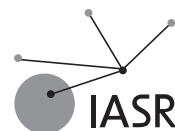




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Article

# Adolescents' Perceptions of Competitive Classroom Climate and Career-related Search Engagement: New Evidence from Italy and South Korea

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## Abstract

The findings of this study support the advantages of competitive classroom settings (as measured by adolescents' perceptions of a competitive class climate) in enhancing involvement in career-related exploration pursuits. This study utilized data from the PISA 2018 assessments conducted in Italy and Korea. When examining career-related search engagement, we analyzed two aspects: engagement versus no engagement and the number of career-related search activities across nine different types of activities. Our findings are also robust across various sensitivity analyses. Competitive educational environments present both benefits and drawbacks to adolescents' achievement across multiple dimensions. However, at an individual level, adolescents may find it inadequate to ignore competitive pressures. Therefore, satisfaction with learning engagement in competitive settings may prove more advantageous, including when making career decisions.

## Keywords

Competitive classroom environment, Career-related search engagement, Career-related search activities

## Introduction

Competitiveness can be conceptualized as a trait within the realm of personality constructs, and it is purported to be linked to a learning approach, as supported both intuitively and empirically. For instance, individuals with a competitive disposition are likely to adopt a strategic learning approach, provided their learning style is consistent rather than context-specific (Cassidy, 2008).

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According to Burger (2004), competitive individuals typically exhibit strong motivation, a drive for achievement, and a preference for engaging in competitive environments. Additionally, such individuals demonstrate a high level of striving for competitive success and put in diligent efforts toward accomplishing tasks, irrespective of external factors such as deadlines. Furthermore, competitive individuals often exhibit high confidence in their ability to perform proficiently in games within competitive settings (Gotay, 1981).

As children transition from primary to secondary school, they frequently encounter a classroom setting characterized by increased levels of competition compared to their prior experience in primary school (Harter, 1996). Some educators argue that competition is essential in establishing work-oriented norms and consequently enhances student achievement through increased motivation. In a competitive motivational system, students concentrate on their capacity to outperform others, and their self-assessment of competency is influenced by their performance compared to their peers. In accordance with the study of Lam et al. (2004), students in the competitive environment showed greater performance in tasks compared to students in the non-competitive condition. Additionally, Ames (1984) observed that children were more likely to attribute their success to their abilities in the competitive setting as opposed to the individual setting.

Considering the highly competitive nature of the labor market, it is advisable for adolescents to enhance their skills, seek opportunities to increase their professional worth, and understand the requirements for attaining a lasting competitive edge in the job market. Economic literature often links gender disparities in labor market achievements with the greater competitiveness of males, particularly in areas requiring Science, Technology, Engineering, and Mathematics (STEM) competencies, attributed to their higher levels of confidence (Booth & Nolen, 2012; Booth et al., 2019; Niederle & Vesterlund, 2011). Furthermore, studies in the field of education have demonstrated that gender-based disparities in self-assurance contribute to lower academic achievements among girls in mathematics and science assessments (Louis & Mistele, 2012) and deter them from pursuing competitively perceived educational fields (Niederle & Vesterlund, 2007).

Previous research suggests that incorporating competition into speed-related tasks in an educational environment consistently enhances performance. The impact of educational competition appears to be influenced by the nature of the task and the motivational factors at play. Prior studies have predominantly examined the relationship between competitive attitudes or environments and academic performance among students (e.g., Bing, 1999; Smither & Houston, 2002; Ryckman et al., 1997).<sup>1</sup> However, limited evidence exists regarding adolescents' involvement in seeking career-related information and programs. During adolescence, the contemplation of career decisions is crucial, as it holds both personal and societal significance and extends beyond the mere identification of an objectively ideal profession (Di Fabio et al., 2015). The process of identity formation during adolescence, along with the factors influencing the development of vocational maturity, encourages adolescents to explore and comprehend their abilities and interests and make informed decisions regarding their academic and career paths.

This study examined the impact of a perceived competitive classroom climate on two dimensions of engagement in career-related search activities: extensive (engagement vs. no engagement) and intensive (number of career-related search activities). Our analysis Our study centers on a sample of Italian and Korean adolescents from the PISA 2018 dataset. Both Italy and South Korea (hereinafter referred to as Korea) have encountered similar challenges with gender disparities in the labor market, especially in STEM fields, and the gender wage gap. According to the Global Gender Gap Index 2023,<sup>2</sup> Italy is ranked 79th and Korea 105th out of 146 countries in terms of achieving gender pay equality.

In Italy, the employment rate for individuals aged 20–64 years differs by gender, as reported by the Gender Equality Index (2019 edition) from the European Institute for Gender Equality.<sup>3</sup> Specifically, employment rates stand at 53% for women and 73% for men. Moreover, there exists a notable gender-based gap in the proportion of part-time workers: approximately 33% of women and 9% of men work part-time. Furthermore, a smaller proportion of Italian women (6%) are employed in STEM occupations compared to their male counterparts (31%).<sup>4</sup> There is also a disparity in mean monthly earnings, with women earning 18% less than men.

Likewise, Korea shows a substantial underrepresentation of women in the STEM fields, as indicated by the Organization for Economic Cooperation and Development (OECD) data reporting that only 30% of STEM workers are female.<sup>5</sup> According to OECD estimates released on May 23, 2022, Korea exhibits the highest gender pay gap among the 38 member countries of the OECD. The data indicate that, on average, Korean female employees earn 31.2% less than their male counterparts. The inequality in this particular metric surpasses that of all other OECD nations—more than double the OECD average of 12.1%.

Further, it is important to note the significance of the young not employed, educated, or trained (NEET) population for both Italy and Korea. According to a report from the Korea Employment Information Service,<sup>6</sup> Korea ranks third among the OECD member countries in terms of the proportion of young people aged 15–29 years who are not engaged in education, employment, or training, with an estimated 1.56 million NEET individuals on average. In Korea, the proportion of NEET individuals is significantly higher among those who have completed tertiary education compared to those in other countries, including Italy, with 45% of NEET individuals in Korea holding a college or university degree, in contrast to 18% in the OECD area.<sup>7</sup>

In 2020, Italy had the highest NEET rate among all European Union countries, with 25.1% of young Italians aged 15–34 years falling into this category (Ellena et al., 2021), compared with the EU average of 17.6% (Eurostat, 2021). Despite a promising trend of gradual decline observed over the past five years, the rate of NEET individuals in Italy has consistently remained above 20% (Statista, 2021). According to Pastore (2018), Italy has a higher proportion of NEET individuals compared to other countries owing to the general breadth and abstract nature of the education provided, in addition to a lack of professional training opportunities. The use of datasets from Italy and South Korea as our focus does not preclude the cases of other countries. Nevertheless, especially for the matter of NEETs, these two nations could serve as relevant case studies regarding competitive educational environments and adolescents' pursuit of career opportunities.

The remainder of this paper is organized as follows: Section 2 outlines the PISA 2018 dataset utilized in this study, along with the empirical methodology employed. Section 3 presents the findings and robustness tests. Section 4 provides a policy discussion and concludes the discussion.

## Data and Empirical Specification

This study utilized data for Italy and South Korea obtained from the OECD's Programme for International Student Assessment (PISA) 2018. The population of interest for the PISA survey involves students aged 15 years. The first wave of the PISA survey was conducted in 2000 across 32 countries to assess student proficiency in reading, mathematics, and science. In addition to cognitive assessments, students completed a demographic questionnaire, and the school principals provided information about their respective institutions through a survey.<sup>8</sup> PISA includes a comprehensive array of data regarding the characteristics of students, parents, and schools (OECD, 2001, 2002a, 2002b).

This study aims to provide new evidence on the impact of adolescents' perceptions of a competitive classroom environment on their involvement in career exploration. In the Programme for International Student Assessment (PISA) 2018 dataset, we used the measure of the perceived competitive class climate (hereafter *PCCC*) as our outcome variable, with the survey question, "It seems that students are competing with each other," rated on a scale from 1 = not at all true to 4 = extremely true. In this study, we employed a binary variable that takes a value of one when participants select "3 = very true" or "4 = extremely true."

The PISA 2018 includes a measure of career-related search engagement (hereafter *CSE*), which consists of nine distinct career-related search activities answered with either "yes" or "no": "I did an internship," "I attended job shadowing or work-side visits," "I visited a job fair," "I spoke to a career advisor at my school," "I spoke to a career advisor outside of my school," "I completed a questionnaire to find out about my interests and abilities," "I researched the Internet for information about careers," "I went to an organized tour in an International Standard Classification of Education (ISCED) 3-5 (colleges, universities, or any other institution in upper secondary or tertiary education) institutions," and "I researched the Internet for information about ISCED 3-5 programmes."

This study used two dimensions of *CSE*: extensive (engagement versus no engagement) and intensive (the number of career-related search activities) margins. First, as an extensive margin, we employed a binary variable (hereafter *CSE\_D*), with a value of one indicating an affirmative response (yes) among a selection of nine distinct forms of such engagement. Second, as the intensive margin, we used a variable denoted as the number of career-related search activities (hereafter *NCSA*) to represent the number of each *CSE* where a respondent affirms participation in each *CSE*.

Table 1 displays a summary of the traits of the sample taken from the PISA 2018 Italian and Korean datasets. Panel A in Table 1 presents the averages of our main variables, while Panel B provides descriptive statistics for the control variables.

After excluding missing responses, the final sample consists of 8,828 Italian adolescents and 6,522 Korean adolescents, with approximately 49% of the sample comprising female students in both countries. The mean number of years of education completed by parents in the Italian sample was 13.9, compared to 14.8 years in the Korean sample. Similarly, the average number of books at home of Korean adolescents slightly exceeded that of Italian adolescents. In the Korean sample, a higher proportion of schools were located in cities (or big cities), irrespective of school type, which was likely influenced by geographical features. Korean schools exhibit a greater prevalence of classrooms with a higher number of students and institutions that are gender segregated (single-sex schools). Consistent with previous research findings, Korean students significantly outperformed Italian students in mathematics, reading, and science.

In the Panel of Table 1, it was found that approximately 36.6% of Italian and 72.6% of Korean adolescents perceived their classroom environment as competitive, indicating a substantial difference between the two nations. On average, Italian adolescents conducted 3.54 career-related search activities among the nine types, while Korean adolescents conducted 4.76.

To examine the impact of perceived competitive classroom climate (*PCCC*) on career-related search engagement (*CSE*), we used an Ordinary Least Squares (OLS) model with both unconditional and conditional effects on individual backgrounds and school characteristics. We estimated the following model:

$$CSE_i = \beta PCCC_i + \theta IDV_i + \alpha School_i + AP_i + \varepsilon_i$$

The outcome variable in this study was *CES*, for which we estimated two distinct regression

**Table 1.** Summary Statistics

Country	Italy		Korea	
	Mean	S.D	Mean	S.D
<b>Panel A</b>				
Perceived competitive class climate ( <i>PCCC</i> ) (0/1)	0.366	0.482	0.726	0.446
Career-related search engagement ( <i>CSE_D</i> ) (0/1)	0.811	0.392	0.919	0.273
N. of career-related search activities ( <i>NCSA</i> ) (0-9)	3.542	2.678	4.755	2.641
<b>Panel B</b>				
Female	0.490	0.500	0.487	0.500
Parents' education (year) (6-16)	13.910	3.091	14.757	1.899
N. of home books: 10 books or fewer	0.109	0.312	0.054	0.226
N. of home books: 11-25 books	0.162	0.369	0.078	0.268
N. of home books: 26-100 books	0.297	0.457	0.265	0.442
N. of home books: 101-200 books	0.197	0.398	0.229	0.420
N. of home books: 201-500 books	0.148	0.355	0.246	0.431
N. of home books: 501 or more books	0.086	0.281	0.127	0.333
Duration of ECEC: did not attend	0.158	0.365	0.198	0.399
Duration of ECEC: at least a year	0.042	0.201	0.109	0.312
Duration of ECEC: 1-2 years	0.150	0.357	0.217	0.412
Duration of ECEC: 2-3	0.520	0.500	0.281	0.449
Duration of ECEC: 3-4	0.121	0.326	0.134	0.340
Duration of ECEC: 5-8 years	0.008	0.089	0.061	0.239
Private school in small town/rural area	0.024	0.152	0.006	0.075
Private school in town	0.030	0.172	0.042	0.201
Private school in city/big city	0.015	0.120	0.359	0.480
Public school in small town/rural area	0.223	0.416	0.038	0.191
Public school in town	0.479	0.500	0.060	0.238
Public school in city/big city	0.229	0.420	0.494	0.500
Class size: 15 students or fewer	0.026	0.159	0.018	0.132
Class size: 16-20 students	0.370	0.483	0.083	0.276
Class size: 21-25 students	0.508	0.500	0.341	0.474
Class size: 26-30 students	0.084	0.278	0.374	0.484
Class size: 31-35 students	-	-	0.151	0.358
Class size: 40 or more students	0.001	0.037	0.034	0.180
Single-sex school	0.002	0.041	0.244	0.430
School computer: available and use it	0.581	0.493	0.632	0.482
School computer: available but don't use it	0.178	0.383	0.193	0.395
School computer: not available	0.241	0.428	0.175	0.380
Standardized math score	-0.140	0.946	0.189	1.039
Standardized reading score	-0.133	0.959	0.180	1.026
Standardized science score	-0.197	0.931	0.267	1.028
Observation	8,828		6,522	

Data source: PISA 2018

models using the *CSE\_D* and *NCSA* measures. Individual characteristics, such as gender, parents' education level, number of books at home, and duration of early childhood education and care, were included within the variable *IDV*. The *School* control variables consisted of a combination of school type (private or public), school location (small town/rural area, town, city/big city), class size, proportion of single-sex schools, and availability of school computers. *AP* consisted of standardized scores in the subject areas of mathematics, reading, and science.  $\epsilon$  represents an error term in the equation. Standard errors were clustered within the school ID, and the final student weight from the PISA was utilized. Section 3 presents the estimated coefficients of *PCCC* on *CSE*, where each control variable is included in a sequential manner.

## Results

### OLS Results

This study examines the relationship between adolescents' perceived competitive classroom climate (*PCCC*) and career-related search engagement (*CSE*) at extensive (engagement vs. no engagement in career-related search; *CSE\_D*) and intensive (number of career-related search activities; *NCSA*) margins, focusing on cases from Italy and Korea.

First, we report the OLS results for the full sample using four different specifications.

**Table 2.** Effects of Perceptions of Competitive Classroom Environment on Career-related Search Engagement

Country	Italy		Korea	
	Career-related search engagement ( <i>CSE_D</i> ) (1)	N. of career-related search activities ( <i>NCSA</i> ) (2)	Career-related search engagement ( <i>CSE_D</i> ) (3)	N. of career-related search activities ( <i>NCSA</i> ) (4)
Outcome variable				
<i>Specifications</i>				
(1) No controls	0.027** [0.012]	0.359*** [0.085]	0.043*** [0.008]	0.546*** [0.085]
(2) + Individual characteristics	0.027** [0.012]	0.346*** [0.085]	0.039*** [0.008]	0.452*** [0.084]
(3) + School characteristics	0.028** [0.012]	0.342*** [0.084]	0.036*** [0.008]	0.427*** [0.081]
(4) + Academic performance	0.030** [0.012]	0.343*** [0.085]	0.021*** [0.008]	0.365*** [0.079]
Observation	8,828	8,828	6,522	6,522

Notes: Individual characteristics include gender, parents' education level, number of books at home, and duration of early childhood education and care. School characteristics consist of the combination of school type (private or public) and school location categories, class size, the indicator of single-sex schools, and availability of school computers. Academic performance controls consist of standardized scores in mathematics, reading, and science. Standard errors in the square parentheses are clustered within school ID and the final student weight from the PISA are utilized.

\*, \*\*, and \*\*\*, corresponds to 10%, 5%, and 1% levels of significance, respectively.

Table 2 displays the estimates at various stages of the model specification, beginning with the unconditional model (without controls) in row 1, and subsequently incorporating control variables in subsequent rows, including individual characteristics (row 2), school characteristics (row 3), and academic performance (row 4). The estimated coefficients for *CES\_D* are presented in columns 1 and 3, while the results for *NCSA* are presented in columns 2 and 4 for each country.

In the Italian sample, the range of the estimated coefficients on *CES\_D* in column 1 is from 2.7%p to 3.0%p, while in the Korean sample in column 3, they range from 2.1%p to 4.3%p. Based on our preferred specification with all controls, when adolescents perceive the classroom environment as more competitive, they tend to be more inclined to seek career-related

**Table 3.** Effects of Perceptions of Competitive Classroom Environment on Career-related Search Engagement: by Gender

Country	Italy		Korea	
	Career-related search engagement ( <i>CSE_D</i> ) (1)	N. of career-related search activities ( <i>NCSA</i> ) (2)	Career-related search engagement ( <i>CSE_D</i> ) (3)	N. of career-related search activities ( <i>NCSA</i> ) (4)
<b>Specifications (Female)</b>				
(1) No controls	0.001 [0.018]	0.015 [0.113]	0.030*** [0.010]	0.489*** [0.115]
(2) + Individual characteristics	-0.006 [0.017]	-0.002 [0.111]	0.025** [0.010]	0.380*** [0.108]
(3) + School characteristics	-0.004 [0.017]	0.040 [0.111]	0.025** [0.010]	0.391*** [0.108]
(4) + Academic performance	-0.007 [0.017]	0.029 [0.112]	0.015 [0.010]	0.307*** [0.107]
Observation	4,322	4,322	3,178	3,178
<b>Specifications (Male)</b>				
(1) No controls	0.046*** [0.015]	0.474*** [0.096]	0.045*** [0.009]	0.458*** [0.068]
(2) + Individual characteristics	0.048*** [0.015]	0.469*** [0.097]	0.037*** [0.008]	0.363*** [0.070]
(3) + School characteristics	0.047*** [0.015]	0.443*** [0.097]	0.032*** [0.009]	0.314*** [0.069]
(4) + Academic performance	0.046*** [0.015]	0.450*** [0.096]	0.022*** [0.008]	0.291*** [0.068]
Observation	4,506	4,506	3,344	3,344

Notes: Individual characteristics include parents' education level, number of books at home, and duration of early childhood education and care. School characteristics consist of the combination of school type (private or public) and school location categories, class size, the indicator of single-sex schools, and availability of school computers. Academic performance controls consist of standardized scores in mathematics, reading, and science. Standard errors in the square parentheses are clustered within school ID and the final student weight from the PISA are utilized.

\*, \*\*, and \*\*\*, corresponds to 10%, 5%, and 1% levels of significance, respectively.



information. This tendency increased by approximately 3.0%p for Italian and 2.1%p for Korean adolescents; the corresponding relative magnitudes of the estimated values were 3.7% and 2.3% for Italian and Korean adolescents, respectively.<sup>9</sup>

The estimates of the outcome of *NCSA* with a full set of controls in row 4 show similarities between the two countries. When adolescents perceived the classroom atmosphere as being competitive, they demonstrated a slight increase in engagement in career-related search activities, with Italian adolescents showing an average increase of 0.34 (mean score of 2.68) and Korean adolescents showing an average increase of 0.37 (mean score of 2.64). All regression coefficients were statistically significant at the conventional level.

Table 3 categorizes the estimates by sex, revealing varied findings, particularly in the female sample. For female Italian students, all estimates of career-related variables (both *CES\_D* and *NCSA*) appeared to lack statistical significance, regardless of whether we controlled for individual and school characteristics. Based on the specification with full controls (row 4), a significant positive correlation was observed between *PCCC* and *NCSA* among female Korean students, with an average increase of approximately 0.31 on average (mean score of 4.96). For male students, our estimates show a significant relationship between *PCCC* and all *CES* measures (*CES\_D* and *NCSA*) regardless of the country; Italian male students exhibited a comparatively stronger effect in this relationship compared to Korean male students, with a difference in magnitude about twice as large.

**Table 4.** Effects of Perceptions of Competitive Classroom Environment on Career-related Search Engagement: Using Reweighted Balanced Sample

Country	Italy		Korea	
	Career-related search engagement ( <i>CSE_D</i> ) (1)	N. of career-related search activities ( <i>NCSA</i> ) (2)	Career-related search engagement ( <i>CSE_D</i> ) (3)	N. of career-related search activities ( <i>NCSA</i> ) (4)
<b>Sample</b>				
Full sample	0.021** [0.009]	0.323*** [0.061]	0.016** [0.008]	0.300*** [0.079]
Observation	8,828	8,828	6,522	6,522
Female	-0.006 [0.012]	0.130 [0.083]	0.008 [0.008]	0.176* [0.097]
Observation	4,322	4,322	3,178	3,178
Male	0.042*** [0.012]	0.491*** [0.088]	0.021 [0.013]	0.392*** [0.122]
Observation	4,506	4,506	3,344	3,344
Full set of controls	Yes	Yes	Yes	Yes

Notes: Individual characteristics include parents' education level, number of books at home, and duration of early childhood education and care. School characteristics consist of the combination of school type (private or public) and school location categories, class size, the indicator of single-sex schools, and availability of school computers. Academic performance controls consist of standardized scores in mathematics, reading, and science. Standard errors in the square parentheses are clustered within school ID and the final student weight from the PISA are utilized.

\*, \*\*, and \*\*\*, corresponds to 10%, 5%, and 1% levels of significance, respectively.



### Robustness Checks

To evaluate the robustness of our findings, we employ entropy reweighting to create balanced samples. This approach allows us to reweight a dataset such that the distributions of the covariates in the reweighted data have specified moment conditions (see Hainmueller, 2012 for further details). This method can be advantageous for achieving a more balanced sample in observational studies with a binary treatment, wherein the data from the control group can be reweighted to match the covariate moments in the treatment group (see STATA manual; *ebalance*

**Table 5.** Effects of Perceptions of Competitive Classroom Environment on Career-related Search Engagement: Each Type of CSA

Country Sample	Italy			Korea		
	Full	Female	Male	Full	Female	Male
<i>Type of career-related search engagement</i>						
Did an internship	0.009 [0.009]	-0.003 [0.012]	0.021 [0.013]	0.009 [0.009]	0.009 [0.011]	0.007 [0.013]
Attended work-site visits	0.030*** [0.010]	0.027* [0.014]	0.037** [0.015]	0.005 [0.014]	-0.031 [0.019]	0.036* [0.021]
Visited a job fair	0.047*** [0.010]	0.030** [0.013]	0.063*** [0.015]	0.030** [0.012]	0.016 [0.017]	0.037* [0.018]
Spoke to a career advisor at school	0.028*** [0.011]	0.008 [0.015]	0.044*** [0.015]	0.043*** [0.015]	0.024 [0.021]	0.054** [0.022]
Spoke to a career advisor outside of school	0.042*** [0.010]	0.029** [0.014]	0.053*** [0.014]	0.037** [0.014]	0.030 [0.020]	0.044** [0.021]
Completed a questionnaire to find out about my interests and abilities	0.042*** [0.011]	0.024 [0.016]	0.060*** [0.015]	0.020* [0.012]	0.007 [0.013]	0.025 [0.018]
Researched the Internet for career information	0.032*** [0.011]	0.016 [0.016]	0.047*** [0.015]	0.032** [0.012]	0.003 [0.014]	0.055*** [0.019]
Went to an organized tour in an ISCED 3-5 institution	0.030*** [0.011]	-0.008 [0.016]	0.061*** [0.015]	0.030** [0.015]	0.014 [0.021]	0.048** [0.021]
Researched the Internet for information about ISCED 3-5 programmes	0.035*** [0.011]	0.002 [0.016]	0.058*** [0.015]	0.053*** [0.015]	0.048** [0.021]	0.057** [0.022]
Observations	8,828	4,322	4,506	6,522	3,178	3,344
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Individual characteristics include parents' education level, number of books at home, and duration of early childhood education and care. School characteristics consist of the combination of school type (private or public) and school location categories, class size, the indicator of single-sex schools, and availability of school computers. Academic performance controls consist of standardized scores in mathematics, reading, and science. ISCED 3-5 programmes include colleges, universities, or any other institution in upper secondary or tertiary education. Standard errors in the square parentheses are clustered within school ID and the final student weight from the PISA are utilized.

\*, \*\*, and \*\*\*, corresponds to 10%, 5%, and 1% levels of significance, respectively.

command). In our investigation, we specifically concentrated on the second moment of the covariate distributions, encompassing means and variances of the covariates.

The re-estimated results of the specifications, including a comprehensive set of controls and balanced samples, are presented in Table 4. Our main findings remain robust both within the full sample and when segmented by sex. When juxtaposing our primary findings with significant estimates of reweighted balanced samples, the differences in coefficients on *CES\_D* correspond to merely 0.9%p (3.0%p vs. 2.1%p) for the Italian full sample, 0.5%p (2.1%p vs. 1.6%p) for the Korean full sample, and 0.4%p (4.6%p vs. 4.2%p) for the Italian male sample: estimates for Italian female students' sample and Korean male students' sample are statistically insignificant.

For the outcome of *NCSA*, the significant coefficients for the Italian full sample and male students are similar to our primary findings; the estimated coefficients for Italian female students remain statistically insignificant. When reweighted balanced samples were utilized, the results for Korean female and male students exhibited regression coefficients of a slightly lower magnitude than our original analyzed samples, although the disparity in coefficient sizes was not considerable.

### Supplementary Results

In this separate subsection, we present results of the effect of *PCCC* on each category of career-related search activities (hereafter *CSA*) as shown in Table 5: there are a total number of nine *CSA* types. For male students in both the Italian and Korean samples, at least seven types of *CSE* showed significant positive coefficients. Conversely, Table 5 shows the varied results for female students. We observed negligible coefficient estimates for female Italian students in relation to *CES\_D* and *NCSA* (Tables 3 and 4). However, there was a significant positive association between *PCCC* and enhanced engagement in work-site visits (2.7%p), job fairs (3.0%p), and consultations with a career advisor outside school (2.9%p). In contrast to the pattern observed in Italian female students, significant evidence revealed that *PCCC* played a positive role in increasing the likelihood of Korean female students spending time researching college or university programs (4.8%p).

Overall, our analyses indicate that adolescents who perceive their classroom environment as competitive are more inclined to seek career-related information and engage in activities related to career exploration, and there are no significant adverse effects of adolescents' perceptions of a competitive classroom environment on their involvement in career-related exploration.

## Conclusion

The findings of this study provide evidence of the benefits of competitive classroom environments (as measured by adolescents' perceptions of a competitive class climate) on their engagement in career-related search activities. This study employed datasets from the PISA 2018 assessments in Italy and Korea. In terms of career-related search engagement, we considered two dimensions: the extensive margin (engagement vs. no engagement) and the intensive margin (number of career-related search activities among the nine different types of activities). Our findings are also robust across various sensitivity analyses. Particularly, we also utilized an entropy-reweighted balanced sample to check the robustness and found that our primary findings demonstrate robustness.

This section provides a brief overview of the findings. When students perceive their classroom environment as competitive, 1) they are more likely to engage in career-related search activities

by an increase of approximately 2.1-3.1%p (4.2-4.6%p) for Italian adolescents (Italian male students) and 1.6-2.1%p (2.2%p) for Korean adolescents (*Korean male students*): the estimates for Italian and Korean female students did not show statistical significance, 2) all estimates for the number of career-related search activities were statistically significant regardless of gender, except for Italian female students: the coefficients for Italian adolescents ranged from 0.32 to 0.34 (with a mean score of 3.54), while for Korean adolescents, the coefficients ranged from 0.30 to 3.37 (with a mean score of 4.76), 3) across nine distinct types of career-related search activities, statistical significance is observed among male students, regardless of country, and 4) Italian female students exhibit a higher likelihood of participation in work-site or job fairs and discussions with career advisors, while Korean female students show a greater propensity for researching information on colleges' or universities' programs.

Competitive educational environments present both advantages and disadvantages in relation to adolescents' achievement in various dimensions, but they are inherent in different contexts such as the labor market, academic institutions, sports competitions, familial relationships, and cooperative frameworks. Individuals may develop intrinsic motivation and improve their subjective performance in competitive settings with appropriate challenges and constructive feedback. At the individual level, adolescents may find it insufficient to disregard competitive influences. Therefore, deriving satisfaction from learning in competitive settings may be more beneficial. Simultaneously, schools should foster collaborative and supportive environments to facilitate positive adjustment outcomes.

This study had some limitations. First, we utilized the PISA 2018 cross-sectional datasets despite the fact that longitudinal data collection is desirable. Further analyses using longitudinal datasets may help overcome the restrictions of cross-sectional data when examining different aspects of competitive classroom environments and career-related job search activities. Additionally, the measure used in this study focuses on the number of career-related search activities rather than the frequency of each of the nine types of activities, which are not available in the PISA 2018 data. It would be advantageous for future supplementary datasets to incorporate the frequency of occurrences across various types of career-related search activities over specified timeframes. Finally, the scope of this study can be widened by including data from other countries such as the United States and the United Kingdom, where competitive environments are widespread, to enhance the applicability of our findings to a more diverse population.

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## Notes

1. Prior research has explored competitive attitudes across various domains, such as sports (Bhardwaj et al., 2018), sales (Wang et al., 2018), health behaviors (Burckle et al., 1999; Keresztes et al., 2015), and psychology (Bohlmeyer et al., 1985; Ou & Ma, 2023).
2. The Global Gender Gap Report compares 147 countries in terms of their progress toward gender equality across four thematic dimensions: economic participation and opportunity, educational attainment, health and survival, and political empowerment (<https://www.weforum.org/publications/global-gender-gap-report-2023/in-full/benchmarking-gender-gaps-2023/>)
3. <https://eige.europa.eu/gender-equality-index/2019/domain/work/IT>
4. According to the World Bank Gender Statistics, the proportion of female STEM (tertiary) graduates in Italy is approximately 40 percent, whereas in Korea, it is only 26 percent, based on the most recent data from 2015–2017.
5. <https://epale.ec.europa.eu/en/blog/gender-segregation-stem-vocational-training-brief-comparison-estonia-indonesia-and-south-korea>
6. <https://www.koreaherald.com/view.php?ud=20211213000131>
7. <https://keia.org/the-peninsula/low-youth-employment-in-korea-part-1the-golden-ticket-syndrome/>
8. For a comprehensive description, refer to the OECD publications from 2001 and 2002, containing data on the sampling methodology, questionnaire design, response rates throughout the survey process, and findings from international sources. The PISA data can be assessed at [www.pisa.oecd.org](http://www.pisa.oecd.org).
9. The logit or probit regression models yield comparable results, which are not provided in the paper but available upon request from the authors.

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