wanted higher education were more likely to go to college, regardless of gender, parental educational level and household income.

Table 4.8

Effect of Controls on College Enrollment of Vocational HS Graduates (Dataset 1)

Predictor Variables	College Enrollment (ref.=No College Enrollment)			
	4yr College		2yr College	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)				
Female	-1.23(.17)***	.29	-.85(.13)***	.43
Academic Achievement (ref.=Low)				
Average/High	.33(.18)	1.40	.42(.15)**	1.53
Educational Aspiration (ref.= high school or 2yr college)				
4yr college	2.26(.18)***	9.56	.30(.14)*	1.35
Career Awareness (ref.=no)				
Yes	.49(.17)**	1.64	.32(.13)*	1.37
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college	1.03(.35)**	2.81	.87(.32)**	2.38
High school	.47(.18)**	1.59	.28(.14)*	1.32
Household Income (Ln)	1.02(.14)***	2.78	.86(.11)***	2.37
N		1,637		
-2Log Likelihood		1.964E3***		
Pseudo R-Square (Cox & Snell)		.145 (.260)		

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4.9

Effect of Controls on College Enrollment of General HS Graduates (Dataset 1)

Predictor Variables	College Enrollment (ref.=No College Enrollment)			
	4yr College		2yr College	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)				
Female	.51(.31)	1.667	1.08(.31)***	2.95
Academic Achievement (ref.=Low)				
Average/High	2.25(.53)***	9.51	1.52(.54)**	4.57
Educational Aspiration (ref.= high school or 2yr college)				
4yr college	3.33(.33)***	27.81	.76(.29)**	2.14
Career Awareness (ref.=no)				
Yes	.22(.30)	1.24	-.02(.31)	.98
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college	.35(.49)	1.42	-.30(.50)	.74
High school	.08(.35)	1.09	-.11(.35)	.90
Household Income (Ln)	.94(.25)***	2.57	.43(.25)	1.52
N		1,745		
-2Log Likelihood		1.174E3***		
Pseudo R-Square (Cox & Snell)		.179 (.208)		

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4.10 delineates the results of logistic regression analyses of high school track on college enrollment, using the pooled sample. Model 1, including only high school track as a predictor, explained 14.6% of variance in college enrollment (pseudo $R^2 = .146$). High school track played a significant role in determining college enrollment for students in both tracks. Specifically, vocational high school graduates were 95% less likely to go to four-year colleges than those from general high schools (odds ratio = .05, $p < 0.001$). For two-year college enrollment, the odds ratios jumped to .36, implying that vocational high school graduates were 64% less likely to go to two-year college than general high school graduates (odds ratio = .36, $p < 0.001$). When the control factors were added (Model 2), the predictability increased by 12% (pseudo $R^2 = .267$). With the

control variables, high school track still significantly predicted college enrollment, and the odds ratio of vocational track to general increased to .14 (odds ratio = .14, $p < 0.001$). All of the control factors significantly influenced college enrollment of the samples, having similar relationships as found in Table 4.8 and Table 4.9. Educational aspiration was proved to be the most influencing determinant on college enrollment, especially for those who desired four-year colleges (odds ratio = 12.65, $p < 0.001$). Higher academic achievement increased college enrollment 3.4 times, compared with low achievement (odds ratio = 3.40, $p < 0.001$).

Table 4.10

Effect of HS Track on College Enrollment (Dataset 1)

Predictor Variables	College Enrollment (ref.=No College Enrollment)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odd Ratio
	4yr College			
High School Track (ref.=General)				
Vocational	-3.03(.15)***	.05	-1.95(.17)***	.14
Gender (ref.=Male)				
Female			-.92(.13)***	.40
Academic Achievement (ref.=Low)				
Average/High			.82(.15)***	3.40
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			2.54(.16)***	12.65
Career Awareness (ref.=no)				
Yes			.45(.14)**	1.54
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			1.04(.27)***	2.84
High school			.41(.15)**	1.50
Household Income (Ln)			1.05(.12)***	2.85

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4.10 (continued)

Predictor Variables	College Enrollment (ref.=No College Enrollment)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odd Ratio
	2yr College			
High School Track (ref.=General)				
Vocational	-1.03(.15)***	.36	-.65(.16)***	.52
Gender (ref.=Male)				
Female			-.52(.12)***	.59
Academic Achievement (ref.=Low)				
Average/High			.47(.14)**	1.60
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			.41(.13)**	1.50
Career Awareness (ref.=no)				
Yes			.26(.12)*	1.30
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			.57(.26)*	1.77
High school			.24(.13)	1.27
Household Income (Ln)			1.05(.12)***	2.85
N	3,382		3,382	
-2Log Likelihood	28.414***		3.232E3***	
Pseudo R-Square (Cox & Snell)	.146 (.249)-		.267 (.408)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Most of the control factors were not a significant determinant in college stopout. Only gender and educational aspiration significantly predicted college stopout of the general track high school graduates (Table 4.12), and only gender was significant in the vocational track (Table 4.11). In the vocational track (Table 4.11), the odds of college stopout were 86% less for female students than for male students (female to male students' odds ratio = .14, $p < 0.001$). In the general track (Table 4.12), if a student more desired to go to a four-year college, he/she would be 1.5 times more likely to choose a temporary stopout in college study (odds ratio = 1.54, $p < 0.05$). The control variables

explained 14.8% of variance in college stopout of the vocational track students, 13.0% in those from the general track (pseudo $R^2 = .148$ and $.130$, respectively).

Table 4.11

Effect of Controls on College Stopout of Vocational HS Graduates (Dataset 2)

Predictor Variables	College Stopout (ref.=No College Stopout)	
	Stopout	
	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)		
Female	-1.96(.13)***	.14
Academic Achievement (ref.=Low)		
Average/High	.05(.14)	1.06
Educational Aspiration (ref.= high school or 2yr college)		
4yr college	.14(.13)	1.15
Career Awareness (ref.=no)		
Yes	.02(.13)	1.02
Parental Educational Level (ref.= Middle school& below)		
2 or 4yr college	-.13(.23)	.88
High school	.07(.14)	1.07
Household Income (Ln)	.14(.12)	1.15
N	1,237 ^a	
-2Log Likelihood	1.038E3***	
Pseudo R-Square (Cox & Snell)	.148 (.185)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college were excluded.

Table 4.12

Effect of Controls on College Stopout of General HS Graduates (Dataset2)

Predictor Variables	College Stopout (ref.=No College Stopout)	
	Stopout	
	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)		
Female	-1.76(.11)***	.17
Academic Achievement (ref.=Low)		

Table 4.12 (continued)

Predictor Variables	College Stopout (ref.=No College Stopout)	
	Stopout	
	Coef.(Std.Error)	Odds Ratio
Average/High Educational Aspiration (ref.= high school or 2yr college)		
4yr college	.43(.21)*	1.54*
Career Awareness (ref.=no)		
Yes	-.08(.13)	.93
Parental Educational Level (ref.= Middle school & below)		
2 or 4yr college	.17(.19)	1.18
High school	.26(.17)	1.30
Household Income (Ln)	.06(.11)	1.07
N	1,638 ^a	
-2Log Likelihood	1.075E3***	
Pseudo R-Square (Cox & Snell)	.130 (.160)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college were excluded.

These analysis results were very similar to those for the pooled sample from both tracks (see Table 4.13), except that high school track was revealed as a significant predictor on college stopout. Compared with the general track students, the vocational track students had 24% less odds of temporarily stopping their college studies (odds ratio = .76, $p < 0.001$) than the general high school graduates. However, this result should be carefully interpreted because college stopout did not separate two-year college stopout from four-year college stopout. We need to note that students in the vocational track are more likely to be enrolled in two-year colleges. Nonetheless, high school track (Model 1) hardly explained the variance in college stopout (pseudo $R^2 = .003$). When the control variables were added to Model 1 (Model 2), the predictability increased to 14% (pseudo $R^2 = .139$). High school track was still significant in controlling after those factors: The vocational track students were 26% less likely to choose a temporary stopout (odds ratio

= .74, $p < 0.01$). Gender and educational aspiration still significantly affected college stopout. Females had 84% lower odds of college stopout than males (odds ratio = .16, $p < 0.001$). Educational aspiration had a positive relationship with college stopout. When a respondent desired to graduate from a four-year college for his/her education, the odds of stopping college studies were 25% greater than those for a respondent who wanted a two-year college education or high school completion (odds ratio = 1.25, $p < 0.05$). After adding control variables to high school track (Model 2), the variance explained by the model increased to 14% (pseudo $R^2 = .139$).

Table 4.13

Effect of HS Track on College Stopout (Dataset 2)

Predictor Variables	College Stopout (ref.=No College Stopout)			
	Stopout			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
High School Track (ref.=General)				
Vocational	-.27(.08)***	.76	-.30(.10)**	.74
Gender (ref.=Male)				
Female			-1.84(.08)***	.16
Academic Achievement (ref.=Low)				
Average/High			.06(.08)	1.06
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			.22(.11)*	1.25
Career Awareness (ref.=no)				
Yes			-.04(.09)	.96
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			.04(.14)	1.04
High school			.15(.11)	1.16
Household Income (Ln)			.10(.08)	1.10
N	2,920 ^a		2,920 ^a	
-2Log Likelihood	15.410***		2.117E3***	
Pseudo R-Square (Cox & Snell)	.003 (.004)		.139 (.173)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college were excluded.

College completion was significantly predicted by gender and educational aspiration (See Tables 4.14 and 4.15). In the vocational high school track, the odds of four-year and two-year college completion were 28 times and 6 times higher for female students than for male students, which were statistically significant ($p < 0.001$). If students desired four-year college graduation for their future education, the probability to complete four-year colleges was 7.5 times greater for those in the vocational track (odds ratio = 7.47, $p < 0.001$) and 7 times greater for those in the general track (odds ratio = 7.08, $p < 0.001$), in comparison with those who did not want college education. In the general track, academic achievement in high school significantly influenced four-year college graduation. If a student felt his/her academic achievement in high school was average or high, he/she was 3 times more likely to complete a four-year college, compared with those who felt their achievement was low (odds ratio = 2.99, $p < 0.01$). In the vocational track, however, academic achievement did not show significance in predicting college completion.

When analyzed with the pooled sample from both tracks, high school track was revealed as a significant predictor on college completion, only for four-year colleges (Table 4.16). Compared with those from the general track (Model 1), vocational graduates had 86% less odds to complete four-year colleges (odds ratio = .14, $p < 0.001$). However, high school track did not significantly predict two-year college completion. Furthermore, high school track hardly explained college completion (pseudo $R^2 = .074$). When control factors were added, the predictability of the model (Model 2) increased to

20% (pseudo $R^2 = .206$). Nevertheless, high school track still significantly influenced four-year college completion even after controlling for those factors.

Table 4.14

Effect of Controls on College Completion of Vocational HS Graduates (Dataset 3)

Predictor Variables	College Completion (ref.=No College Completion)			
	4yr College		2yr College	
	Coef.(Std.Error)	Odds Ratio	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)				
Female	3.51(.55)***	34.41	1.35(.20)***	3.87
Academic Achievement (ref.=Low)				
Average/High	.21(.35)	1.24	.29(.21)	1.34
Educational Aspiration (ref.= high school or 2yr college)				
4yr college	2.01(.37)***	7.47	.23(.20)	1.26
Career Awareness (ref.=no)				
Yes	-.07(.35)	.93	-.25(.20)	.78
Parental Educational Level (ref.= Middle school & below)				
2 or 4yr college	.71(.59)	2.03	.05(.37)	1.06
High school	.60(.39)	1.81	-.03(.21)	.97
Household Income (Ln)	.50(.33)	1.64	.03(.17)	1.03
N		672 ^a		
-2Log Likelihood		805.295***		
Pseudo R-Square (Cox & Snell)		.133 (.204)		

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college were excluded. The missing data of college completion were excluded.

For the two kinds of colleges, gender was a determining factor to complete colleges (see Table 4.16). Females were more highly expected to finish their college studies, compared with male students, with odds ratios of 22.34 for four-year colleges and 4.57 for two-year colleges ($p < 0.001$). Whereas all the other variables except gender did not significantly determine two-year college completion, academic achievement in high school, the student's own educational aspiration, and parental educational level

significantly influenced four-year college completion. If the respondent felt his/her high school academic achievement was average or high, the possibility to complete a four-year college increased twice as much as the one who felt his/her achievement was low (odds ratio = 2.11, $p < 0.01$). Educational aspiration also had a positive relationship with college completion. Compared with those desiring two-year college or high school graduation for their future education, a student expecting four-year college education were 7 times more likely to complete a four-year college (odds ratio = 6.97, $p < 0.001$).

Table 4.15

Effect of Controls on College Completion of General HS Graduates (Dataset 3)

Predictor Variables	College Completion (ref.=No College Completion)			
	4yr College		2yr College	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)				
Female	3.12(.34)***	27.75	1.79(.28)***	5.96
Academic Achievement (ref.=Low)				
Average/High	1.10(.33)**	2.99	.47(.32)	1.61
Educational Aspiration (ref.= high school or 2yr college)				
4yr college	1.96(.47)***	7.08	.23(.34)	1.26
Career Awareness (ref.=no)				
Yes	.12(.33)	1.13	-.08(.31)	.93
Parental Educational Level (ref.= Middle school & below)				
2 or 4yr college	.54(.52)	1.72	-.59(.48)	.55
High school	-.16(.44)	.85	-.71(.39)	.49
Household Income (Ln)	-.22(.29)	.80	-.58(.27)*	.56
N		590 ^a		
-2Log Likelihood		755.425***		
Pseudo R-Square (Cox & Snell)		.170 (.288)		

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college were excluded. Plus, the missing data of no college completion were excluded.

Table 4.16

Effect of HS Track on College Completion (Dataset 3)

Predictor Variables	College Completion (ref.=No College Completion)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
4yr College				
High School Track (ref.=General)				
Vocational	-1.98(.19)***	.14	-1.22(.23)***	.30
Gender (ref.=Male)				
Female			3.11(.26)***	22.34
Academic Achievement (ref.=Low)				
Average/High			.75(.22)**	2.11
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			1.94(.28)***	6.97
Career Awareness (ref.=no)				
Yes			-.02(.23)	.99
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			.83(.35)*	2.30
High school			.36(.26)	1.43
Household Income (Ln)			.18(.19)	1.20
2yr College				
High School Track (ref.=General)				
Vocational	-.13(.16)	.88	-.06(.18)	.95
Gender (ref.=Male)				
Female			1.52(.16)***	4.57
Academic Achievement (ref.=Low)				
Average/High			.34(.18)	1.40
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			.22(.17)	1.25
Career Awareness (ref.=no)				
Yes			-.20(.17)	.82
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			-.17(.28)	.82
High school			-.19(.18)	.83
Household Income (Ln)			-.18(.14)	.84

Table 4.16 (continued)

Predictor Variables	College Completion (ref.=No College Completion)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
	2yr College			
N	1,262 ^a		1,262 ^a	
-2Log Likelihood	25.392***		1.580E3***	
Pseudo R-Square (Cox & Snell)	.074 (.137)		.206 (.338)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college were excluded. Plus, the missing data of college completion were excluded.

Research question 2. In order to determine which of the independent variables were significant in predicting post-college occupational outcomes, multinomial logistic regression was conducted because the outcome variables were categorical. Because of the relatively small number of valid cases ($N = 867$), the analyses were performed only with the pooled sample from both high school tracks. All the respondents were the people who graduated from two- or four-year college and obtained their first-paid jobs among the original sample of 4,000 12th graders. Table 4.17 through 4.20 present the results of the analyses on the two outcome variables: *job relevance to college major* and *job correspondence to education level*. Each outcome variable had three levels of category: (a) dissatisfied (reference category), neither dissatisfied nor satisfied, and satisfied for job relevance to college major; and (b) much higher/much lower than what I possess (reference category), higher/lower than what I possess, and similar to what I possess for job correspondence to education level. Satisfied and similar to what I possess were the most desirable responses, comparing to the reference categories.

Differently from the results discovered for Research Question 1, only a few control factors significantly predicted the likelihood of the outcomes. Regarding job relevance to college major, only gender, educational aspiration, and career awareness

were significantly related (see Table 4.17). Females had almost 3 times higher probability to be satisfied than males, rather than to be dissatisfied (odds ratio = 2.89, $p < 0.001$).

This result needs to be carefully interpreted because female had much more valid cases than men (female : male = 78.3% : 21.7%; see Table 4.5). The ones who desired four-year college graduation, however, were 40% less likely to be satisfied than those who wanted just two-year college or high school graduation (odds ratio = .60, $p < 0.05$).

Interestingly, career awareness affected their job satisfaction: If the respondents had decided their future job when in high school, they were 2 times more likely to feel satisfied, concerning their job relevance to college major (odds ratio = 1.94, $p < 0.01$).

Nevertheless, the control factors explained a very small proportion of the variance of this outcome (pseudo $R^2 = .031$).

The next analysis explored whether high school track predicted job relevance to college major or not, with and without the control factors (Table 4.18). It was found that high school track did not significantly affect the outcome, when its graduates had completed colleges and acquired their first-paid job (Model 1). This result did not change even when the control factors were added (Model 2). Only gender and career awareness were significantly related with the outcome variable: Female were 3 times more likely to be satisfied than males (odds ratio = 2.93, $p < 0.001$). If the respondents had made a decision on their future jobs, the likeliness to be satisfied regarding job relevance to college major was 2 times higher than those who had not (odds ratio = 1.97, $p < 0.01$). The two models, however, explained a considerably small proportion of the variance of the outcome (pseudo $R^2 = .000$ and .032 for Model 1 and Model 2, respectively).

Table 4.17

Effect of Controls on Job Relevance to College Major (Dataset 4)

Predictor Variables	Job Relevance to College Major (ref.=Dissatisfied)			
	Satisfied		Neither Satisfied Nor Satisfied	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)				
Female	1.06(.22)***	2.89	.87(.25)***	2.39
Academic Achievement (ref.=Low)				
Average/High	.18(.21)	1.20	.11(.24)	1.11
Educational Aspiration (ref.= high school or 2yr college)				
4yr college	-.55(.23)*	.60	-.53(.25)*	.59
Career Awareness (ref.=no)				
Yes	.66(.21)**	1.94	.07(.23)	1.09
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college	.15(.33)	1.16	-.29(.38)	.75
High school	.09(.24)	1.09	.02(.26)	1.02
Household Income (Ln)	-.20(.19)	.82	.000(.22)	1.00
N		867 ^a		
-2Log Likelihood		1.117E3***		
Pseudo R-Square (Cox & Snell)		.031 (.057)		

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college and who did not complete college were excluded. Plus, the missing data of college completion, job relevance to college major, and job correspondence to education level were excluded.

Table 4.18

Effect of HS Track & Controls on Job Relevance to College Major (Dataset 4)

Predictor Variables	Job Relevance to College Major (ref.=Dissatisfied)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
High School Track (ref.=General)				
Vocational	.09(.19)	1.10	.16(.23)	1.18

Table 4.18 (continued)

Predictor Variables	Job Relevance to College Major (ref.=Dissatisfied)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
Satisfied				
High School Track (ref.=General)				
Vocational	.09(.19)	1.10	.16(.23)	1.18
Gender (ref.=Male)				
Female			1.08(.22)***	2.93
Academic Achievement (ref.=Low)				
Average/High			.18(.21)	1.20
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			-.48(.25)	.62
Career Awareness (ref.=no)				
Yes			.68(.21)**	1.97
Parental Educational Level (ref.= Middle school &below)				
2 or 4yr college			.18(.34)	1.20
High school			.10(.24)	1.11
Household Income (Ln)			-.19(.19)	.82
Neither Satisfied Nor Satisfied				
High School Track (ref.=General)				
Vocational	-.02(.22)	.98	-.12(.25)	.89
Gender (ref.=Male)				
Female			.86(.25)**	2.36
Academic Achievement (ref.=Low)				
Average/High			1.04(.24)	1.10
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			-.58(.27)*	.56
Career Awareness (ref.=no)				
Yes			.06(.23)	1.06
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			-.32(.39)	.73
High school			.01(.27)	1.01
Household Income (Ln)			.00(.22)	1.00
N	867 ^a		867 ^a	
-2Log Likelihood	24.136		1.286E3***	
Pseudo R-Square	.00		.032	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college and who did not complete college were excluded. Plus, the missing data of college completion, job relevance to college major, and job correspondence to education level were excluded.

These findings were similar to that of job correspondence to education level (Table 4.19). Specifically, only gender and educational aspiration showed statistical significance. Female respondents were 5 times more likely than males to feel satisfaction (odds ratio = 5.18, $p < 0.01$). What is interesting is that people who desired four-year college graduation were found to be 80% less likely to feel satisfaction regarding job correspondence to their education level (odds ratio = .21, $p < 0.05$). All the control variables explained only 3.3% of variance in the outcome (pseudo $R^2 = .033$).

Likewise, high school track did not significantly affect its graduates' satisfaction with job correspondence to their education level, as shown in Table 4.20 (Model 1). This result did not change when the control variables were added in the model (Model 2). In addition, all the control variables except gender were proven not to be determining when they were combined with high school track. Accordingly, the explaining power of the two models on this outcome was extremely small (pseudo $R^2 = .003$ and $.035$ for Model 1 and Model 2, respectively). In brief, with regard to the effect of high school track on job correspondence to education level, no significance was found with the models explaining 0.3% of variance in the outcome variables. Only gender showed significant predictability: Female respondents were 5 times more likely to feel satisfaction than males (odds ratio = 5.33, $p < 0.01$).

Table 4.19

Effect of Controls on Job Correspondence to Educational Level (Dataset 4)

Predictor Variables	Job Correspondence to Education Level (ref.=Much Higher/Much Lower)			
	Similar		Higher/Lower	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
Gender (ref.=Male)				
Female	1.65(.56)**	5.18	1.10(.58)	3.01
Academic Achievement (ref.=Low)				
Average/High	.81(.67)	2.25	.89(.68)	2.45
Educational Aspiration (ref.= high school or 2yr college)				
4yr college	-.156(.79)*	.21	-1.33(.81)	.26
Career Awareness (ref.=no)				
Yes	-1.02(.78)	.36	-1.31(.79)	.27
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college	.25(.91)	1.28	.64(.94)	1.90
High school	.48(.61)	1.62	.74(.64)	2.10
Household Income (Ln)	.41(.51)	1.51	.63(.53)	1.88
N		867 ^a		
-2Log Likelihood		381.149*		
Pseudo R-Square (Cox & Snell)		.033 (.036)		

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college and who did not complete college were excluded. Plus, the missing data of no college completion, job relevance to college major, and job correspondence to education level were excluded.

Table 4.20

Effect of HS Track & Controls on Job Correspondence to Educational Level (Dataset 4)

Predictor Variables	Job Correspondence to Education Level (ref.=Much Higher/Much Lower)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
High School Track (ref.=General)				
Vocational	.37(.55)	1.45	.24(.61)	1.27
Gender (ref.=Male)				
Female			1.67(.57)**	5.33

Table 4.20 (continued)

Predictor Variables	Job Correspondence to Education Level (ref.=Much Higher/Much Lower)			
	Model1		Model2	
	Coef.(Std.Error)	Odd Ratio	Coef.(Std.Error)	Odds Ratio
Similar				
Academic Achievement (ref.=Low)				
Average/High			.82(.67)	2.26
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			-1.46(.83)	.23
Career Awareness (ref.=no)				
Yes			-.96(.79)	.37
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			.29(.92)	1.34
High school			.50(.62)	1.65
Household Income (Ln)			.42(.51)	1.52
Higher/Lower				
High School Track (ref.=General)				
Vocational	.08(.56)	1.08	-.04(.63)	.96
Gender (ref.=Male)				
Female			1.10(.59)	3.00
Academic Achievement (ref.=Low)				
Average/High			.89(.68)	2.44
Educational Aspiration (ref.= high school or 2yr college)				
4yr college			-1.35(.85)	.26
Career Awareness (ref.=no)				
Yes			-1.30(.80)	.27
Parental Educational Level (ref.= Middle school& below)				
2 or 4yr college			.63(.95)	1.87
High school			.73(.64)	2.08
Household Income (Ln)			.62(.53)	1.86
N	867 ^a		867 ^a	
-2Log Likelihood	19.608		774.282**	
Pseudo R-Square (Cox & Snell)	.003 (.004)		.035 (.038)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college and who did not complete college were excluded. Plus, the missing data of college completion, job relevance to college major, and job correspondence to education level were excluded.

Research question 3. This research investigated whether or not and to what extent high school track and college performance predicted the post-college occupational outcomes: *job relevance to college major* and *job correspondence to education level*. In order to determine the predictability, multinomial logistic regressions were conducted with the valid cases on the survey questions without dividing the samples by their high school track (N = 867). Like Research Question 2, all of them were first—job-paid workers after college graduation. Since Research Question 3 aimed to examine the change of the predictability of high school track when it was combined with college performance, college performance (*college enrollment*, *college stopout*, and *college completion*) was added to the regression model as the independent variables. Tables 4.21 and 4.22 present the results of the analyses on the two outcome variables. Each outcome variable had three levels of category as stated in Research Question 2.

Similar to the findings for Research Question 2, high school track was found to be a non-significant factor in determining its graduates' satisfaction, concerning job relevance to college major. In addition, it was proved not to explain any variance of the outcome (pseudo $R^2 = .000$; see Model 1 in Table 4.21). However, college enrollment and stopout were significantly related to the outcome variable, both with and without the control factors. When the three college performance variables were added to high school track (Model 2), the predictability very slightly increased by 2.6% (pseudo $R^2 = .026$). Compared with those enrolled in two-year colleges, the respondents who entered four-year colleges were 64% less likely to feel satisfaction with their jobs, regarding job relevance to college major (odds ratio = .36, $p < 0.01$), which slightly increased to 67% (odds ratio = .33, $p < 0.01$) when combined with the control factors (Model 3). College

stopout significantly predicted this outcome: Compared with the people who had not chosen a temporary stop on their college education, those having experienced stopout were 56% less likely to feel satisfied (odds ratio = .44, $p < 0.001$) with their job related to their college major (Model 2), which dropped to 40% with the control variables in Model3 (odds ratio = .60, $p < 0.05$).

Another interesting finding was that the gender difference was reduced when gender was combined with college performance variables in a model (see Tables 4.18 and 4.21). Female students were 2.3 times more likely than male students to feel satisfaction with their jobs regarding their job relevance to college major (odds ratio = 2.34, $p < 0.01$), which was 2.93 without the college performance factors. Career awareness was still significant in predicting this outcome, and the predictability also increased when the model included college performance variables: Compared with those saying 'no,' the people who answered 'yes' when asked if they had made a decision on their future jobs, were 2.2 times more likely to feel satisfied with their job relevance to college major (odds ratio = 2.17, $p < 0.001$), increasing from 1.97 when the model did not include college performance (see Table 4.18).

With regard to job correspondence to education level, the results of the analysis were more conspicuous: Only college stopout turned out to be influential (see Table 4.22). The respondents who had chosen a temporary stopout in their college studies were 88% less likely to feel satisfaction than those who had not (odds ratio = .12, $p < 0.01$). Although the controls were added to the model (Model 3), the probability slightly changed to 86% (odds ratio = .14, $p < 0.01$). Not surprisingly, high school track did not influence this outcome (Model 1; pseudo $R^2 = .003$). The explanatory power of the model

increased to 3.6% when the college performance factors were added (pseudo $R^2 = .036$) and rose to 5.3% when all the control factors were included in the model (pseudo $R^2 = .058$).

The analyses on Research Question 3 discovered that college graduates who were female, had enrolled in two-year colleges, and had not temporarily stopped their college education were much more likely to feel satisfaction, regarding job relevance to college major. Further, when it came to job correspondence to education level, only college stopout had significant predictability. The models barely explained the variance in outcome variables. Compared with the findings for Research Question 2, high school track did not predict job-related satisfaction when students had graduated from college. Rather, college enrollment and stopout turned out to be significant determinants regardless of the high school track in which the respondents had been involved.

Table 4.21

Effect of HS Track & College Performance on Job Relevance to College Major (Dataset 4)

Predictor Variables	Job Relevance to College Major (ref.=Dissatisfied)					
	Model 1		Model 2		Model 3	
	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.
	Satisfied					
High School Track (ref.=General)						
Vocational	.09(.19)-	1.10	-.10(.22)	.90	-.01(.24)	.98
College Enrollment (ref.=2yr College)						
4yr College			-1.02(.31)**	.36	-1.10(.33)**	.33
College Stopout (ref.=No Stopout)						

Table 4.21 (continued)

Predictor Variables	Job Relevance to College Major (ref.=Dissatisfied)					
	Model 1		Model 2		Model 3	
	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.
	Satisfied					
Stopout			-.82(.21)***	.44	-.51(.23)*	.60
College Completion (ref.=2yr College)						
4yr College			.51(.32)	1.66	.37(.34)	1.45
Gender (ref.=Male)						
Female					.85(.25)**	2.34
Academic Achievement (ref.=Low)						
Average/High					.20(.22)	1.22
Educational Aspiration (ref.= high school or 2yr college)						
4yr college					-.17(.27)	.84
Career Awareness (ref.=no)						
Yes					.77(.22)***	2.17
Parental Educational Level (ref.= Middle school & below)						
2 or 4yr college					.18(.35)	1.20
High school					.11(.25)	1.12
Household Income (Ln)					-.11(.20)	.90
	Neither Satisfied Nor Satisfied					
High School Track (ref.=General)						
Vocational	-.02(.22)	.98	-.31(.25)	.73	-.33(.27)	.72
College Enrollment (ref.=2yr College)						
4yr College			-.45(.34)	.64	-.39(.35)	.68
College Stopout (ref.=No Stopout)						
Stopout			-.72(.24)**	.49	-.48(.26)	.62
College Completion (ref.=2yr College)						
4yr College			-.38(.36)	.68	-.58(.37)	.56
Gender (ref.=Male)						
Female					.77(.28)**	2.16
Academic Achievement (ref.=Low)						
Average/High					.16(.24)	1.18

Table 4.21 (continued)

Predictor Variables	Job Relevance to College Major (ref.=Dissatisfied)					
	Model 1		Model 2		Model 3	
	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.
Neither Satisfied Nor Satisfied						
Educational Aspiration (ref.= high school or 2yr college)						
4yr college					-.31(.29)	.74
Career Awareness (ref.=no)						
Yes					.11(.24)	1.12
Parental Educational Level (ref.= Middle school & below)						
2 or 4yr college					-.27(.39)	.77
High school					.05(.27)	1.05
Household Income (Ln)					.09(.22)	1.10
N	867 ^a		867 ^a		867 ^a	
-2Log Likelihood	24.136		113.983***		1.412E3***	
McFadden Pseudo R-Square (Cox & Snell)	.000 (.001)		.026 (.049)		.051 (.092)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college and who did not complete college were excluded. Plus, the missing data of college completion, job relevance to college major, and job correspondence to education level were excluded.

Table 4.22

Effect of HS Track & College Performance on Job Correspondence to Educational Level

(Dataset 4)

Predictor Variables	Job Correspondence to Education Level (ref.=Much Higher/Much Lower)					
	Model 1		Model 2		Model 3	
	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.
Similar						
High School Track (ref.=General)						
Vocational	.37(.55)	1.45	.08(.62)	1.08	-.04(.65)	.96
College Enrollment (ref.=2yr College)						
4yr College			-1.26(.72)	.28	-.98(.75)	.38

Table 4.22 (continued)

Predictor Variables	Job Correspondence to Education Level (ref.=Much Higher/Much Lower)					
	Model 1		Model 2		Model 3	
	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.
Similar						
College Stopout (ref.=No Stopout)						
Stopout			-2.10(.69)**	.12	-1.97(.72)**	.14
College Completion (ref.=2yr College)						
4yr College			.28(.70)	1.32	-.54(.79)	.59
Gender (ref.=Male)						
Female					1.25(.68)	3.48
Academic Achievement (ref.=Low)						
Average/High					.86(.68)	2.37
Educational Aspiration (ref.= high school or 2yr college)						
4yr college					-1.04(.89)	.35
Career Awareness (ref.=no)						
Yes					-.92(.80)	.40
Parental Educational Level (ref.= Middle school & below)						
2 or 4yr college					.19(.95)	1.21
High school					.50(.65)	1.64
Household Income (Ln)					.64(.55)	1.90
Higher/Lower						
High School Track (ref.=General)						
Vocational	.08(.56)	1.08	-.25(.64)	.78	-.33(.67)	.71
College Enrollment (ref.=2yr College)						
4yr College			-1.73(.76)*	.18	-1.47(.79)	.23
College Stopout (ref.=No Stopout)						
Stopout			-1.52(.70)*	.22	-1.57(.73)*	.21
College Completion (ref.=2yr College)						
4yr College			.77(.74)	2.15	-.07(.84)	.93
Gender (ref.=Male)						
Female					.80(.70)	2.22

Table 4.22 (continued)

Predictor Variables	Job Correspondence to Education Level (ref.=Much Higher/Much Lower)					
	Model 1		Model 2		Model 3	
	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.	Coef. (Std.Error)	Odds Ratio.
Higher/Lower						
Academic Achievement (ref.=Low)						
Average/High					.93(.69)	2.53
Educational Aspiration (ref.= high school or 2yr college)						
4yr college					-.90(.91)	.41
Career Awareness (ref.=no)						
Yes					-1.21(.81)	.30
Parental Educational Level (ref.= Middle school & below)						
2 or 4yr college					.51(.98)	1.66
High school					.71(.67)	2.02
Household Income (Ln)					.85(.56)	2.33
N	867 ^a		867 ^a		867 ^a	
-2Log Likelihood	19.608		83.080**		851.294**	
McFadden Pseudo R-Square (Cox & Snell)	.003 (.004)		.032 (.036)		.053 (.058)	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^aStudents who were not enrolled in college and who did not complete college were excluded. Plus, the missing data of college completion, job relevance to college major, and job correspondence to education level were excluded.

Chapter Summary

This chapter discussed the analysis results, using four datasets. Descriptive statistics of the data revealed that students from vocational high school possessed relatively lower self-efficacy than those from general high school. More students in vocational high school considered their academic achievement was below the average level, and much less desired to go to four-year colleges after high school graduation, compared with general high school students. They had a lower level awareness of their future jobs as well. Regarding their socio-economic backgrounds, the vocational track

students were more likely to come from disadvantaged backgrounds compared with the general track students. Fewer parents of the vocational track students had a college degree and their monthly household income was much smaller, compared with the general track students.

When the students who were not enrolled in college were excluded, the proportion of male student and students who desired four-year college education increased, especially in the vocational track. Further, it was discovered that the parental education level of the vocational track students slightly rose. However, when the ones who did not complete college were excluded, the ratio of male students drastically decreased and dropped even more as the data only included the valid answer on the first-paid jobs after college graduation. This finding can be interpreted to reflect the fact that male students need a longer time than females do to finish their college education and to obtain their initial jobs subsequently after college completion. One interesting finding was that as the valid cases were reduced, the gaps between the two high school tracks became narrower, especially concerning academic achievement, parental educational level, and household income.

The frequencies of dependent variables revealed several differences in the two high school types. In the vocational track, only 1 out of 4 students advanced to four-year colleges, whereas 3 out of 4 students in the general track did so. Rather, half of the students in the vocational track matriculated at two-year colleges. More than half of the respondents from both tracks experienced temporary stopout during their college education, but relatively small number of students from the vocational track did. Accordingly, a smaller number of the vocational high school graduates completed four-

year colleges, compared with those from general high school. College graduates from the vocational track demonstrated a similar probability to obtain a first-paid job and a similar level of job satisfaction to those from the general track. When it came to *job correspondence to one's education level*, however, the answers from the vocational track students were more polarized: More respondents chose *similar* or *much higher/much lower*, compared with those from the general track, even though the differences were not much salient.

The correlation analysis exploring the relationships between high school track and control variables discovered that all the control factors were significantly related to high school track, except gender. The control factors were found negatively correlated with high school track, which means that the students from vocational high school were in lower placements regarding academic achievement, educational aspiration, career awareness, parental educational level, and household income than those in general high school. These results reassured the past findings.

With regard to the predictability of the control factors, gender was found as a key determinant throughout college enrollment, stopout, and completion, and even job satisfaction after college graduation. Female students were more likely than male students to enroll in two-year colleges, less likely to choose stopout, but more likely to complete colleges with a limited time frame between 2005 and 2010. As illustrated, this finding may be due to the fact that male students were more likely to stop their college studies because of the compulsory military service and thus needed more time to complete colleges. Furthermore, a higher probability was found for females than for males to feel satisfied with their first jobs, regarding relevance to college major and correspondence to

educational level. Interestingly, almost all the control variables greatly influenced college enrollment, but only gender and educational aspiration functioned as a significant factor in deciding college stopout. The more students desired four-year college advancement, the more they were likely to choose a temporary stopout of college attendance. With regard to college completion, educational aspiration as well as academic achievement was positively related.

High school track was found to be an important factor in determining college performance of its graduates, even after controlling for their socio-economic factors. Compared with those from general high school, the respondents in vocational high schools were less likely to enroll in colleges, less likely to temporarily stop their college learning, and less likely to complete four-year colleges (not significant in completing two-year colleges). Regarding post-occupational outcomes of college graduates, however, high school track lost its significant influence and hardly explained the variances. Regardless of including or excluding the control factors, there was no significant difference in determining the satisfaction about *job relevance to college major and job correspondence to education level* between the two high school tracks. Even combined with the three variables of college performance, the model including high school track revealed no significant relationships with the outcomes.

Chapter 5

Conclusion

This chapter presents an in-depth discussion on the analysis results concerning the effects of high school track upon its graduates' college performance and subsequent post-college occupational outcomes. This study discovered that the college enrollment rate of vocational high school graduates was 20% less than that of general high school graduates, but only one-fourth of them advanced to four-year colleges. Consequently, among the college graduates, those from the vocational track occupied a much smaller proportion in four-year college completion. Regarding first-paid jobs after college graduation, there was no difference between the two high school tracks. High school track had significant impacts on college performance but not on post-college occupational outcomes. However, those involved in four-year colleges demonstrated a lower level of satisfaction regarding *job relevance to college major* and *job correspondence to education level*. The implications for policy and future research are also suggested.

Discussion

This study was designed to address the following research questions, utilizing the KEEP data of 2004 through 2010. The data originally included the sample of 4,000 12th graders as of 2004 with equal numbers from both high school tracks (vocational : general = 2,000 : 2,000).

1. To what extent does high school track, vocational vs. general, influence college performance?
2. To what extent does high school track, vocational vs. general, influence post-college occupational outcomes?

3. To what extent do high school track and college performance influence post-college occupational outcomes?

The Followings summarizes the key findings of the study.

1. Even though there was only about 20% difference in overall college enrollment between the two high school tracks, graduates from general high school were three times more likely to advance to four-year colleges than those from the vocational high school. Furthermore, the college completion rate of the vocational high school track students was 10% less than that of the general high school track students.

2. When selecting the cases that had completed colleges and had first-paid jobs, there were similar numbers of respondents in both tracks. Furthermore, few disparities between the two high school tracks were found on *job relevance to college major*. In sum, regarding post-college occupational outcome variables, those involved in vocational high school showed considerable competitiveness, compared with their peers from general high school.

3. College graduates from both kinds of high school revealed a similar probability of initial-paid job employment. Moreover, a slightly higher level of satisfaction about their job and college-major match was found in vocational track. The result implies that regarding job-usefulness and educational level-match, those involved in secondary vocational education demonstrate substantial competitiveness in comparison with those in general education.

4. Analyses on the control variables suggested that the vocational high school students possessed lower self-efficacy and lower socio-economic background than their peers in general high school. However, as the cases of no-college enrollment and no-

college completion were excluded, the gap between the two high school tracks became narrowed. This finding adds to our knowledge, since little research examines college performance of vocational high school graduates.

5. In the vocational track, most of the control factors significantly affected enrollment of both two- and four-year colleges. In contrast, only academic achievement and educational aspiration were found significant in the general track. This result indicates that graduates from vocational high school are relatively more influenced by their socio-economic background when deciding college enrollment, compared with those from general high school.

6. High school track was confirmed as a significant factor in determining college enrollment, college stopout, and college completion, regardless of whether the control variables were included in the regression model or not. The vocational high school graduates were less likely than the general high school graduates to enroll in college, less likely to choose temporary leave from their college attendance, and less likely to complete their college education.

7. However, the high school track was found to be non-significantly related to post-college occupational outcomes. This result may suggest that the high school track fail to demonstrate a long-term effect on satisfaction with their initial jobs after college graduation, regarding *job relevance to college major* and *job correspondence to education level*. Yet, this study found that those who had aspired to four-year college graduation, had been enrolled in four-year colleges, and had chosen a temporary leave on their college attendance, were less likely to be satisfied with the two outcome variables.

Descriptive trends. The results of descriptive analyses on the sample of this study reflected the preexistent similarities and differences between the two types of high school students. First, the overwhelming number of students, regardless of high school track, chose college entrance instead of direct entry into the labor market after high school graduation: Three-thirds of the vocational high school graduates and almost all of the general high school graduates were enrolled in colleges. This finding explains the reason why reorienting the goal of secondary vocational education has been in a hot controversy since the mid-1990s (Lee et al., 2008) and why the main purpose of secondary vocational education has shifted from nurturing a middle-level-skilled workforce to preparing post-secondary education in pursuit of a long-term and highly-skilled career (Chae, 2006; Lee et al., 2008). Literally, Korean secondary vocational education is no longer just vocational education but *new vocational education* for tertiary education, not *education about occupations* but *education for occupations*, inevitably integrated with academic education (Dow 2002; Kim, 2001; Kim et al., 2010; Lee et al., 2008; Tilak, 2002).

Second, regarding college type, huge differences were identified between the two high school tracks. In vocational high school, one-fourth of the graduates advanced to four-year colleges, where three fourths in general high school did so. On the other hand, half of the vocational high school graduates advanced to two-year colleges, which was only one-fifth in general high school. Among those who enrolled in colleges, over 40% of the general high school graduates completed four-year colleges, which was 10% among the vocational high school graduates. These findings reassured that even though the Korean vocational education system is highly standardized with a strong emphasis on

generic skills and college-preparatory curriculum (Kim, 2001; Tilak, 2002), it is still regarded as *second-class education* for academically less competitive students (Chae & Chung, 2009). In addition, this result is consistent with the previous study, explaining that vocational high school graduates have more difficulties preparing for the college entrance exam since the secondary vocational education in Korea is not aimed to college admission (Byun & Kim, 2012).

Third, regarding college retention, a slightly higher proportion of the general high school graduates chose a temporal leave from their college attendance than those from vocational high school. However, in both tracks, more than half of the graduates used to stopout their college studies. This finding is not compatible with the previous research recognizing that students from vocational high schools are highly associated with college stopout (Kim, 2008). Substantial studies reported that socioeconomic backgrounds are most decisive in placing students in the high school track (Ainsworth & Roscigno, 2005; Fletcher, 2009; Lewis & Cheng, 2006; Okes, 1987; Rosenbaum, 1980; Vanfossen et al., 1987), and it has been generally accepted that students in vocational high schools are characterized by relatively inferior socioeconomic status to those in general high schools (Bae et al., 2011; Byun & Kim, 2012; Jang, 2007; Kim & Ryu, 2008; Park et al., 2009). Considering these findings, it may be concluded that college stopout in Korea is not strongly affected by demographic or socio-economic characteristics of students. On the other hand, there was a noticeable difference in college completion: Whereas the general track students showed similar completion rates between two-year and four-year colleges, a huge gap was found for vocational track students. Furthermore, among the students enrolled in colleges, vocational high school graduates who answered *no completion* were

10% more than those from general high schools. These results may suggest that demographic factors significantly affect college completion.

Fourth, the vocational high school graduates seemed to have a similar probability of employment for first-paid jobs after college graduation to those from general high school. Furthermore, little disparity between the two high school tracks was found in those who answered they were satisfied with *job relevance to college major*. Regarding *job correspondence to education level*, however, more respondents from the vocational track were categorized in the *much higher/much lower* category. In sum, regarding post-college occupational outcome variables, college graduates who had graduated from vocational high schools demonstrated considerable competitiveness, compared with their peers from general high school. This finding is in accordance with Lee et al. (2008), who found that vocational high school graduates were more likely to be employed in full-time and regular jobs than general high school graduates, and higher satisfaction with major-match and major-usefulness to the initial job. Together, findings indicate the positive influence of secondary vocational education on employment after college graduation.

Fifth, the descriptive analyses on the samples of the four datasets supported that students involved in vocational high school hold relatively low self-efficacy in comparison with their peers in general high school. This finding is consistent with previous studies emphasizing the individual abilities in high school tracking (Ainsworth & Roscigno, 2005; Fletcher, 2009; Lewis & Cheng, 2006; Okes, 1987; Rosenbaum, 1980; Vanfossen et al., 1987). A considerable portion of students in the vocation track felt their academic achievement was under average, and accordingly, a much smaller number of students in the vocational track desired four-year college enrollment, compared with

students in the general track. Further, a smaller number of students in the vocational track set their career goals than did students in the general track,

Regarding socio-economic background, the status of the vocational high school students was lower than that of the general high school students. Compared with those of the general high school students, parents of the vocational high school students were less likely to have a college degree and had a lower level of monthly household income. These results confirmed the past findings suggesting that students in vocational high schools are more likely than their counterparts in general high schools to come from disadvantaged backgrounds, characterized by lower parents' educational level, less family income, and less support from their parents (Bae et al., 2011; Byun & Kim, 2012; Jang, 2007; Kim & Ryu, 2008; Park et al., 2009).

Lastly, excluding students who were not enrolled in college resulted in some significant changes in the descriptive statistics, especially for the vocational high school graduates. In detail, the number of male students increased, and students who wanted four-year college advancement rose in the vocational track more than in the general track. Similarly, the number of students whose parents had graduated from two- or four-year colleges was greater in the vocational track. This trend continued as the sample of the datasets declined when excluding invalid cases on college completion. The proportion of students perceiving their academic achievement as *average or high* became similar in both tracks. With regard to parental educational level, the gap between the two tracks decreased. Similarly, the minimum value of monthly household income increased in the vocational track. These findings may suggest that the demographic circumstances improved as vocational high school graduates advanced and complete college education.

Influence of high school track on college performance. The analyses of the control factors regressed on college enrollment revealed several important findings. First, all of the control factors were identified as significant in predicting two- and four-year college enrollment in the vocational track (Academic achievement was significant only in predicting two-year college enrollment.). However, in the general track, only academic achievement and educational aspiration were significant determinants of two- and four-year college enrollment. Gender, educational aspiration, and household income were the most significant determinants of two- and four-year college enrollment of vocational high school graduates. Career awareness and parental educational level also greatly influenced college enrollment of the vocational track students. These findings are consistent with those of the previous studies (Byun & Kim, 2012; Chae, 2006; Choi, 2009; Kim & Shin, 2010), suggesting parental educational level and household income as the most influencing factors on college enrollment of vocational high school graduates. On the other hand, the graduates from general high school were affected only by academic achievement and educational aspiration when deciding on college enrollment. Students considering their academic achievement were in the *average or high* level had much greater probability to enroll in two- and four-year colleges, in comparison with those who felt their academic achievement was in the *low* category. Gender was significantly related to two-year college enrollment, and household income significantly predicted only four-year college enrollment. This result reinsured the past findings suggesting that Korean students make decisions on high school advancement primarily by their academic records during middle schools (Jung et al., 2004; Jung & Lee, 2005).

These results indicated that even though more than 70% of the sample students in the vocational track advanced to colleges, their college enrollment was considerably determined not only by the factors associated with their own individual ability or self-evaluation, such as educational aspiration or academic ability, but also by their socioeconomic backgrounds such as parental educational level or household income. In the general track, however, their college advancement was significantly predicted only by their academic achievement and educational aspiration. This finding is quite noteworthy: The vocational high school graduates had a relatively lower level of socioeconomic backgrounds and thus were inevitably more influenced by their surroundings than their peers in the general track. By contrast, the general high school students were barely influenced by their surroundings. They were academically more competent and accordingly had higher educational aspiration than their peers in the vocational track had, resulting in higher enrollment rates for four-year colleges.

The analysis utilizing the pooled sample of both high school tracks discovered that high school track was a significant predictor of college enrollment. In comparison with no college enrollment, vocational high school graduates were less likely to be enrolled in four-year colleges than were the general high school graduates. Even after controlling for the other factors, high school track still significantly predicted college enrollment, and students from the vocational track demonstrated slightly raised but still much less odds for four-year college enrollment than those from the general track. This finding adds to our knowledge, since there is little research examining the influence of high school track on college enrollment, especially from the longitudinal perspective.

Second, the analyses of this study found that college stopout was significantly influenced only by gender, educational aspiration, and high school track. The effects of the control factors were found similar between the two high school tracks. This finding is consistent with the evidence by Chu, Cha, and Pyo's (2011) study. They examined institutional as well as demographic factors affecting college stopout but concluded that only GPA and satisfaction with college choices were statistically significant in predicting students' stopout. However, household income and parental educational level did not demonstrate any significance in predicting college retention, which was not consistent with the findings of Kim (2008) and Choi (2010). This study also found that female students were less likely to choose temporary leave from their college education than male students were. This finding may reflect the fact that male students are subjected to the compulsory military service. Educational aspiration was positively related to college stopout: Students who anticipated four-year college advancement after high school graduation were more likely to stopout their college studies, compared with those who chose *high school or two-year colleges*.

High school track alone did not much explain the variance of college stopout, but including the individual background factors increased the explaining power. Nevertheless, high school track still played a significant role in determining college stopout: The vocational track students showed less odds to choose a temporary stop than did the general track students. This finding may suggest that general high school students have higher educational expectation, more likely to enroll in four-year colleges, and more likely to stop their college education, compared with vocational high school graduates. Previous research found inconsistent results on college stopout of vocational high school

graduates. Some studies concluded that vocational high school students show higher dropout rates (Kim, 2008; Lim & Kim, 2006). However, Lim (2011) compared students from general and vocational high schools and identified that vocational high school students had a lower probability to choose stopout but a higher likelihood to dropout their college attendance for various reasons, such as economic, physical, or mental problems, or difficulties in academic work.

Third, regarding the control factors' influence on college completion, there was no significant difference between the two tracks. Gender and educational aspiration were statistically significant in predicting college completion in both high school tracks. Students desiring four-year college graduation were seven times more likely to complete four-year colleges, compared to those who wanted *high school/two-year* colleges. In the general track, however, academic achievement significantly influenced college completion. Students who reported that their academic achievement was at the *average/high* level demonstrated three times greater odds to complete four-year colleges than those who did not. However, academic achievement was not found statistically significant in the vocational track.

The high school track was significantly related to the likelihood of four-year college completion but not to the likelihood of two-year college completion. The vocational high school graduates had much less odds to complete four-year colleges than those from general high schools. Even after controlling the background factors, high school was still statistically significant. Unlikely the analyses on each track, the analysis with the pooled sample identified that academic achievement, educational aspiration, and parental educational level significantly predicted college completion. These findings are

consistent with those of previous studies that asserted that high school curriculum track is significantly associated with college completion (Lim & Kim, 2006; Swail et al., 2003). Especially, Lim and Kim (2006) found that students from vocational high schools demonstrated lower aptitude in academics, less perception on their career, and lower self-efficacy, in their college lives. These various findings can contribute to understanding why many vocational high school students did not finish their college education.

In sum, this study confirmed that high school track was a significant determinant of college enrollment, stopout, and completion. Compared to those from general high schools, vocational high school graduates were less likely to enroll in colleges (much less likely to enroll in four-year college), less likely to temporarily stop college attendance, and less likely to graduate from colleges. These findings were supported by the previous research reflecting the inferior outcomes of those involved in secondary vocational education, compared with general high school graduates, concerning college performance (Byun & Kim, 2012; Chae, 2006; Kim & Phang, 2005). In addition to high school track, gender, academic achievement, and educational aspiration played as significant factors that predicted the college performance outcomes.

This study also found that the college enrollment among students from vocational high schools was more strongly affected by their socio-economic background, whereas among those from general high schools college enrollment was determined primarily by their own abilities or aspiration. These findings are consistent with those of Moore and Shulook (2009) asserting the importance of academic preparation in high schools to complete college education. According to the study, so-called *traditional students* are in an advantageous status regarding college completion, and their characteristics are

described as high academic preparation in high schools, direct college enrollment after high school graduation, and full-time college students (Moore & Shulook, 2009).

Considering that vocational high school students have relatively lower self-efficacy and a more disadvantaged family backgrounds than general high school graduates, vocational high school students are less likely to be well prepared academically and thus less likely to be enrolled in college as a full-time student. This explains the reason why vocational high school graduates are less likely to complete college education than general high school graduates, and why the policies for non-traditional students are necessary (Ishitani & Desjardins, 2002; Moore & Shulock, 2009).

Influence of high school track on post-college occupational outcomes. To determine the linkage between involvement in secondary vocational education and post-college occupational outcomes, this study analyzed 867 cases that had graduated from two- or four-year colleges and secured their first-paid jobs. As a result, the control variables turned out to barely have statistical significance in *predicting job relevance to college major* and *job correspondence to educational level*. Only gender was significantly related to the satisfaction with the two outcome variables, showing that females had greater odds to be satisfied than males. High school track did not reveal any significance in predicting satisfaction of the two outcome variables and scarcely explained the variance of outcomes.

One of the key findings is that educational aspiration was negatively related to the satisfaction on both outcome variables. People who desired four-year college graduation when they were in high school, were less likely to be satisfied *with job relevance to college major* and *job correspondence to educational level*, compared with those who

wanted high school or two-year college graduation. These results match the fact that 42% of college graduates are oversupplied and 10% of youth are underemployed (Kim et al., 2010). Based on the human capital theory, four-year college graduates obviously tend to expect higher economic returns than those who do not have a university degree. Given the oversupply and underemployment of college graduates, there may be a great possibility that their expectation is not sufficiently fulfilled in the job market. The finding of this study-the satisfaction of those who expected four-year college graduation turned out to be much lower than those who did not-is also supported by the fact that people with a high-educational background confront more challenge in the labor market, and about 40% of university graduates feel a mismatch with their jobs and college studies (Kim et al., 2010).

This study also found the non-significant relationships between high school track and the two post-college occupational outcomes. This finding may suggest that although high school track plays an important role in college enrollment, college stopout, and college completion, its impact may disappear when making the transition from college to the job market. In other words, secondary vocational education may have a short-term effect on college performance but may not have a long-term effect on the post-college occupational outcomes. Yet, given the limitations of the data used in this study, findings of the effect of secondary vocational education after college graduation need to be carefully interpreted. However, after college graduation, high school track did not affect the two outcomes concerning job-related performance, at least in this study. This finding suggests that secondary vocational education loses its advantageous edge to maintain the identity of vocational high school. In conclusion, secondary vocational education in

Korea may not succeed in securing its own merit, even though it has shifted its primary function to preparing post-secondary education for the life-long career path rather than direct entry to the world of work by emphasizing the integration with academic learning (Chae, 2006; Dow 2002; Kim, 2001; Kim et al., 2010; Lee et al., 2008; Tilak, 2002).

Influence of high school track and college performance on post-college occupational outcomes. The analyses were performed to identify whether or not and to what extent high school track combined with college performance factors would predict post-college occupational outcomes. Since the evidence of college premium from the economic perspective has been identified in a considerable number of previous studies (Bailey et al., 2004; Baum et al., 2010; Belfield & Bailey, 2011; Compton et al., 2010; Fletcher, 2009; Grubb, 1995; Grubb, 2002a; Grubb, 2002b; Kim et al., 2010), the current study explored the effects of high school track on the satisfaction of *job relevance to college major* and *job correspondence to education level*.

First, high school track was confirmed to be non-significant in determining *job relevance to college major* and *job correspondence to educational level* with or without the college performance factors (i.e., college enrollment, college stopout, and college completion). Regarding *job relevance to college major*, college graduates from vocational high school were more likely to be satisfied than those from general high school, but this was not statistically significant. With regard to *job correspondence to educational level*, college graduates who had been involved in vocational track during high school verified higher likelihood to be satisfied, which was not have statistical significance, either. Further, high school track did not explain any variance of the two outcomes.

Second, it was discovered that *college enrollment* and *college stopout* were significantly related to *job relevance to college major*. People who had enrolled in four-year colleges were less likely to feel satisfaction than those who had enrolled in two-year colleges. This result is well-matched with the finding of Research Question 2: Those who had desired four-year college graduation for their future education verified less probability to be satisfied with job relevance to college major. Further, the respondents who chose temporary leaves from their college attendance were less likely to be satisfied with *job relevance to their college major* and much less likely with *job correspondence to educational level*. These results did not change even after the control variables were added to the regression model, even though the odds slightly decreased. This result may suggest that those who temporarily stop their college studies may pursue other colleges or majors, and consequently demonstrate less satisfaction with the job-major match. This finding is also in accordance with the analysis of Lee et al. (2008). Lee et al. (2008) analyzed the GOMS (Graduate Occupational Mobility Survey) data and identified that regarding the initial employment after college graduation, the graduates of vocational high school turned out to be more likely to be in full-time and regular jobs than those from general high school. This implies that those from vocational high school may possess higher satisfaction with their initial jobs after tertiary education.

In this study, even though high school track was found to be a non-significant factor to determine the two variables about post-college initial jobs, it was already found that college graduates from vocational high school were less likely to be involved in four-year colleges than those from general high school. Together, these findings may indicate that those from vocational high school were less likely to matriculate four-year colleges

compared with their peers from general high school, and thus more likely to be satisfied with *their job relevance to college major* and *job correspondence to educational level*, concerning their initial job after college graduation. This may also imply that they have a relatively greater preference to choose practical studies in college than those from general high school. This finding may also correspond to the finding of Kim et al.'s (2010) study, which identified that vocational high school graduates have a greater preference for choosing job-related majors rather than academic majors in college.

Third, career awareness was found to be positively related to the satisfaction about job relevance to major. This finding is not exactly compatible with the results of previous studies. While students in the vocational track had been consistently demonstrating lower family income, lower parental educational level, and less family support (Bae et al., 2011; Byun & Kim, 2012; Jang, 2007; Kim & Ryu, 2008; Park et al., 2009), studies presented mixed results on their career awareness: Some studies identified that students in the vocational track demonstrated higher perception on their future career and higher probability to determine their career goals at an early age than their peers in the general track (Oh et al., 2010; Yoon et al., 2005). However, Lim and Kim (2006) recognized that students involved in the vocational track lack maturity regarding career decision and career aspiration, compared with students in the general track. On the other hand, it was also found that setting a career goal in college indicates higher satisfaction with their initial jobs, regardless of high school track (Lee et al., 2008).

In conclusion, this study suggests that high school track may have significant short-term effects on college performance but may not have significant long-term effects on the satisfaction about initial jobs after college graduation. This study also confirms

that educational aspiration, college enrollment, and college stopout significantly affects the satisfaction. Further, people who had been involved in four-year colleges demonstrated much less satisfaction with their initial jobs with regard to *job relevance to college major* and *job correspondence to educational level*. The following section discusses implications for policy and future research.

Implications for Policy

Today's secondary vocational education in Korea aims at expediting students' readiness for tertiary education toward life-long career paths. Due to the *equalization policy* for high school education and the sweeping growth of college enrollment since the mid-1980s, secondary CTE in Korea has been failing to differentiate itself from general education, casting a doubt about its effectiveness. A continuous decline in the student population forces secondary CTE to lose its attractiveness, which has resulted in a decrease in enrollment since the 1990s. Currently, more than 70% of the students involved in the vocational track go to *some college* after high school graduation. As a result, Korea is facing high unemployment of college graduates, referred to as *over education*. It is necessary to make it certain whether secondary vocational education is performing its function demanded by the society. To this end, the followings are the suggestions, based on the analyses of this study, are offered.

First, it is required to measure the exact demand of vocational education in secondary schools and the related policies needs to be changed, based on the assessment. The analyses of this study identified that 75.6% of the vocational high school graduates chose college advancement instead of direct entry into the labor market. However, high school track turned out to have no influence after college graduation, which means there

is no difference between those from vocational high schools and general high schools after college completion. The only distinction is that two times more students from the vocational track enrolled in two-year colleges, compared with those from the general track. This is the reason why people ask the questions: Where is secondary vocational education? Does the real demand for vocational education in high school exist? Likewise, Byun and Kim (2012) warned that vocational high school is often preferred in order to take advantage of the extra-quota system for college admission. Together, as Byun and Kim (2012) pointed out, the reasons why vocational high school graduates choose college enrollment should be examined, too.

Second, it is the very time to formally reestablish the goal of secondary vocational education from the long-term perspective, embracing post-secondary vocational education. Currently, given the reality that three-fourths of vocational high school graduates advance to *some college*, *vocational effect* is definitely supposed to last after college graduation. Despite the worries over *blurring its boundary*, secondary vocational education is believed to provide transferrable and generic skills rather than specific techniques confined into a particular occupation (Klein & Green, 2012). The reoriented goal is expected to properly broaden its boundary to include a higher level of academic education and make a distinction of vocational track in- and post-college education. As a result, integration is essential between the vocational and general education in the high school level, as new vocationalism has emphasized (Benson, 1997; Bragg, 2001; Dow, 2002; Grubb, 1996a; Grubb, 1996b). If vocational high school graduates possess improved flexibility and adaptability toward post-secondary vocational education, their

success in college enrollment and completion will increase accordingly, leading the increase of a highly-skilled workforce.

Third, two- or three-year college education, so-called *post-secondary vocational education*, should be more systematically invested by the government. This study revealed that individuals from four-year colleges have less satisfaction about job-major relevance and job-educational level correspondence than those from two-year colleges. This result implies that the post-secondary level of the vocational education has competitiveness over university education, regarding job-usefulness and job-educational level match. Given that 50.4% of high school graduates from the vocational track enrolled in two-year colleges, reinforcement of post-secondary CTE certainly emerges as the key policy to improve college-to-work transition. Strengthened vocational education at the college level could reduce a high unemployment rate of college graduates, and ultimately attract more selective students to the vocational high school. Moreover, considering that this study recognized that 20.5% of general high school graduates advanced to two-year colleges, developing post-secondary CTE could also be accommodating to those from the general track.

Fourth, to resolve the problem of *over education*, the traditional STW should be redefined as *college-to-work transition*, and the related policies need to be more concentrated on facilitating the transition from college education to the real world of work. Given that there is increasing doubt about the job-relevance of university education, the so-called *educational gospel* (Grubb, 2005; Grubb & Lazerson, 2009), vocationalism in college education is projected to keep growing in the future. This study confirmed that while the control variables significantly influence college enrollment, college stopout,

and college completion, they do not have any significance determining job relevance to college major and job correspondence to educational level after college graduation. This result indicates that individual backgrounds do not significantly affect post-college occupational areas, signifying that job-major relevance or job-educational level correspondence of college education could be heightened by public policies. Likewise, policies related to university education are also required to support the students' transition to work after graduation. These policies could also increase the effectiveness of college education, addressing the decreasing *college premium* or *signal effect* of college degrees.

Lastly, the Korean government needs to enlarge the investment in secondary and post-secondary CTE not only by improving the programs, human resources, and facilities, but also by facilitating a smooth transition toward tertiary education and the labor market. Furthermore, the government is anticipated to track the performance of college graduates from both high school tracks, based on the long-term perspective. In this regard, the KEEP survey is important in that it allows researchers to explore the in-college and post-college behaviors and employment of graduates from vocational and general high schools. Especially, the occupational outcomes of college graduates should be examined as a possible way to compare the two high school tracks. These efforts could support developing customized policies for those from the two high school tracks, and finally intensify usefulness of the policies.

Implications for Future Research

This study aimed to investigate college performance of high school graduates and their subsequent occupational outcomes after college graduation, especially

differentiating the two high school tracks. In pursuit of exploring the influence of high school track, this study analyzed its predictability in determining college enrollment, stopout, completion, job relevance to college major, and job correspondence to educational level. As a result, the analyses contributed to confirming non-economic rewards of secondary vocational education. However, since the findings of this study do have some limitations, as mentioned in Chapter 1, there should be further research on this issue.

First, in-depth examination of college performance and subsequent occupational outcomes after college graduation is necessary. This study restricted the factors representing college performance to only three variables: college enrollment, college stopout, and college completion. Therefore, future research should include more comprehensive factors signifying college performance, such as GPA, student-professor relationship, participation in job-related experience, or other variables related to institutions or individual school lives. In addition, in this study, post-college occupational outcomes were assessed only by two variables: job relevance to college major and job correspondence to educational level. Future research should analyze a variety of factors related college-to-work transition and employment status of college graduates. It is crucial that future research distinguish the target cohorts based on high school track, given that it is difficult to recognize those from vocational high school among the estimated 730,000 college graduates with an unemployed status in 2010 (Choi & Kim, 2012).

Second, since this study analyzed the KEEP datasets of 2004 through 2010, future research should perform analyses of more recent follow-up data from the subsequent

surveys. Especially, since this study was unable to scrutinize post-college performance of male students due to the time limit of the datasets, additional research is needed to explore the follow-up longitudinal data on this issue. Moreover, since some outcome measures were based on self-reports, their reliability may be questionable. Thus, future research should utilize high school and college transcript data to better address reliability issues.

Third, this study did not deal with the reasons for the analysis results, so further research exploring the causes of the findings is necessary: for example, the reasons of college stopout, no-college completion, no-first-paid jobs, or no-satisfaction with their first-paid jobs. There is only limited research on these themes, with the few exceptions of Lim (2011) and Lim and Kim (2006). Thus, future research on these themes could contribute to better understanding the behaviors of college students and graduates in consideration of their high school tracks, leading the government to make pertinent policies embracing secondary and post-secondary vocational education.

Lastly, further research should focus on non-economic returns of secondary and post-secondary vocational education. It is generally accepted that the effectiveness of Korea's secondary vocational education has been disappearing (Kim, 2004). Without a consensus on what the effectiveness means, previous studies have primarily been interested in economic returns, such as a regular job or income, targeting the cohorts from vocational high school in status of employment right after high school graduation. Likewise, few studies have explored the employment status or payment of two-year-college graduates of vocational high school. Accordingly, studies have not been interested in their non-economic conditions. Therefore, the effectiveness of secondary

vocational education should be defined as a concept including non-economic as well as economic rewards, and expanding its target cohorts to two- and four-year college graduates.

Conclusion

This study investigated the impacts of high school track on college performance and post-college occupational outcomes, making a distinction between vocational and general high school graduates. Despite the limitations of the analyses, this study confirmed that there are still great gaps in college outcomes between the two tracks of high school graduates, but no difference in post-college outcomes. Just 20% fewer of vocational high school graduates enrolled in colleges than those from the general high schools, but 50% of the total graduates in the vocational track advanced to two-year colleges, which was 25% in the general track. Compared with their peers from general high schools, 10% fewer vocational high school graduates completed colleges. Most importantly, the analyses on the control variables supported the findings of previous research suggesting that high school students involved in the vocational track are characterized by lower self-efficacy and inferior socio-economic backgrounds in comparison with those in general track.

A noticeable finding is that regarding college enrollment, stopout, and completion, vocational high school graduates are significantly affected by their socio-economic surroundings, whereas those in the general track are influenced only by their academic records and individual aspirations. However, the differences are lessened when those who had not completed colleges and had not responded as first-paid employees were excluded. Further, this study recognized that high school track significantly predicts only college

performance but does not influence post-college occupational outcomes. Thus, we may conclude that high school track demonstrates short-term effects, but the influence disappears when it comes to the cohorts who graduated from colleges. In sum, regarding *job relevance to college major* and *job correspondence to educational level*, high school track does not make a difference to first-paid job employees. One conspicuous finding was that those who desired four-year college degrees, enrolled in four-year colleges, and temporarily stopped college attendance, demonstrate less satisfaction on the two variables.

University education is already universal in Korea. Secondary education is focused on academic education, aiming to prepare students for prestigious university admissions. As a result, over 70% of high school graduates enroll in colleges regardless of their high school tracks. Yet, vocational high school graduates are still two times more likely to go to two-year colleges than four-year colleges, while three-thirds of general high school graduates advance to four-year colleges. Thus, Korea's secondary vocational education is still regarded as *second-class education* for those having low academic records. Caused by the dramatic growth of college education and traditional favoritism toward white-color jobs, vocational education in Korean high schools has been evaluated as losing its effectiveness since the 1990s.

Nevertheless, this trend is also interpreted as accomplishing the pre-requisite of the highly-skilled workforce demanded in this knowledge- and technology-based era. It is generally accepted that *some college education* beyond high school is essential for the future young workforce, and many countries struggle to reorient their VET systems to this trend. What is important is how to facilitate the smooth transition from college education to the real world of work. Given that previous studies pointed out that *over*

education is a serious social problem in Korea (Goodman et al., 2009; Kim et al., 2010; Ryoo et al., 2012) and the fact that people having a high level of educational backgrounds suffer more difficulties in employment (Kim et al., 2010), it is essential to provide relevant education, corresponding to the level required for their careers. In this regard, the findings of this study confirmed that new vocationalism should be embodied in the secondary vocational system of Korea. Vocational high school students should be educated with more integrated curriculum and thus possess transferrable skills to tertiary vocational education. Heightening their adaptability to college education could lead them to successful completion of college and an enlarged capacity in the labor market.

A college degree no longer guarantees high economic or social rewards. As Jung et al. (2004) advised, it is more desirable to assist the highly educated from the vocational track to develop relevant competencies in consistence with their high school experience. Differentiating the competencies of college graduates from vocational high school could secure the redemption of the identity of secondary vocational education and finally disclose its effectiveness. Pertinent policies from the long-term perspective, supported by future research, need to be implemented by the Korean government.

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Appendix

A. Survey Questions of the Korean Education and Employment Panel (KEEP)

Variables	Questions	Responses
Gender [BYS24001]	What is your gender?	1 Male 2 Female
Academic Achievement Math[BYS11004] English[BYS11006]	For the following high school courses, please use the 5-point scale to indicate your skill	1 Very low 2 Low 3 An average level 4 High 5 Very high
Educational Aspiration [BSY16001]	What is the highest level of education that you plan to complete?	1 High school 2 2-year college 3 4-year college 4 Graduate school 5 Ph.D.
Career Awareness [BSY15001]	Have you decided what your future job will be?	1 Yes 2 No
Parental Educational Level [BH01008]	What is the highest level of education that this parent has received? Or is he/she currently in school?	1 Not in school yet 2 Not currently studying 3 Elementary School 4 Middle School 5 High School 6 2-3 year college 7 4-year university 8 Graduate school (master's degree) 9 Graduate school (Ph.D.)
Household Income [BYH20001]	What was your household's average monthly income last year	_____ Unit 10,000won

Variables	Questions	Responses
High School Track [BYS17009C]	Questionnaire type	
College Enrollment [F3Y01002]	Type of school	1 A two-year-course college 2 A three-year-course college 3 A 4-year-course college 4 A five-year-course college 5 A 6-year-course college 6 Others
College Stopout [F3Y01068]	Did you ever temporarily leave school in 2005 or 2006 (through 2010)?	1 Yes 2 No
College Completion	What is your current academic background?	1 Dropped out of middle school 2 Graduated from middle school 3 Dropped out of high school 4 Graduated from high school 5 Dropped out of a 2-3 year-course college 6 Graduated from a 2-3 year-course college 7 Dropped out of a 4-6 year-course college 8 Graduated from a 4-6 year-course college
Job Relevance to Major	Do you think that your current work is suitable to your major?	1 Completely dissatisfied 2 Somewhat dissatisfied 3 Neither satisfied nor dissatisfied 4 Somewhat satisfied 5 Completely satisfied

Variables	Questions	Responses
Job Correspondence to Educational Level	How do you feel about the educational level required in your workplace in comparison with your educational level?	1 much higher than that which I possess 2 Higher than that which I possess 3 Similar to that which I possess 4 Lower than that which I possess 5 Much lower than that which I possess

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