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Equity in Career Development of High School Students in South Korea: The Role of School Career Education

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Abstract: Along with the rising concerns of career education in school, the government in South Korea has increased investments for closing the opportunity gap in career education. However, limited studies explored the equity in students' outcomes of career education. Focusing on career development competencies, we examined if school career education could reduce the socio-economic disparities in the career development of high school students. We used the ordinary least squares (OLS) regression applying school-fixed effects with the representative data from the Korean Education and Employment Panel II. Findings showed that parental education level was positively linked to career development competencies of high school students, though household income was not shown as statistically significant. We also found that for students who engaged in career and vocational classes in school, the parental education level was less likely to be related to their career development competencies. Also, students who were more satisfied with school career education showed a weaker relationship between career development competencies and parental education level. Based on these findings, we discussed the role of school-based career education to narrow the gap in students' career development from socio-economic backgrounds.

Keywords: equity in career development; socio-economic gap; parents' socio-economic status; school career development activities; career development competencies

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1. Introduction

Socio-economic disparities in education have been a well-acknowledged social problem in many countries. In South Korea, the parents' socio-economic status is known to affect the occupational outcomes of their children as well as educational attainments [1]. The children of highly-educated parents with professional careers are more likely to enter professional careers as well than those whose parents who are less educated. In contrast, students in poverty are suffering from the high risk of deprivation and exclusion in preparing for their career path, resulting from insufficient financial and emotional supports from parents [2–4]. An increasing body of literature has concerned that the influence of parental background on students' career development might become a mechanism causing social stratification and inequality [5].

School career education had been rapidly expanded in South Korea by training school career counselors, allocating funds for career education, and developing a variety of career development programs [6]. As a result, more than 94% of secondary schools in South Korea became able to allocate financial and human resources for career education as reported by the Korean National School Survey of Career Education (KNSSCE) in 2019 [7]. The expansion can be attributed to the Career Education Act in South Korea, enacted in 2015, aiming to ensure opportunities for all students to be given career education programs and acquire career development competencies [8].

In this regard, we assumed the discussion on career education should be extended to reducing the achievement gap, not only focusing on the opportunity gap. The career education policies in South Korea have included government efforts to promote equity in career

development since the disparities were reported in access to career education [6]. However, the early government supports seemed to be concentrated on the equal distribution of career education resources for the primary and secondary levels. Briefly, the government has facilitated career development in K-12 school settings, but students from low-income families still remain underserved. It presents questions as to whether school career education is equitable in promoting the desired outcomes for every student regardless of socioeconomic status.

To ensure an adequate level of career development, schools are expected to take the initiative by particularly aiming at equal treatment for all students. Previous studies have argued that school resources can effectively support underserved students, closing the gap in educational outcomes [9–12]. However, opposing opinions say that the influence of parents has remained substantial to the career development of adolescents, whereas the effect of career development activities in secondary schools was not significant [13]. Also, public education would not be able to fill the gap, if the distribution of career education resources is biased to economically advantaged students. Some studies on the educational gap have cautioned if the teaching curriculum is beneficial to high-achieving or socially advantaged students [14,15]. Moreover, under the competitive college admission environments among Korean high schools, school-based career education programs might be superficial, losing their effectiveness to support the career development of high school students [16].

Despite ample evidence of the socio-economic gap in career development of adolescents, surprisingly, few empirical studies have taken a closer look at educational gap in outcomes of career education. In general, the educational gap encompasses education inputs, processes, and outcomes; while the gap in educational outcomes was typically deemed as academic achievement gap [17]. However, equity in career development also deserves full attention, since the investments in career education surged over the past decade in South Korea. Hereby, we tried to explore the socio-economic gap in the career development of high school students. Also, we initiated discussion on the relationship between school career education and narrowing the gap of career development competencies, as little discussion on the issue left the role of school unsettled. Career development has been emerging as a main achievement goal of education, so the analysis would allow us to provide policy recommendations on the possibility of school to enhance equity in career education.

2. Literature Review

As beginning to discuss the educational gap in career development, we should note that the equity in educational outcomes becomes valid when the differences in the outcomes among individuals are highly connected to social rewards or benefits that a person can obtain in the future (e.g., employment and/or income). In addition, when these variances are derived from demographic and biological factors—such as gender, race, and parents' socio-economic status—they are regarded as socially unacceptable. That is, the educational gap becomes a social problem in case the gap is difficult to overcome by individual efforts [12].

We first reviewed the concept and implications of career development competencies to show whether those competencies are related to positive growth and consequences that the youth will attain in the future. Career development competencies are also notable as it is the foremost objective and outcomes of school career education in South Korea. Furthermore, we covered the evidence of the impact of career maturity and career competencies as well as career development competencies. Career development competencies are deemed to be interchangeable with the career competencies, and career maturity and career decision-making self-efficacy are regarded as being included in a wide range of career development competencies. Similar or the same questionnaires were named as either career maturity or career development competencies, as the two were very unclear to distinguish [18–20].

2.1. Career Development Competencies

Promoting career development in adolescence ranks one of the most crucial responsibilities of government in a rapidly changing world. In a modern society, the young generation is expected to have the ability to autonomously construct and manage personal life plans in unpredictable environments. In the sense, the National Career Development Association (NCDA) [21] defined career development as a life-long process consisting of many simultaneous things that occur while finding, choosing, and deciding roles related to an individual's education, career, and life. Also, those competencies are highlighted in the Definition and Selection of Competencies (DeSeCo) project launched by OECD [22].

This study focused on career development competencies to estimate the level of career development of adolescents. A great body of research dealing with career development competencies is based on the definition derived from Lim et al. [23]. According to the research, career development competencies refer to "the knowledge, skills, attitudes, values, and dispositions which are essential in the process of setting the direction of the future, choosing a career path, and preparing to realize the choice" [23] (pp. 183–184). The research developed career development competencies comprised of three subcomponents: 'understanding of self and developing social relations', 'career planning', and 'academic achievement and lifelong learning'. The concept of career development competencies has begun to be commonly used, since the objective of school-based career education was specified established in Career Education Act enacted in 2015 [8].

Previous studies have proved the strong linkages between career development competencies including career maturity and ones' career success [24]. At the high school level, the career maturity of students was known as predicting labor market performance as well as the quality of their school life [25,26]. Hwang and Lim [25] found that students who showed higher career maturity were more likely to be academically motivated. Also, Jo et al. [26] examined the positive relationship among students' school satisfaction, academic achievement, and career maturity. Furthermore, career maturity played a significant role for vocational high school students, who sought to get employed right after high school graduation; career maturity showed positive associations with higher job satisfaction after employment [27] and academic achievement [28]. Career maturity in high school years can also be related to students' adaptation to college [29].

Correspondingly at the college level, studies have demonstrated that career development competencies are also positively related to students' academic performances and labor market outcomes. Jeong [30] confirmed that college students with higher career competencies were more likely to adapt to university environments. Perry et al. [31] also supported the connection between career maturity and college persistence, including GPA, academic integration, faculty contact, and encouragement. Furthermore, Crook et al. [32] argued that the career maturity of college students could promote academic and work performances mediated by students' enhanced self-esteem. Liu et al. [33] also found the significant relations between the career maturity of college students and their success in employment.

In summary, those studies above empirically showed that the career development competencies can be a predictor for school adaptation, academic performances, and labor market rewards. Based on the high associations with satisfaction and performance in school, work, and life, we were able to consider career development competencies as vital for all people irrespective of their socio-demographic backgrounds. These findings provide the foundation to argue the desirability of equity in career development in the following analyses and discussion.

2.2. Family Background and Career Development in Adolescence

Parents are known as a strong predictor of career development of adolescents [34,35]. Not only parenting practices and emotional supports, parental socio-economic status (SES) is also one of the key mechanisms of the family influence [35]. In South Korea, parental SES is regarded as an important socio-cultural environment, as adolescence is

a period that students are largely under the influence of their parents, and sensitively interact with external environments to develop their identities [36]. In addition, parents' SES is related to the social capital of their children such as relationships with parents, teachers, and peers and adaptation of schools, ultimately linking to their children's career development [37]. Accordingly, a large literature has examined the influence of parents' SES on career-related variables in adolescents. Hereby, we reviewed the findings from prior studies on the relationship between parents' SES and career development competencies and career maturity of adolescents.

Studies provided evidence that parents' SES—parents' education level and household income—showed a positive connection with the career development of adolescents [36,38–41]. Roh [36] reported that both the educational level of father and household income level were positively associated with the career maturity of middle school students in South Korea; however, the statistical significance of the educational level of father disappeared at a higher age, indicating that the influence of parents' SES variable on children's career maturity can change within the adolescent period. Choi [38] showed that children whose parents were in a higher class had a higher growth rate of career maturity; they used longitudinal data analysis, applying structural equation models to explain patterns of change. Attending to the upper secondary level, Won [39] found that students in the high-household income group were likely to show a higher level of career maturity than those in the middle and low household income groups throughout high school years; and even after graduation. Likewise, Kim [40] identified students in general academic high schools in South Korea tended to show a higher level of career maturity when their household income was higher.

On the other hand, conflicting results exist proving that the linkage between parents' SES and children's career maturity is not statistically significant [42–47]. Jang [42] supported the view that among various predictors of career development including individual, parental, and school factors, parents' SES is likely to have relatively marginal impacts, rather highlighting the role of parental involvement and supports. In a similar vein, studies also indicated that a direct effect of SES on the career maturity of adolescents was not statistically significant [43,44]. Jung and Roh [45] conducted a meta-analysis on variables relating to career maturity; the study found that, among five family variables, the parental attachment was primary while the effect size of parental economic status was the smallest. Lee [46] reported that household income was negatively associated with the career planning of high school students after controlling all other variables.

In sum, previous studies as reviewed above have not reached to a conclusion whether parents' socio-economic status predicts career development of adolescents. Also, the results from the previous research have critical limitations to clarify the relationship between career development and SES due to the partial dataset, statistical models they used, and insufficient control variables. As the purpose of this study was to analyze the education equity in career development, we needed to confirm the gap between students from high- and low-socioeconomic backgrounds. Thus, by using the school fixed effects model, we tried to reduce omitted variables bias that might occur due to the school context. The model enables us to fill the research gap and provide more empirically rigorous evidence to attest if there exists a socio-economic gap in career development.

2.3. Schools: Enhancing or Impeding the Equity

Extensive research argued that varying types of educational interventions in school could compensate for the dearth of family background for students from low socioeconomic status [9–11,48]. Students' concentration, participation, and understanding of class are known to positively predict their academic achievement, and these class activities in school are more likely to enhance academic performances for students who are from lower social class backgrounds [15,49]. In addition, centering upon the potential of teachers to close the gap, previous research provided evidence that the association between parents' socioeconomic status and learning outcomes of children could be reduced when students

met teachers who show high teaching expertise, passion, and teaching efficacy [11,15,50]. School climate also was the crucial factor to the achievement gap; a culture of trust in teachers, engagement of students and parents, school social bonds, and stable learning environment were reported as positive to support students from low-income and deprived family [9,51–53].

The government intervention in education can have differential effects on students depending on their socio-economic background. That is, it can be greater for the disadvantaged students who had been vulnerable, and unable to receive proper learning opportunities from their parents [12] (p. 169). To substantiate the argument with evidence, analyses on after school program and E-learning platform implemented by the Korean government called Educational Broadcasting System (EBS) programs have demonstrated that the government-funded programs might be more effective to underserved students [54,55].

Although researchers have expected the role of schools and public education to support students from low family backgrounds, still a large number of studies have demonstrated that parental socio-economic background played a significant role in students' learning process and outcomes [56–59]. For instance, Kim [58] analyzed the mediation effect of parental involvement and private tuition on the academic achievement of children. Using the structural equation model, the study revealed that the parents' socio-economic status presented both direct and indirect effects on academic achievement, indicating that parental involvement could not include every possible path of the relation between parental SES and students' learning outcomes. Moreover, studies have reported that the effect of school education was likely to be fostered, when it was supplemented by family supports [57]. Kang [60] indicated that the attachment to school teachers might strengthen the association between parental income and academic achievement of lower secondary students. To address non-cognitive outcomes, Ryu and Kim [15] showed positive influences of passionate teachers and encouraging school climate were larger to students from the socially advantaged families. Parcel and Dufur [11] also presented positive interaction between teacher's care and parental human capital on students' academic performances.

A great deal of research has debated whether school education is able to reduce disparities in students' learning outcomes caused by parental socio-economic backgrounds. We assumed that public education can make a substantial contribution to close the gap as social stratification becomes a more severe concern during the past decade. However, it is highly likely to increase the gap, when the school curriculum could not take account of equity in a proper manner while managing and distributing educational resources [15]. Especially, in South Korea, the parental socio-economic backgrounds have been shown as a statistically significant predictor of students' decision of participating in school career development activities, field trips, and club activities, leading to unequal distribution of school resources and learning opportunities [14,61,62].

Based on the background of the study including literature review, we aimed to explore the socio-economic gap in the career development of adolescents and verify if career education in school was possible to reduce the gap. While career education has been enlarged in both primary and secondary level of education in South Korea, we put an emphasis on high school. This is because high school is a critical period for students who would face a school-to-work transition. Students are expected to make a decision on either going to a college or getting a job at the time [13]. We organized two research questions as below:

First, is parents' socio-economic status associated with the career development competencies of high school students?

Second, is the relationship between parents' socio-economic status and career development competencies of high school students be moderated by school career education?

3. Methodology

3.1. Data and Samples

To address the relationship between the parents' socio-economic status of Korean high school students and their career development competencies, we used the second version of the Korean Education and Employment Panel data (KEEP II). KEEP II is longitudinal data, and the survey was conducted by the Korea Research Institute for Vocational Education and Training (KRIVET). Similar to the Education Longitudinal Study of 2002 (ELS:2002) [63] in the United States, KEEP is nationally representative panel data that is planned to follow high school students throughout their secondary years, postsecondary years, and career progress [64]. After the follow-up of the first KEEP respondents, which began in 2004 and ended in 2015, KEEP II was launched in 2016 to reflect the transformative policies of career and technical education and labor market.

The KEEP II data are appropriate for discussion on career education, since they include the questionnaires for students' experiences of career education programs in their schools, and indicators of career development competencies, one of the objectives of the career education programs. In addition, the data, which provides information on students' overall high school experiences and demographic characteristics, allow researchers to account for confounding factors in regression models.

The study used the data of sophomore students in academic high schools in 2016, the base year of the survey. The target population of the KEEP II survey is high school students nationwide. The data collection used stratified cluster sampling; after stratified by region, schools were systemically sampled in each region in proportion to the number of students in the region compared to the nation. In this way, the raw dataset includes 5393 students from 216 academic high schools in South Korea. The number of random samples is approximately 25 members in each high school. For the analysis, we first removed the cases which did not have the education level of either father or mother due to their absence. Then, after excluding variables that have any single missing value (listwise deletion), 5074 samples are included for the final analysis.

3.2. Variables

3.2.1. Career Development Competencies

Our key outcome variable is the career development competencies of high school students. Career development competencies were measured by 14 items on students' ideas and attitudes to career development (Cronbach $\alpha = 0.9044$). We used an average value of the items of five-point Likert scale, ranging from '1' (not at all) to '3' (neutral) and '5' (strongly agree). The questionnaires contain three factors: understanding of work and job, educational and occupational exploration, and career planning and preparation. Understanding of work and job was constructed of five items, including "I know how the world of work has changed." Educational and occupational exploration comprises three items, including "I can explore many different ways to find information for my dream job." Career planning and preparation was composed of six items, including "I know the ways to prepare myself for my future career." The rest of items are shown in Appendix A.

Note that career development competencies encompass knowledge, skills, and attitudes, which are required for students to develop their own career paths successfully. As the competencies are broad, subcomponents, and questionnaires are considered differently by scholars. They are also varying depending on school levels and grades. In the study, when using the variables for career development competencies, we decided to define them referring to prior research such as Kim [65]. As high school is a period for career and occupational exploration, decision-making, and planning [65], we concluded that we were able to use the 14 items composed of those contents to estimate career development competencies for high school students.

3.2.2. Parents' Socio-Economic Status

To represent parents' socio-economic status, the main independent variable of interest, we used two kinds of variables: parental education level, and household income, respectively. We recoded the parental education level from a categorical form to a continuous variable, so that it refers to the total years of education of each parent. Then, we used the value from the parent who had reported the higher level of education. When one parent's education level was missing, the value from the other parent was used to replace it. Furthermore, we used household income as a continuous variable, surveying average monthly household income with an open question—all kinds of earned income covering all members of a household. The natural logarithm was used to transform a right-skewed distribution.

3.2.3. School Career Education

We utilized two variables to represent school career education: students' experiences of career development activities, and satisfaction with career education in school. First, we used students' experiences of career development activities in school. The variable identifies whether students have participated in each type of school-based career development activities. Career development activities were coded into five categories: career and vocational classes, vocational interest test, career counseling, job shadowing, and club activity focused on career development. For the experiences of career development activities, we used each item as a dichotomous variable (experienced = 1, not experienced = 0). Note that job shadowing in the data from South Korea is not perfectly matched to the activity named 'job shadowing' in the US context. We used the term 'job shadowing' to indicate various forms of career exploration programs in secondary school, including lectures by professionals, campus tours, and business field trips. Those activities commonly consist of experiencing the lives of people with their career in either directly or indirectly, and earning advice from people currently working in the fields. Students' satisfaction with career education in school is a five-point Likert scale, ranging from 1 to 5 (1 = completely dissatisfied, 5 = highly satisfied).

3.2.4. Control Variables

We included covariates in the model to control for other important variables that might be correlated with career education in school and students' career development: gender [66], residential region [67], self-efficacy of student [68,69], parental involvement [70,71], teachers' concern on students' aptitude [72,73], and learning attitude of students [74]. Self-efficacy was estimated with six items, including "I know what I am good at.", "I know what I like.", and "I know what is important for my life." Parental involvement refers to the frequency of conversation with parents on school life, interests, aptitudes, dream job, career planning, and values of life (not at all =1, once a month = 2, one or twice a week = 3, three to four times a week = 4, almost every day = 5), and we used it as a five-point Likert-scale [19]. Items for learning attitude of students are self-reported by students on their concentration on classes, active participation, assignment performance, course preview, and review: the higher the value, the better the attitude. A detailed description of the variables is in Table 1, and questionnaires that are used to estimate self-efficacy, parental involvement, teachers' attention on students' aptitude, and students' learning attitude are shown in Appendix A.

Table 1. List of variables

Variable	Type (Value)	Full Definition
Outcome		
Career development competencies	Likert-scale (1–5)	Questions composed of three areas: understanding of work and job, educational and occupational exploration, and career planning and preparation; the arithmetic mean of 14 items (examples of the original questions above)
Parents' socio-economic status		
Parental education level	Continuous (0–21)	Years of education that each parent had (utilizing the higher value); none = 0, primary = 6, lower-secondary = 9, upper-secondary = 12, 2-year college graduate =14, 4-year college graduate = 16, master's degree = 18, doctorate degree = 21
Household income	Continuous	Average monthly household income (log transformation)
School Career Education		
Experiences of career development activities	Dummy (0–1)	Career and vocational classes, vocational interest test, career counseling, job shadowing, and club activity focused on career development; experienced (=1), not experienced (=0)
Satisfaction with career education in school	Likert-scale (1–5)	An item asking students' general satisfaction with career education provided by their schools
Covariates		
Gender	Dummy (0–1)	Female (=1), Male (=0)
Self-efficacy	Likert-scale (1–5)	Questions on students' self-efficacy; strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5; self-reported; the arithmetic mean of six items
Parental involvement	Likert-scale (1–5)	Questions on the conversation with parents on school life, interests, aptitudes, dream job, and career choice and planning, value of lives; not at all = 1, once a month, once or twice a week = 3, three to four times a week = 4, almost every day = 5; the arithmetic mean of 5 items
Teachers' attention on students' aptitude	Likert-scale (1–5)	An item surveyed to students if 'one or more teacher cares for my career and aptitude'; strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5
Students' learning attitude	Likert-scale (1–5)	Questions on students' learning attitude including concentration on classes, active participation, assignment performance, course preview, and review; strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5; the arithmetic mean of five items; self-reported
Region of residence	Dummy (0–1)	Metropolitan area, small and medium urban area, town or rural area (reference: town or rural area)

3.3. Analysis

For the analysis, we used the least-squares dummy variable (LSDV) model, an ordinary least squares (OLS) model estimated with LSDV estimator shown as Equation (1):

$$y_{ij} = \beta_0 + \beta_1 SES_{ij} + \beta_2 CONTROLS_{ij} + S_j + \epsilon_{ij} \quad (1)$$

On the left, y_{ij} refers to the outcome variable, career development competencies, for student i in school j. The key independent variable of interest, SES_{ij}, represents a vector of parental education level and household income, representing parents' socio-economic status. $CONTROLS_{ij}$ represents vectors of control variables, which are mainly student characteristics (i.e., gender, self-efficacy, etc.).

We assumed that both students' participation in career development activities and their satisfaction with career education in school could be influenced by the characteristics

of schools where career education has performed. In addition, parents' socioeconomic status is likely to be associated with the school that students attend [75] (p. 32). Therefore, we restricted the analyses to students of academic high school, which accounts for the majority among the types of high schools in South Korea, and removed cases from vocational high school and special purpose high school. In addition, we utilized school fixed effects given by the least squares dummy variable (LSDV). We inserted dummy variables (S_j) for each high school, leaving one as a reference group [76]. It helps reduce omitted variable bias by taking account of unobserved school-level factors between schools [77].

The second research question of the study is the moderation analyses to see if the influence of a parent's socioeconomic status on career development competencies can be greater or lesser depending on school career education. The equation is shown as Equation (2) below:

$$y_{ij} = \beta_0 + \beta_1 SES_{ij} + \beta_2 CE_{ij} + \beta_3 (SES_{ij} * CE_{ij}) + \beta_4 CONTROLS_{ij} + S_j + \epsilon_{ij} \quad (2)$$

CE_{ij} represents variables of school career education: students' experiences of career development activities in school, and a Likert-scale of their satisfaction with school-based career education in general. The focus is on the significance of the interaction terms (β_3) between the socioeconomic status of parents and school career education (students' experiences of school career activities and their satisfaction with overall career education in school). Note that we put each interaction term separately for each analysis, while all other variables were controlled.

We used listwise deletion to address missing values. In our dataset, 5.28% of samples contained one or more missing values. As the assumption that missing was completely at random (MCAR) held, and the sample is large enough to avoid the issue of losing statistical power, listwise deletion was sufficient to provide unbiased estimates [78,79]. We used STATA 13.0, and analyzed the regression with cluster robust standard error to address the multilevel structure of the data [80].

4. Results

4.1. Descriptive Analysis

Before the empirical analysis, we began to summarize descriptive statistics of the variables of interest: school career education in Korean high schools in 2016. Also, we tried to identify if we can observe differences in career development competencies by parents' socio-economic status. It leads us to figure out the descriptive picture of our first research question: the disparities in career development in South Korea.

Figure 1 presents the participation rates of high school students in different types of career development activities provided by high school. The most pervasive type of career development activity is taking career and vocational classes, shown as 94.5% of 11th grade students in South Korea have experienced career and vocational classes in their schools. In addition, 87% of students replied that they participated in at least one type of job shadowing programs. The proportions of high school students in South Korea who experienced vocational interest test, career counseling, and club activity focused on career development are 82.0%, 63.4%, and 33.4%, respectively.

Table 2 indicates the average level of career development competencies depending on categories classified as parents' SES groups. Parental education level was classified referring to the International Standard Classification of Education (ISCED 2011), and household income was split by standards from the Pew Research Center [81]. The US middle-income range in 2016 was from $45,200 to $135,600 per year. As parental education level is higher, students' career development competencies are presented as higher. For students whose parents had completed education in lower secondary education or less, their career development competencies are shown as 3.268, while those who had parents with a doctoral degree show 3.704. Also, career development competencies are different among household income groups. Students in the lower-income family show the lowest level of career development competencies (3.454); it is higher in the middle-income family

(3.537), and the highest in the upper-income family (3.631). Therefore, the difference among SES categories in Table 2 might reveal the disparities of career development depending on family backgrounds. Description of variables including all control variables are presented in Table 3 below.

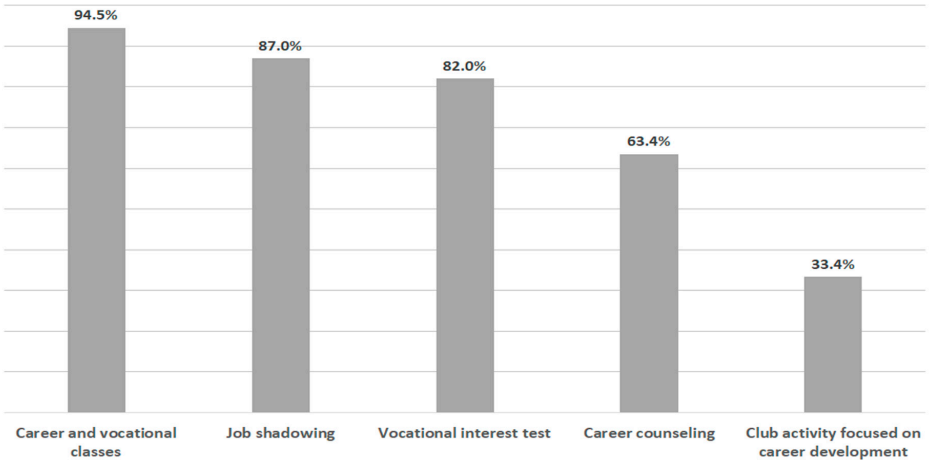


Figure 1. Prevalence of career development activities at the upper secondary level in South Korea.

Table 2. Description of parents' SES and career development competencies of students

	N	%	Cumulative %	Career Development Competencies of Students	
				Mean	SD
Parental education level					
Lower Secondary Education or less	76	1.50	1.50	3.268	0.548
Upper Secondary Education	1649	32.50	34.00	3.426	0.618
Short-Cycle Tertiary (2-year college)	853	16.81	50.81	3.483	0.572
Bachelor or Equivalent (4-year college)	1899	37.43	88.23	3.537	0.600
Master or Equivalent	444	8.75	96.98	3.690	0.594
Doctoral or Equivalent	153	3.02	100.00	3.704	0.555
Household Income (in 2016 US $)					
Lower-income (less than $45,200)	2015	39.71	39.71	3.454	0.614
Middle-income ($45,200~$135,600)	2933	57.80	97.52	3.537	0.594
Upper-income (greater than $135,600)	126	2.48	100.00	3.631	0.622
Total	5074	100	100.00		

Considering the possibility of the socio-economic gap, we tried to find out if the relationship between parents' SES and career development competencies of students was statistically significant after all other relating variables were controlled. Even though there seemed to exist a relationship between parents' socio-economic status (both parental education level and household income) and career development competencies of high school students, the descriptive results could not prove their statistically significant relationship. Therefore, the following sections provide regression models with school fixed effects to rigorously examine the socio-economic gap in career development.

Table 3. Description of the variables in the analyses

Variables	Mean	SD	Min	Max
Outcome variable				
Career development competencies	3.506	0.605	1.000	5.000
Parents' SES				
Parental education level (year)	14.563	2.466	0.000	21.000
Household average monthly income (ten thousand won, KS)	552.563	366.581	30.000	8000.000
Household income (ln)	6.162	0.557	3.405	8.987
Household average monthly income (transformed with US $)	4862.557	3225.912	264.000	70,400.000
School Career Education				
Satisfaction with career education in school	3.144	0.922	1.000	5.000
Experiences of career development activities				
Career and vocational classes	0.945	0.228	0.000	1.000
Vocational interest test	0.820	0.384	0.000	1.000
Career counseling	0.634	0.482	0.000	1.000
Job shadowing	0.870	0.336	0.000	1.000
Club activity focused on career development	0.334	0.472	0.000	1.000
Control variables				
Gender (Female =1)	0.535	0.499	0.000	1.000
Self-efficacy	3.670	0.646	1.000	5.000
Parental involvement	2.974	0.916	1.000	5.000
Teachers' attention on students' aptitude	3.689	0.888	1.000	5.000
Students' learning attitude	3.090	0.707	1.000	5.000
Region of residence Metropolitan area	0.414	0.493	0.000	1.000
Small and medium urban area	0.399	0.490	0.000	1.000
Town or rural area	0.187	0.390	0.000	1.000
N	5074			

4.2. Association of Parents' Socio-Economic Status on Career Development Competencies of High School Students

Beginning with the first research question, Table 4 presents if family SES significantly predicts the career development competencies of high school students. We used a fixed effects model using least-squares dummy variable (LSDV) estimator as well as an ordinary least squares (OLS) regression. We entered all of the other covariates in both models with and without school fixed effects. To compare our analysis, we paralleled both OLS and fixed effects models. In the OLS results in column (1), the estimates of parental education level are positively related to the career development competencies of students ($p = 0.01$). When unobserved contextual components of each school have been controlled by using school fixed effects in column (2), parental education level still remains statistically significant ($p = 0.01$). Meanwhile, the estimates of the household income are not significant in the model (1) and (2). These findings represent that students who have more highly educated parents are likely to show a higher level of career development than other students whose parents are less educated.

According to column (2) in Table 4, students who have experienced career development activities such as a vocational interest test, job shadowing, and club activity focused on career development show a higher level of career development competencies. However, all other things being equal, students taking career and vocational classes do not show significantly higher level of career development competencies than students who did not take career and vocational classes. Also, the experience of career counseling is not positively connected to career development competencies.

By indicating coefficients of the control variable as shown in the model (2), we tried to provide further insight into the career development of high school students. Results show that all other things equal, female students are likely to have higher career development

competencies than male students. Students' self-efficacy and learning attitudes are positively associated with career development. In addition, we are able to see the role of significant others; parental involvement and teachers' attention on students' aptitude also have a positive relationship with students' career development competencies.

Table 4. Association of parents' socio-economic status on career development competencies

	(1)		(2)	
Parents' SES				
Parental education level	0.013 ***	(0.003)	0.011 ***	(0.003)
Household income	0.003	(0.013)	−0.007	(0.013)
School Career Education				
Satisfaction with career education in school	0.020 **	(0.008)	0.017 **	(0.009)
Career and vocational classes	0.047	(0.030)	0.042	(0.031)
Vocational interest test	0.069 ***	(0.017)	0.070 ***	(0.018)
Career counseling	0.027 *	(0.013)	0.022	(0.014)
Job shadowing	0.077 ***	(0.021)	0.072 ***	(0.023)
Club activity focused on career development	0.028 **	(0.014)	0.036 **	(0.015)
Student characteristics as control variables				
Gender (Female =1)	0.098 ***	(0.014)	0.108 ***	(0.018)
Self-efficacy	0.444 ***	(0.012)	0.440 ***	(0.013)
Parental involvement	0.060 ***	(0.008)	0.063 ***	(0.008)
Teachers' attention on students' aptitude	0.066 ***	(0.008)	0.068 ***	(0.009)
Students' learning attitude	0.144 ***	(0.011)	0.140 ***	(0.012)
Region of residence : Metropolitan area	0.011	(0.023)	0.003	(0.048)
Small and medium urban area (Reference: Town or rural area)	−0.000	(0.023)	−0.030	(0.035)
School fixed effects	No		Yes	
Constant	0.484 ***	(0.092)	0.494 ***	(0.111)
R-squared	0.434		0.472	
N of observations	5074			

Robust cluster standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Considering column (2) as a final model, we concluded the positive relationship between parental education and career development of students was statistically significant, even when we supposed the same condition of school education. Therefore, it can be inferred that the disparities of career development competencies exist among Korean high school students due to family backgrounds.

4.3. Exploring Differences in the Relation between Parental Education Level and Career Development

To examine our second question—the possibility that career development activities provided by school might reduce the disparities from family backgrounds, we moved on to the next stage of analysis. We estimated the interaction between parents' socio-economic status and school career education variables on career development competencies of high school students. Recall that parental education level showed a positive relationship with students' career development, while household income was not significant. Thus, we focused on the interaction between the parental education level and school career education variables. From these analyses, we sought to explore if students' participation in career development activities and satisfaction with career education in school are moderating factors. We entered the interaction terms to the models in Table 4 from the previous section. All control variables were entered just as same as models in Table 4, while only variables related to the moderation analyses were presented for the sake of page limitation.

4.3.1. Moderation Analysis with Experiences of Career Development Activities in School

Table 5 below presents whether five types of experiences of school career education—participation in career and vocational classes, vocational interest test, career counseling, job shadowing, and club activity focused on career development—show statistically significant moderating effects. Here we present only the coefficients associated with the interaction terms of interest, but the results below were estimated with school fixed effects in the way of LSDV modeling. Not only interaction terms, but also variables of parental education level and school career education, were also included separately for each model (see Equation (2) in 3.3 Analysis).

Table 5. Moderating effects of experiences of career development activities in school

	(3)	(4)	(5)	(6)	(7)
Career and vocational classes * Parental education	−0.028 ** (0.013)				
Vocational interest test * Parental education		0.000 (0.007)			
Career counseling * Parental education			−0.005 (0.005)		
Job shadowing * Parental education				−0.006 (0.008)	
Club activity * Parental education					0.005 (0.005)
Parental education level	0.037 *** (0.013)	0.010 * (0.006)	0.014 *** (0.005)	0.016 ** (0.007)	0.009 *** (0.003)
Variables of all kinds of career development activities controlled	Yes	Yes	Yes	Yes	Yes
Covariates controlled	Yes	Yes	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	0.124 (0.212)	0.500 *** (0.137)	0.446 *** (0.115)	0.419 ** (0.141)	0.518 *** (0.113)
R-squared	0.472	0.472	0.472	0.472	0.472
N	5074	5074	5074	5074	5074

Each column represents the results from a separate regression with one interaction at a time. Robust cluster standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

First, the experience of career and vocational classes is negatively moderating the effect of parental education level on career development, and statistically significant ($p = 0.05$) as shown in column (3), Table 5. Students who have taken career and vocational classes in their schools are less likely to be affected by their parents' education level. Put differently, for students who did not take career and vocational classes, their highly educated parents might play a more significant role in a positive way, while less-educated parents could not. For other types of career development activities, there are not significant differences in career development competencies between students who have experienced those activities and those who have not.

4.3.2. Moderation Analysis of Experiences of Career Development Activities in School

Note that it is important for career education programs to gear at interests and needs of each student for their effectiveness [20,82]. We assumed that students would be more satisfied with career education in school, when they can gain career information and support which are personalized to their own career plan. That is, the satisfaction with school-based career education might be used as a proxy variable of the quality. Therefore, we sought to examine if the level of satisfaction with career education in school could moderate the association of parental education level and career development competencies.

In column (8), Table 6, students' satisfaction with career education in school negatively moderates the relationship between parental education level and career development compe-

tencies. The statistical significance of interaction terms holds significant, even after accounting for school fixed effects in column (9). In other words, when students are more satisfied with career education offered by their school, the association of their parents' education and their career development is weaker than those who are not satisfied as much.

Table 6. Moderating effects of the satisfaction with career education in school

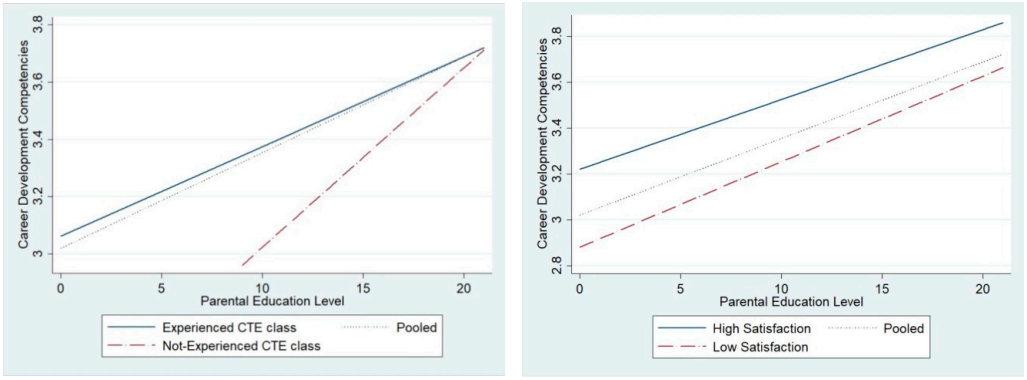
	(8)		(9)	
Satisfaction with career education in school * Parental education level	−0.005 *	(0.003)	−0.006 **	(0.003)
Satisfaction with career education in school	0.099 **	(0.047)	0.111 **	(0.047)
Parental education level	0.030 ***	(0.010)	0.031 ***	(0.010)
Household income	0.003	(0.013)	−0.007	(0.013)
Covariates controlled	Yes		Yes	
School fixed effects	No		Yes	
Constant	0.236	(0.181)	0.204	(0.189)
R-squared	0.435		0.472	
N	5074		5074	

Each column represents the results from a separate regression with one interaction at a time. Robust cluster standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.3.3. Fitted Lines for Subsamples Divided by Moderating Factors

To illustrate the interaction between parental education and school career education, we plotted fitted lines. For fitted line plots, pooled samples were divided into multiple groups by the statistically significant moderators—students who have experienced career and vocational classes (n = 4795) and those who have not (n = 279). In addition, for the satisfaction variable, we used median value (=3) to separate the sample into two: high satisfaction (n = 1852) and low satisfaction (n = 3504) groups.

Independently of variables relating to school career education, the parental education level is positively associated with students' career development competencies. However, Figure 2a presents that the slope is greater for those who have not taken career and vocational classes in school. In contrast, the slope of the group who experienced career and vocational classes is smaller than the pooled sample. Likewise, as shown in Figure 2b, the slope is greater for students who are less satisfied with career education in school than those who are more satisfied.



(**a**) (**b**)

Figure 2. Graphical presentation of the moderating effect of school career education on the association between parental education and career development competencies: (**a**) Fitted lines for each sample divided by the experience of career and vocational classes; (**b**) Fitted lines for each sample divided by the median of satisfaction with career education in school.

5. Conclusions

In this study, we empirically examined a socio-economic gap in the career development competencies of high school students. Our findings indicated that the experiences of career and vocational classes and the satisfaction with career education in school negatively moderated the relationship between the parental education level and career development competencies. Based on the findings of the descriptive and regression analyses, we are going to emphasize that career education in school might be a key to enhance equity in the career development of high school students in South Korea.

First, a well-organized career education curriculum might be an effective way to equally provide career guidance to high school students. As is shown by the descriptive analysis, most of the high school students in South Korea have participated in career and vocational classes (94.5%), which means access to the classes is likely to be distributed impartially. Since 2009, career education has been highlighted in the national curriculum. School career counselors have been gradually allocated to high schools to teach career education courses and offer career counseling [16]. Therefore, we suggest to taking advantage of the high participation rate of career and vocational classes in order to ensure equal outcomes of career development. To elaborate, school teachers and counselors should pay more attention to students who have a lack of parent's guide to career development in a classroom. In addition, it would be beneficial that the classes are composed of practical information that students cannot easily obtain on their own. Also, individualized and continuous guidance would be helpful to facilitate students' proactive career planning. Likewise, underserved students can benefit from career and vocational education class, when the quality of the class is promoted.

It is worth focusing on universal and easy access to career and vocational classes because other activities can be affected by students' individual characteristics and family backgrounds. In this regard, prior research also pointed out that student and school characteristics can predict students' experience of different types of career development activities. For instance, career information of college admission and counseling with teachers and parents were associated with students' academic achievement and household income [14]. Thus, in addition to additional supports of career exploration programs for deprived students, we insist that career and vocational education should be continuously provided by the national curriculum, not only for the effectiveness of career education but for equity perspective.

On top of that, schools should have the responsibility of the school to carry out personalized career education to increase the interests of individual students. Prior studies have argued that more attention needs to be paid to the students' satisfaction with career education rather than the supply of career education programs [20,82]. As we showed, the satisfaction with career education in school was positively related to students' career development competencies. It also mitigated the association between parental education level and career development competencies. Therefore, to provide satisfactory career education and guidance, schools should personalize the forms, contents, and methods of career education to students' needs, considering their stage of career development.

Our findings can be more impressive as we revealed the potential of career education in school to increase the equity in career development competencies. From the descriptive and regression analyses showing the parental education level had a positive association with the career development competencies of high school students, we verified that the disparities of career development existed. The result might be frustrating, as it is consistent with the previous studies of Roh [36] and Lee and Jang [41], which reported parents' SES as a significant predictor of career development of adolescents. However, in the analysis of moderating effects, the experience of career and vocational classes, and the satisfaction with career education in school negatively moderated the coefficient of parents' education level. These findings support the positive views that schools matter, and they are possible to contribute to equity [9,48]. Therefore, our results can trigger the following research on

the potential of career education in school to alleviate the impact of parental backgrounds on career education outcomes.

In spite of the contributions of our findings, we acknowledge that those findings should be carefully inferred, taking several limitations into account. To begin with, the research could not establish a causal relationship between parents' SES and students' career development competencies, because we could not use panel data analysis. Admitting the limitation of the cross-sectional data, we tried to minimize omitted variable bias by controlling school fixed effects as well as other covariates. Nevertheless, the limitations still remain, because we could not assure the order of occurrence of the variables of interest—the experiences of career development activities, the satisfaction with career education in school, and the career development competencies. It might generate the problem of reverse causality, which makes it difficult to interpret the moderating effects as a causal relationship. For instance, some students who already had high career development competencies are likely to actively participate in career development activities in school, since they already knew setting a career goal is important. In this case, it is hard to say the career development activities are effective to improve career development.

Another limitation lies in the items of career development competencies. In this study, we did not use the instruments developed for estimating career development competencies. Instead, we used 14 items from the panel data—the Korean Education and Employment Panel Survey (KEEP II)—which are highly relevant to career development competencies. As we relied on secondary data, the 14 items might not be sufficient to reflect career development competencies of high school students. Thus, we recommend future studies use the items developed particularly for career development competencies considering the developmental characteristics for high school students.

Lastly, our findings are unable to address why and how school-based career education might narrow the gap, which is in fact a fundamental limitation of quantitative research. The school career education estimates are dichotomous and Likert-scaled, and the career development activities in school are already categorized from the raw survey data. However, we should note that not all schools offer the same form and quality of career education. We tried to control the difference of career education among schools by school fixed-effects, but were not able to elaborate the differences through the model. Therefore, a qualitative approach, such as interview and participation observation, might be more appropriate to comprehend the context of career development activities in high schools.

Although socio-economic disparities can negatively affect the career development of adolescents, a lack of attention was paid to equity in career education outcomes compared to academic outcomes. In this study, we empirically revealed that there exist socio-economic gaps in the career development competencies of high school students, possibly relating to the parental education level. We also demonstrated the potential of school-based career education to mitigate the gaps. The relationship between parental education level and career development competencies of high school students was weaker for those who participated in career and vocational classes, and who were more satisfied with career education in school. These preliminary results implied the role of school career education to enhance equity in career development. To reduce the socio-economic gap in the career development of high school students, a statewide career education curriculum should be planned and implemented. Also, schools can put more effort into meeting the interests and aptitudes of individual students when offering career guidance and counseling programs. In other words, we suggest the government should aim for adequate career development competencies of all students by ensuring universal access to high-quality career education in school. We hope future studies extend the discussion on government intervention to increase the equity of career development and the salutary role of school career education.

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Appendix A

Table 1. Items of variables

Variable	Factors	Items	Cronbach α
Career development competencies (14)	Understanding of work and job (5)	1. I know some stories of people who carved out a new career path. 2. I know how the world of work has changed. 3. I can explain several work ethics required for my future job. 4. I can explain widespread prejudice and discrimination in the workplace. 5. I can explain several types of higher education institutions for high school graduates.	0.9044
	Educational and occupational exploration (3)	6. I can explore many different ways to find information for my dream college and major. 7. I can explore many different ways to find information for my dream job. 8. I can discern reliable sources from non-reliable sources when searching for career information.	
	Career planning and preparation (6)	9. I know a degree or certification that I need for my career plan. 10. I can build my long-term career plan with consideration of my personality and circumstances. 11. I have had my own career plan after high school (attending college, getting a job, starting a business, etc.) 12. I know the ways to prepare myself for my future career. 13. I have important factors to consider when choosing my career path. 14. I can overcome obstacles and challenges facing in my career path.	
Parental Involvement		How often do you talk to your parents? (Choose one: Not at all, Once a month, One or twice a week, Three to four times a week, Almost every day) 1. Life in school 2. My interests and aptitudes 3. My dream job 4. Career choice and planning 5. Values of my life	0.8622

Table 1. *Cont.*

Variable	Factors	Items	Cronbach α
	Self-efficacy (6)	1. I know what I am good at. 2. I know what I like. 3. I know what is important for my life. 4. I can determine whatever I have to decide without any trouble. 5. I can carry out plans that I made. 6. I believe I am a good person.	0.8279
	Teachers' attention on students' aptitude (1)	1. One or more teachers care for my career and aptitude.	-
	Students' learning attitude (5)	1. I stay focused in class. 2. I actively ask questions in class. 3. I do not put off or skip doing my homework. 4. I review what I learned in class on the same day. 5. I preview studying materials before the next class.	0.7906

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