



Research Paper

Beautiful inside and out: Peer characteristics and academic performance [☆]

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ABSTRACT

This paper explores the effect of own and peer attractiveness on various measures of academic performance. Using data from the National Longitudinal Survey of Adolescent Health (Add Health), we focus on high school students in the United States and exploit random variation within schools across cohorts in adolescents' physical and personality attractiveness as assessed by the interviewer. We find that for girls only own personality attractiveness boosts academic outcomes. For boys instead, both own physical and personality attractiveness positively affect performance and peer characteristics also matter. An increase in the fraction of physically attractive high school peers decreases boys' academic performance in later years. We show that this effect is driven by less physically mature boys and operates through a decrease in self-confidence.

1. Introduction

Since the pioneering work of Hamermesh and Biddle (1994), numerous studies have examined the existence and the size of a beauty premium in the labor market –see Sierminska and Singhal (2023) for a recent review. In certain cases, the effects of physical appearance may go beyond the labor market and extend to happiness (Hamermesh and Abrevaya, 2013), crime (Mocan and Tekin, 2010), and risky behavior (Green et al., 2023). Less is known about beauty effects on educational attainment during adolescence and the role of peer beauty in shaping academic outcomes. If own and/or peer beauty matter already during high school, this can

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have implications for the development of human capital and the existence of beauty premia in the labor market, with long-lasting consequences later in life.

In this paper we fill this gap by analyzing a representative longitudinal sample of adolescent students in the United States with information on own and peer attractiveness and various indicators of academic performance. The data we use in our analysis come from the National Longitudinal Survey of Adolescent Health (Add Health) survey and include two distinct yet potentially interrelated measures of attractiveness, namely, the interviewers' assessment of physical and personality attractiveness of the respondents measured during adolescence. While most papers mainly focus on one aspect of attractiveness, possibly due to the unavailability of such measures (see, for a similar discussion, Ritts et al., 1992; and French et al., 2009), we analyze in a unified framework the effect of both physical and personality attractiveness.¹ This approach enables us to explore whether own and/or peer personality attractiveness counterbalance or further reinforce any effects of physical attractiveness on academic performance. The data also include detailed information on academic achievement in later years (high-school Grade Point Average (GPA), the Peabody Picture Vocabulary test score and college enrollment), an extensive list of socio-economic characteristics and various questions that allow us to analyze attributes and behaviors that are generally difficult to observe such as self-confidence, college aspirations, risky behavior and perception of unfair treatment by the teachers during adolescent years.

For identification we exploit the random variation within schools across cohorts in the proportion of attractive peers in terms of physical appearance and personality, after taking out school, cohort and interviewer fixed effects. Following the procedure proposed by Guryan et al. (2009), we demonstrate a lack of strong evidence that would indicate sorting into school-cohorts based on attractiveness. By focusing on peers within the same cohort instead of classmates or nominated friends we address the concern of selection related to the endogenous formation of peer groups. The inclusion of interviewer fixed effects controls for the subjective nature of beauty assessments. Moreover, by analyzing academic outcomes measured seven years after the assessment of attractiveness we mitigate potential concerns regarding simultaneity.

We find a personality premium in academic performance for both girls and boys and a beauty premium only for boys. Moreover, we estimate a strong negative effect of peer physical attractiveness on academic performance but only among boys. An increase in the proportion of physically attractive peers in a cohort lowers boys' transcript GPA and their Peabody Picture Vocabulary test score. This translates into a lower probability of college enrollment. Our estimates imply that a 10 percentage points increase in the share of physically attractive peers *decreases* the chances of college enrollment for boys by 3 percentage points.

We explore various mechanisms and uncover a novel channel that operates through self-confidence. A high proportion of attractive peers lowers the self-confidence of adolescent boys and, as a result, their cumulative GPA during high school. This effect has persistent consequences as their score in Peabody Picture Vocabulary test after graduation and the probability of college enrollment also drop. The literature so far has highlighted self-confidence as a factor through which own attractiveness boosts wages of adult workers in the labor market (Mobius and Rosenblat, 2006). Our analysis sheds light on a similar mechanism but for *peer* physical attractiveness, which operates in the opposite direction and negatively affects the academic achievement of adolescent students.

Our study contributes to a small but growing body of literature that analyzes the beauty premium in academic performance. Cipriani and Zago (2011) focus on university students in Italy and find a significant positive effect on academic performance in oral and written exams solely for male students. Deryugina and Shurchkov (2015a) show that the beauty premium for female college students in the United States is negligible as soon as one controls for ability. Our findings confirm this gender difference and point to a significant beauty premium only for boys. Only two studies focus on adolescent students but both abstract from the effects of peer characteristics. The first is by Hamermesh et al. (2023), who analyze various cohorts of young children in the United Kingdom and the United States and document a significant beauty premium in educational attainment. The second is by French et al. (2009) and examines the effects of own physical and personality attractiveness on high school GPA.

To the best of our knowledge, the only study that considers peer physical appearance and academic performance is that of Hernández-Julián and Peters (2018), which focuses on university students at a public open-enrollment university in Denver, Colorado, and considers students taking the same course in the same term as the peer group. However, no causal interpretation is possible due to the descriptive nature of this study which, in addition, has potentially limited external validity. In our analysis we address the endogenous formation of peer groups by using the random variation within schools across cohorts, and as such, provide first evidence on the *causal* effect of peer attractiveness on academic outcomes of a *representative* sample of students during and immediately after high school. Shtudiner (2020), albeit in a different context, analyzes the effect of peer attractiveness on job seekers and also documents a decrease in the probability of being interviewed only for male candidates, whose image was presented along with that of other attractive candidates. Similarly, our analysis reveals significant gender differences and shows that peer beauty considerations play a key role for boys' academic achievement already during adolescence.

Our analysis offers further insights to the literature that examines the beauty premium in terms of labor market outcomes. While the size of the estimated beauty premium and the underlying mechanisms vary, many studies document a significant premium of own physical attractiveness on pay (Hamermesh and Biddle, 1994; Scholz and Sicinski, 2015; Fletcher, 2009; Doorley and Sierminska, 2015; Deryugina and Shurchkov, 2015b) and employability (Ruffle and Shtudiner, 2015). We show that the physical attractiveness premium starts earlier in life for boys, already during adolescence. This beauty premium in high school GPA is accompanied by an

¹ Exceptions in the literature include (French et al., 2009), who study the effects of various aspects of *own* attractiveness on the grades students received in high school, and (Hamermesh and Parker, 2005), who consider the potential impact of ("go-getter") personality of faculty members as part of their sensitivity analysis in exploring the impact of beauty on university instructor ratings in the courses they teach. While there may be potential interaction effects between physical and personality attractiveness, our results are robust to considering physical and personality attractiveness in isolation (see Section 4).

increase in the probability of college enrollment and thus in human capital accumulation, with potential implications for future labor market outcomes.

Our paper also relates to the growing literature that studies how peer characteristics can influence individuals' academic outcomes. Most studies adopt a similar identification strategy to ours and estimate the causal effect of peer characteristics either by using random variation in peer composition across cohorts within schools or by randomly assigning peers in each classroom. More specifically, Golsteyn et al. (2021) and Shure (2021) focus on peer persistence and other personality traits and show that they improve GPA and overall academic achievement. Our measure of peer attractiveness in terms of personality is loosely related to these traits as it likely captures the general spirit that the respondents demonstrated throughout the interview. The vast literature that analyzes the effects of peer characteristics on academic performance can guide the choice of control variables in our empirical specification and may serve as a benchmark for the quantification of our results. In particular, Bifulco et al. (2011), Bifulco et al. (2014), and more recently Cools et al. (2022) use the Add Health dataset and focus on the role of peer parental education, with mixed findings. Other studies consider the role of peer composition in terms of gender and find a positive effect of the proportion of female peers on GPA (Lavy and Schlosser, 2011; Goulas et al., 2018) and a null (Anelli and Peri, 2019) or negative (Brenøe and Zölitz, 2020) effect on the STEM participation. Given the lack of consensus in the literature, our benchmark analysis excludes other peer characteristics among controls, but we explore the sensitivity of our findings to their inclusion and show that our results remain robust to controlling for peer composition in terms of other characteristics.

2. Data

In our analysis, we use data from the Add Health which is a longitudinal study of a nationally representative sample of high school students in the United States. In 1994-1995 school year, a sample of 80 high schools and 52 middle schools was selected to participate in an in-school survey, which was conducted among more than 90,000 students, who were enrolled in grades 7 through 12. Approximately 20,000 of these students were then asked to participate in in-home interviews and were subsequently followed in five further waves. Over the years, Add Health collected data on various topics including demographic characteristics, social relations, family and socioeconomic background, behavioral and health-related issues, as well as academic performance of the participants. In our analysis, we use the in-home interview data on adolescents in 1994-1995 (Wave I) when the respondents were 11 to 19 years old and the follow-up data six-seven years after, in 2001-2002 (Wave III) when the respondents were 18 to 25 years old and would have completed high school.² Over 15,000 individuals from Wave I were followed to Wave III.³

The Add Health data include the interviewer's assessment of the physical and personal attractiveness of the respondents in Wave I which is key for our analysis. In particular, at end of each in-home interview, the interviewers were asked to answer the following questions: "How physically attractive is the respondent?" and "How attractive is the personality of the respondent?". We determine the physical attractiveness of each respondent based on the interviewer's rating of the former, and the attractiveness of personality using the rating for the latter. Possible ratings for each question are (1) very unattractive, (2) unattractive, (3) about average, (4) attractive, and (5) very attractive. Based on these ratings we construct two binary variables, one for physical attractiveness and one for attractiveness of personality of each respondent and consider individuals as (above average) attractive if they received a rating of 4 (attractive) or 5 (very attractive). We opt for binary explanatory variables to ease the interpretation of the coefficient estimates, particularly regarding peer physical and personality attractiveness. Nevertheless, in section 5, we demonstrate the robustness of our results to our definition by considering a three-way classification: above average (categories 4 and 5), average (category 3), and below average (categories 1 and 2). Our cohort-level variables are constructed using the Add Health school and grade identifiers.⁴ More specifically, for each respondent, we construct the proportion of physically attractive peers and the proportion of peers with attractive personality among the respondents' peers in the same school and grade excluding the respondent.⁵ Our benchmark measures consider the proportion of attractive peers, but in section 5, we further explore possible non-linearities in the effect of peer attractiveness by considering quintiles instead of simple shares and demonstrate the robustness of our findings.

We examine the effects of peer characteristics (physical and personality attractiveness) on respondent's academic performance using several outcomes measured in Wave III including the high-school GPA, college enrollment and the individual's post high school Add Health Picture Vocabulary Test (AHPVT) standardized score. A common challenge in the literature that studies beauty premia is simultaneity, that is the interviewer's rating of the respondent's attractiveness can be influenced by the respondent's academic performance if the interviewer knows the latter or can infer it (see Hamermesh and Biddle, 1994 for a similar discussion in the context of beauty premium in the labor market). We mitigate this concern, by considering measures of physical and personality attractiveness variables measured in Wave I and analyzing their effect on academic outcomes measured in Wave III, i.e., six-seven years after. Our first academic performance measure, high-school GPA, is based on transcripts which were requested and abstracted for respondents in Wave III.⁶ However, this information is only available for 88% of Wave III respondents and the attrition might

² We exclude a small number of individuals who were older than 25 years (101 observations) in Wave III or were still attending high school (81 observations).

³ We exclude data from Wave II which was conducted just one-two years after Wave I and solely included respondents from Wave I who were still attending high school.

⁴ Our benchmark measures consider all peers but we also explore the sensitivity of our results to using same gender peers within the same school and grade (see Section 5).

⁵ For respondents who have less than three peers within school-grade, we treat cohort-level variables as missing.

⁶ The information on high school GPA in Wave III represents a cumulative GPA that is assigned during Grades 9-12. Therefore, it may be subject to simultaneity concerns. However, the inclusion of alternative academic outcomes that are solely measured in Wave III provides an additional robustness check in this regard.

Table 1
Sample statistics.

	Panel A. Benchmark sample		Panel B. GPA (transcripts) sample	
	Boys	Girls	Boys	Girls
GPA (transcripts)	-	-	2.436 (0.840)	2.768 (0.783)
Prop. college enrollment	0.547 (0.498)	0.636 (0.481)	0.596 (0.491)	0.666 (0.472)
AHPVT in Wave III	101.150 (14.182)	100.594 (14.407)	102.515 (12.827)	101.169 (14.097)
Prop. physically attractive	0.428 (0.495)	0.579 (0.494)	0.436 (0.496)	0.575 (0.494)
Prop. attractive personality	0.449 (0.497)	0.570 (0.495)	0.468 (0.499)	0.569 (0.495)
Prop. physically attractive peers	0.514 (0.124)	0.511 (0.128)	0.513 (0.124)	0.509 (0.127)
Prop. peers with attractive personality	0.517 (0.132)	0.515 (0.138)	0.519 (0.129)	0.511 (0.136)
Age in Wave III	21.712 (1.788)	21.569 (1.772)	21.753 (1.793)	21.584 (1.781)
Race				
Prop. non Hispanic White	0.705 (0.456)	0.708 (0.455)	0.733 (0.442)	0.720 (0.449)
Prop. Black or African American	0.139 (0.346)	0.142 (0.350)	0.121 (0.326)	0.138 (0.345)
Prop. Hispanic or Latino origin	0.118 (0.323)	0.112 (0.316)	0.107 (0.309)	0.104 (0.305)
Prop. Other (Asian or Native)	0.038 (0.192)	0.037 (0.190)	0.039 (0.193)	0.038 (0.190)
Prop. foreign-born	0.053 (0.225)	0.057 (0.232)	0.055 (0.227)	0.054 (0.226)
Maternal education				
Prop. less than high school	0.144 (0.349)	0.151 (0.358)	0.123 (0.329)	0.141 (0.348)
Prop. high school or similar	0.304 (0.460)	0.314 (0.464)	0.290 (0.454)	0.311 (0.463)
Prop. more than high school	0.315 (0.464)	0.294 (0.456)	0.332 (0.471)	0.299 (0.458)
Prop. college or more	0.240 (0.427)	0.241 (0.427)	0.255 (0.436)	0.249 (0.433)
Gross household income (in thousand \$)	44.974 (42.361)	46.926 (48.557)	46.680 (39.642)	47.444 (45.547)
Number of siblings	1.399 (1.190)	1.398 (1.135)	1.389 (1.181)	1.406 (1.124)
Prop. first born	0.421 (0.494)	0.427 (0.495)	0.425 (0.495)	0.437 (0.496)
Prop. two-parent family	0.673 (0.469)	0.663 (0.473)	0.691 (0.462)	0.670 (0.470)
N	3,626	4,034	2,924	3,295

Note: See text for sample restrictions and Appendix Table A.1 for the definitions of all variables. Corrected for the design effects of the Add Health sampling process.

be non-random (French et al., 2009). Thus, as a robustness check, we use the self-reported grade information from the most recent grading period at the time of the Wave I in-home interview, which is available for a larger number of observations, as an alternative measure (see Section 5).⁷ Our second outcome measure, college enrollment, is derived from information obtained during Wave III when respondents were asked to provide details about the highest grade or year of regular schooling they had completed, as well as their current enrollment status in a regular school. If they were currently enrolled in school, they were further asked to specify whether the school was a college. Based on these responses, we determine whether the respondent had ever been enrolled in college by Wave III. Our final academic performance measure is the standardized score from the AHPVT (measured in Wave III), which is a computerized, abridged version of the Peabody Picture Vocabulary Test-Revised (PPVT-R, Dunn and Dunn, 1981) and can be considered as an indicator of an individual's verbal skills (Bifulco et al., 2011).

⁷ In Wave I, respondents were asked about their grade in English, Math, Science and History or Social studies in the most recent grading period/last grading period in spring. Our alternative measure takes the simple average of the scores in these four subjects which we refer to as self-reported GPA. Given that the interviewer assesses the attractiveness of the respondent at the end of the interview in Wave I, the self-reported GPA may influence this assessment. This is partly accounted for through the inclusion of interviewer fixed effects. Nevertheless, given simultaneity concerns, our benchmark measure of GPA is based on transcripts.

Table 1 presents the descriptive statistics of our sample separately for girls and boys. Panel A shows the statistics for our benchmark sample, which consists of all observations that have non-missing information for any of the variables included in the analysis. Panel B displays statistics for the GPA (transcript) sample, which is a subset of our benchmark sample that has non-missing high school transcript information in Wave III. On average, girls perform better than boys in terms of their GPA, and have a higher probability of enrolling in college, while boys outscore girls on the AHPVT standardized score. We observe similar patterns in Panels A and B, but the GPA (transcript) sample includes slightly better-performing students independent of the metric used to measure academic performance.⁸

The subsequent four rows of the table present the ratings of own physical appearance and personality attractiveness, as well as the proportion of peers considered attractive in both dimensions. In Panel A, which refers to our benchmark sample, 42.8% of boys received ratings of above average attractiveness in physical appearance, while 44.9% were deemed attractive in terms of personality. For girls, in line with earlier studies (e.g. Hamermesh and Biddle, 1994; Mocan and Tekin, 2010), a greater proportion than boys was rated as (above average) attractive both in terms of physical appearance (57.9%) and personality (57.0%). In Panel B, which presents the GPA (transcripts) sample, the distribution of attractiveness ratings is similar to that of the benchmark sample, with less than half of the boys being rated as attractive in physical appearance and personality, and around 57% of the girls being rated as attractive in both dimensions. However, there is a slightly higher proportion of boys and a lower proportion of girls who were rated as (above average) attractive in the GPA (transcripts) sample compared to the benchmark sample.⁹ Regarding peer characteristics, the proportion of attractive peers is comparable between boys and girls in both samples. On average, approximately 51% of same-grade schoolmates were rated as attractive in terms of physical appearance and personality.

The remaining rows of Table 1 present the variables that are well-established determinants of post-secondary student outcomes (see, for example, Bifulco et al., 2011) including age, race, whether the respondent was born in the United States, maternal education, parental income, number of siblings, whether the respondent is the first-born child in the family, and whether the respondent was living with both parents in Wave I.¹⁰ In Appendix Table A.1 we present the definition of all variables included in our analysis.¹¹

3. Empirical strategy

To determine the role of peer physical and personality attractiveness on academic performance, our identification strategy relies on the unique structure of the Add Health survey, which follows multiple cohorts from the same school, and exploits variation in the proportion of attractive peers in terms of physical appearance and personality across cohorts within schools assuming that families select schools based on the average school composition (i.e., sorting) rather than the composition of the child's cohort (see Hoxby, 2000; Bifulco et al., 2011; Cools et al., 2022; Merlino et al., 2022; Kiessling and Norris, 2023; and Lavy and Schlosser, 2011 for a similar approach). To assess the variation within schools across cohorts, we perform a variance decomposition following Ammermueller and Pischke (2009) by first calculating the school-cohort averages of our key variables, and then decomposing the total variance in these school-cohort averages into within school and between school variances.¹² These results, shown in Appendix Table A.3, confirm that, there is reasonable amount of within, between and total variation across cohorts.

Although in our context, the sorting of students into specific schools based on peer physical appearance and personality is less likely compared to sorting based on other factors such as income, location, education preferences or the ability of the child (Hoxby, 2000), our approach assumes that students are randomly assigned to cohorts within schools. Defining the peer group based on all students in a given cohort, as opposed to friendship nominations also mitigates potential concerns regarding “homophily”, i.e., the tendency of individuals to choose friends who are similar to themselves (see, for reviews, McPherson et al., 2001; Graham, 2015). We formally test sorting in our setting following the correction method proposed by Guryan et al. (2009). Specifically, we regress the proportion of physically attractive peers (leave-out-mean at the cohort-school level) on own physical attractiveness, conditional on the leave-out mean at the school level, as well as school, cohort, and interviewer fixed effects and then add predetermined characteristics as additional controls. Appendix Table A.4, columns 1 and 2, report the results. We find no evidence of sorting in terms of physical attractiveness, as the coefficient estimate of own physical attractiveness is negligible and not statistically significant, independently of controlling for other predetermined characteristics. The coefficient estimates of the predetermined characteristics are not jointly statistically significant either as indicated by the p-value of the F-test in the last row. Appendix Table A.4, columns 3

⁸ While this indicates a non-random attrition of GPA (transcript) records, the analysis of French et al. (2009) implies that accounting for non-random selection has minimal impact on the analysis of the effect of one's physical appearance and personality on cumulative GPA. Nevertheless, to address potential concerns regarding the non-random attrition of GPA (transcript) data, we demonstrate robustness of our findings to the use of self-reported GPA, which includes observations with missing transcript records (see section 4).

⁹ See Appendix Table A.2 for the detailed distribution of physical appearance and personality ratings for both samples.

¹⁰ A parent or guardian was interviewed during Wave I who provided further information about the family characteristics including the highest level of education they attained, and the gross total family income. As more than 90.5% of the parent interview respondents were (biological, step, adoptive or foster) mothers, we refer to parental education as that of the mother throughout.

¹¹ Our benchmark analysis excludes additional controls measured in Wave I such as participation in sports, Body Mass Index (BMI) variables (overweight and obese), (self-assessed) general health status, whether the respondent was rated as well-groomed by the interviewer, or AHPVT standardized score in Wave I that are also potential determinants of the academic outcomes but may be correlated with own attractiveness. We explore the sensitivity of our results to their inclusion in Section 5.

¹² More formally, the total variance in school-cohort average of variable x is decomposed into its within and between school components using the relationship: $\frac{1}{C} \sum_{s=1}^S \sum_{c=1}^{C_s} (x_{cs} - \bar{x})^2 = \frac{1}{C} \sum_{s=1}^S \sum_{c=1}^{C_s} (x_{cs} - \bar{x}_s)^2 + \frac{1}{C} \sum_{s=1}^S C_s (\bar{x}_s - \bar{x})^2$, where $s = 1, 2, \dots, S$ and $c = 1, 2, \dots, C_s$ are school and school-cohort indicators, respectively, and C is the total number of cohorts in the sample.

and 4 show the coefficients of similar regressions for personality attractiveness. There is no strong evidence of sorting in personality attractiveness, as the coefficient estimate of own personality attractiveness is very small in size, albeit statistically significant. Also in this case, the coefficient estimates of all predetermined characteristics are not jointly statistically significant.¹³

After confirming that there is reasonable total, between and within variation at the level of identification and that there is no strong evidence of sorting by attractiveness, we proceed with the main empirical analysis. Our baseline specification is the following:

$$\begin{aligned} \text{Outcome}_{icsj} = & \beta_1 \text{physically attractive}_{icsj} + \beta_2 (\text{prop. physically attractive peers})_{-icsj} \\ & + \beta_3 \text{attractive personality}_{icsj} + \beta_4 (\text{prop. peers with attractive personality})_{-icsj} \\ & + \beta_5 X_{icsj} + \eta_c + \kappa_s + \mu_j + u_{icsj} \end{aligned} \quad (1)$$

where Outcome_{icsj} is the high school GPA (based on high school transcripts), the probability of college enrollment or the AHPVT score (measured in Wave III) of individual student i within grade c (i.e., cohort) and school s , who was interviewed by interviewer j . In equation (1), the considered outcome is regressed on individual student's own physical and personality attractiveness, the proportion of physically attractive peers and the proportion of peers with attractive personality within the same school and grade excluding the individual student (i.e. *leave-out-means* denoted by subindex $-i$), grade fixed effects η_c , school fixed effects κ_s , and interviewer fixed effects μ_j . The specification also includes a set of observable characteristics X_{icsj} that are potential determinants of academic performance such as age, race, whether the respondent was born in the United States, maternal education, household income, number of siblings, whether the respondent is the first born child in the family, and whether the respondent was living with both parents in Wave I. We cluster standard errors at the school level.

In equation (1) the inclusion of grade and school fixed effects, η_c and κ_s ensures that the estimation of the effect of peer characteristics is based on comparisons across cohorts within a school. To address concerns about potential differences in interviewer standards when assessing physical and personal attractiveness (see Hamermesh and Biddle, 1994 for a discussion), equation (1) includes interviewer fixed effects μ_j (see Mocan and Tekin, 2010 for a similar approach). This approach allows us to control for interviewer-specific beauty standards and isolate the effects of individual attractiveness and personality on academic outcomes.¹⁴ By focusing on academic outcomes measured in Wave III, we also mitigate concerns related to reverse causality, as it ensures that our key variables pertaining to physical and personality attractiveness are measured in Wave I, and are not influenced by academic performance.

4. Results

We start our empirical analysis by estimating equation (1) separately for boys and girls. Table 2 presents the results for the three different measures of academic performance considered, namely, transcript GPA, probability of college enrollment, and the AHPVT standardized score. We find that own physical and personality attractiveness boost boys' GPA (Panel A). This also applies to the probability of enrolling in college. The only exception is the AHPVT score, where own physical attractiveness is not statistically significant.¹⁵ For girls, only the personality attractiveness has a positive effect on academic performance while physical attractiveness does not seem to matter (Panel B). This is consistent with Deryugina and Shurchkov (2015a) and French et al. (2009), who also find a limited effect of own physical attractiveness on academic performance.

Turning to the role of peer characteristics, Table 2, Panel A shows a strong, negative effect of the proportion of physically attractive peers on all three academic outcomes of boys. Boys' GPA and AHPVT score are lower, when the proportion of physically attractive peers in their cohort is higher. This translates into a lower probability of college enrollment. By contrast, girls' performance is not significantly affected by the proportion of attractive peers, except for the probability of college enrollment but this effect is less pronounced compared to that observed for boys. Although this gender difference might seem surprising at first, it is confirmed by psychological studies that analyze adolescent behavior and document a larger role of peer appearance culture among boys than girls (see Jones and Crawford, 2006).¹⁶ We obtain similar results if we consider self-reported GPA as an outcome variable –see Appendix Table A.5.

In terms of magnitude of the effects, our estimates suggest that being physically attractive increases boys' GPA by 6.9% (= 0.17/2.44) and the chances of college enrollment by 6 percentage points. This is a substantial beauty premium as the average probability of college enrollment for boys in our sample is 55% –see Table 1. Indeed, our estimate for the beauty (grade) premium is larger than that in Deryugina and Shurchkov (2015a), possibly because their focus is on undergraduate rather than adolescent students and there are no separate estimates for males and females. French et al. (2009) also use Add Health data but do not find any statistically significant effect of physical attractiveness on GPA as soon as they control for grooming, which is likely to be correlated with physical attractiveness and as such its inclusion as an additional control is debatable. Nevertheless, in section 5 we report estimates with grooming as an additional control variable in a robustness exercise and show that the effect of own physical attractiveness on GPA and the probability of college enrollment vanishes as grooming likely captures part of the impact of physical

¹³ In Appendix Table A.4 we focus on our key variables. None of the individual coefficient estimates of pre-determined characteristics included in columns 2 and 4 is statistically significant (results available upon request).

¹⁴ In our sample there are 474 distinct interviewers, each of whom had interviewed around 16 students on average.

¹⁵ The insignificance of own physical attractiveness in determining the AHPVT score suggests a possible role for teachers as the AHPVT is not assessed by them. Thus, in section 6 we explore the role of teachers as a potential mechanism.

¹⁶ These studies are mainly descriptive and do not specifically study the implications of peer appearance on academic performance.

Table 2
Effects on academic outcomes.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Boys			
Physically attractive	0.167*** (0.049)	0.057** (0.022)	0.236 (0.761)
Prop. physically attractive peers	-0.502** (0.250)	-0.312** (0.156)	-10.804*** (3.545)
Attractive personality	0.119*** (0.041)	0.075*** (0.022)	1.897** (0.821)
Prop. peers w. attractive personality	0.108 (0.252)	0.044 (0.163)	1.618 (4.563)
N	2,924	3,626	3,626
Panel B. Girls			
Physically attractive	0.007 (0.038)	0.006 (0.024)	-0.746 (0.682)
Prop. physically attractive peers	0.019 (0.201)	-0.232* (0.140)	-3.067 (2.937)
Attractive personality	0.159*** (0.040)	0.077*** (0.022)	2.835*** (0.801)
Prop. peers w. attractive personality	-0.039 (0.219)	0.162 (0.143)	-0.097 (3.571)
N	3,295	4,034	4,034
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

attractiveness. Our estimates for the effect of own personality attractiveness are instead very similar in size to that in French et al. (2009). In particular, we find that having an attractive personality increases GPA by 4.9% ($= 0.12/2.44$) for boys and 5.8% ($= 0.16/2.77$) for girls and the probability of college enrollment of both boys and girls by 8 percentage points.¹⁷

When it comes to peer characteristics—which is the main focus of our paper—our estimates imply that a 10 percentage points increase in the share of physically attractive peers *decreases* the chances of college enrollment for boys by 3 percentage points. This is sizable. For comparison, Bifulco et al. (2011), who also use the Add Health data, find that a 10 percentage points increase in the share of peers with college educated mothers increases the chances of college enrollment by 5 percentage points.

It is worth noting that, there may be potential interaction effects between physical and personality attractiveness. While limited, studies considering both personality and physical appearance suggest that accounting for personality may slightly diminish the effects of physical appearance (e.g., Hamermesh and Parker, 2005; French et al., 2009). Therefore, we explore potential interaction effects by estimating versions of the empirical specification that include only own and peer physical attractiveness and specifications that include only own and peer personality attractiveness. All else equal, if there are potential interactions between personality and physical attractiveness, we expect the coefficient estimate of physical (or personality) attractiveness to be larger in magnitude than our benchmark estimates, and as such, our benchmark estimates can be considered as relatively conservative estimates of the identified effects. Table 3 presents the results. For boys, the key patterns continue to hold and consistently demonstrate a positive and statistically significant coefficient estimate of own physical attractiveness on GPA and the probability of college enrollment (Panel A). For both boys and girls, own personality attractiveness remains positive and statistically significant for all outcomes considered (Panels B and D). Own physical attractiveness becomes statistically significant for girls in determining GPA and college enrollment once personality attractiveness is excluded (Panel C), but with smaller magnitudes compared to those for boys. As expected, the magnitudes of own attractiveness coefficients are greater in these specifications than in the benchmark.

Importantly, for boys, the coefficient of peer physical attractiveness remains consistently negative, statistically significant, and similar in magnitude to our benchmark estimates (Panel A). The coefficient of peer personality attractiveness continues not to be statistically different from zero (Panel B). For girls, the proportion of attractive peers does not significantly affect academic

¹⁷ For comparison, according to our estimates, coming from a two-parent family increases the chances of college enrollment for boys by 8 percentage points—see Appendix Table A.6. This is within the range of estimates found in the literature. For example, Ermisch and Francesconi (2001) find that growing in a one-parent family is associated with a 14% lower probability of achieving an A-level or higher qualification among young adults in the United Kingdom.

Table 3
Effects on academic outcomes - separately estimating the effect of physical and personality attractiveness.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Boys - only physical attractiveness			
Physically attractive	0.220 ^{***} (0.046)	0.090 ^{**} (0.022)	1.074 (0.648)
Prop. physically attractive peers	-0.468 ^{**} (0.212)	-0.299 ^{**} (0.135)	-10.222 ^{***} (3.211)
N	2,924	3,626	3,626
Panel B. Boys - only personality attractiveness			
Attractive personality	0.194 ^{***} (0.040)	0.101 ^{***} (0.022)	2.017 ^{***} (0.701)
Prop. peers w. attractive personality	-0.182 (0.210)	-0.132 (0.140)	-4.255 (4.147)
N	2,924	3,626	3,626
Panel C. Girls - only physical attractiveness			
Physically attractive	0.075 ^{**} (0.034)	0.040 ^{**} (0.020)	0.491 (0.740)
Prop. physically attractive peers	0.020 (0.215)	-0.147 (0.120)	-2.951 (2.776)
N	3,295	4,034	4,034
Panel D. Girls - only personality attractiveness			
Attractive personality	0.163 ^{***} (0.035)	0.079 ^{***} (0.018)	2.488 ^{***} (0.827)
Prop. peers w. attractive personality	-0.028 (0.233)	0.033 (0.126)	-1.870 (3.251)
N	3,295	4,034	4,034
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

^{**} p < 0.05.

^{***} p < 0.01.

performance (Panels C and D). Overall, all our key findings continue to hold if we consider physical and personality attractiveness in isolation.

Next, Table 4 unfolds the effects of own and peer physical and personality attractiveness on transcript GPA, by estimating equation (1) separately for Math, Science, Humanities, and English grades. The table shows that the negative effect of the proportion of attractive peers on boys' overall GPA is driven by a drop in the English grade (Panel A, column 4). Considering the public speaking requirements in United States high school English courses (as discussed in Kahl Jr, 2014) and the extensive medical literature on the fear associated with public speaking (see, for example, Hancock et al., 2010), it is plausible that the negative impact on boys' English academic performance could be attributed to the potential contribution of peer attractiveness to this fear. Although it is not possible to investigate this directly with our data, in section 6 we analyze different mechanisms that point to this direction.

In all specifications, we have estimated separate regressions for boys and girls by considering all peers (of any gender) in their cohort. Table 5 reports the estimates when we consider only peers of the same gender as the respondent. The coefficients of own physical and personality attractiveness remain practically unchanged. The negative effect of the proportion of attractive peers on boys' academic outcomes holds also when the peer group comprises exclusively of boys (Panel A). However, in this case, we also detect a positive effect of the proportion of peers with attractive personality on AHPVT score (Panel A, column 3). This finding suggests that peers with an attractive personality may partly mitigate the negative effect of physically attractive peers.

5. Robustness checks

In this section we check the robustness of our estimates in three key dimensions: i) the definition of own and/or peer attractiveness; ii) the inclusion of additional controls; and iii) the definition of the peer group of reference.

In our benchmark specification, we use the dichotomous variable "attractive" to classify the respondents and their peers according to their physical appearance and personality to ease the interpretability of peer variables. Following Hamermesh and Biddle (1994), we re-estimate equation (1) by considering a three-way classification of the following form: attractiveness above average, about

Table 4
Effects on academic performance - by course.

	(1)	(2)	(3)	(4)
	Math grade	Science grade	Humanities grade	English grade
Panel A. Boys				
Physically attractive	0.168*** (0.054)	0.260*** (0.062)	0.214*** (0.059)	0.150** (0.059)
Prop. physically attractive peers	-0.476 (0.290)	-0.318 (0.278)	-0.185 (0.292)	-0.628** (0.274)
Attractive personality	0.114** (0.051)	0.053 (0.053)	0.112** (0.049)	0.140*** (0.050)
Prop. peers w. attractive personality	0.177 (0.306)	0.190 (0.331)	-0.288 (0.303)	0.265 (0.274)
N	2,910	2,886	2,887	2,908
Panel B. Girls				
Physically attractive	-0.013 (0.043)	0.011 (0.051)	-0.013 (0.046)	0.005 (0.043)
Prop. physically attractive peers	-0.179 (0.258)	0.146 (0.304)	-0.087 (0.256)	0.107 (0.247)
Attractive personality	0.109** (0.052)	0.175*** (0.051)	0.227*** (0.044)	0.181*** (0.045)
Prop. peers w. attractive personality	0.191 (0.315)	0.025 (0.348)	0.015 (0.283)	-0.020 (0.262)
N	3,282	3,275	3,260	3,286
School FE	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Note: Math grade is the high school cumulative Math GPA based on transcripts; Science grade is the high school cumulative Science GPA based on transcripts; Humanities grade is the high school cumulative Humanities GPA based on transcripts; English grade is the high school cumulative English GPA based on transcripts. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

** p < 0.05.

*** p < 0.01.

average, and below average. Table A.7 in the Appendix reports the results with “about average” as the reference (i.e. omitted) category. All our benchmark estimates continue to hold with this alternative classification. These results also suggest that respondents and peers “above average” rather than “below average” drive the effects. In relation to our peer attractiveness variables, we explore the robustness of our results to the inclusion of non-linear terms of the proportion of attractive peers (both in terms of physical appearance and personality) using quintiles of their distribution rather than simple shares. This additional exercise also enables us to identify at which level of peer composition the effects are more pronounced. Appendix Table A.8 reports the results. The main patterns remain consistent, that is, an increase in the share of physically attractive peers decreases boys’ academic performance and there are significant gender differences in the effects of own and peer attractiveness both in terms of physical appearance and personality. These results also suggest that the identified negative effects are mainly driven by the top two quintiles of physically attractive peers.

Our next set of robustness checks concerns our empirical specification, and in particular the set of controls included in our model. Equation (1) includes an extensive set of controls that are likely to determine academic performance (Bifulco et al., 2011; Cools et al., 2022) including socioeconomic characteristics (age, race, and being foreign born) and characteristics of the family origin (maternal education, household income, two-parent family, number of siblings, and birth order). To test the robustness of our estimates we include a battery of additional controls that may influence academic performance, and range from cohort size, an indicator variable for sport participation in high school, BMI related variables (i.e. overweight and obese dummies) as measured in Wave I, (self-assessed) general health status in Wave I, an indicator variable for whether the respondent was assessed by the interviewer as well-groomed in Wave I, the Wave I AHPVT standardized score, an indicator variable for whether the respondent was sexually active in high school and peer (contextual) characteristics.^{18,19}

Appendix Tables A.9–A.11 report the estimates of separate regressions for boys’ transcript GPA, probability of college enrollment and AHPVT score, which include these additional controls. In column 1 within each Table, we control for cohort size. This also assures that the variability in peer variables is not reflecting a larger number of peers in the cohort. In columns 2 and 5, we control for sport participation and grooming as beauty considerations may induce respondents to invest in activities which enhance physical

¹⁸ We prefer to exclude these variables from the benchmark specification as they are likely to be endogenous and correlated with own and/or peer attractiveness as well as academic performance.

¹⁹ See Appendix Table A.1 for variable definitions.

Table 5
Effects on academic outcomes - same gender peers.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Boys			
Physically attractive	0.160 ^{***} (0.048)	0.054 ^{**} (0.022)	0.045 (0.765)
Prop. physically attractive same gender peers	-0.289 [*] (0.164)	-0.260 ^{***} (0.089)	-10.085 ^{***} (2.539)
Attractive personality	0.126 ^{***} (0.042)	0.077 ^{**} (0.022)	2.083 ^{**} (0.838)
Prop. same gender peers w. attractive personality	0.154 (0.148)	0.064 (0.100)	5.254 ^{**} (2.651)
N	2,914	3,612	3,612
Panel B. Girls			
Physically attractive	0.007 (0.038)	0.005 (0.023)	-0.856 (0.677)
Prop. physically attractive same gender peers	-0.149 (0.165)	-0.187 [*] (0.104)	-2.557 (2.420)
Attractive personality	0.160 ^{**} (0.039)	0.074 ^{**} (0.022)	2.857 ^{***} (0.799)
Prop. same gender peers w. attractive personality	-0.021 (0.163)	0.094 (0.105)	-0.325 (2.371)
N	3,281	4,019	4,019
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.

** p < 0.05.

*** p < 0.01.

appearance. Being sexually active, obese, overweight or unhealthy is directly linked to physical appearance considerations and may adversely affect academic performance (columns 3, 4, and 7). Despite obvious endogeneity concerns, AHPVT score in Wave I may capture state dependence in terms of English vocabulary skills (column 6). Lastly, in column 8, we control for contextual characteristics, i.e., for the full set of peer socioeconomic and family characteristics that may be correlated with peer attractiveness. All estimates remain fairly unchanged after the inclusion of the additional controls.²⁰ A high proportion of physically attractive peers continues to be detrimental for boys' academic performance and the size of the coefficient estimates is comparable across the various specifications. Similarly, the coefficient estimates for own physical and personality attractiveness are robust to the inclusion of the additional control variables.²¹

Our benchmark definition of peers includes all students in the same cohort and school as the respondent, as we argue that peer comparisons in terms of physical and personality attractiveness are mainly made within the same cohort and among students with whom the respondents are likely to interact the most. To ascertain this, we run a series of placebo regressions by randomly assigning to each respondent a different cohort within their own school. In other words, we keep the same school but define placebo peers from higher or lower grades than that of the respondent and repeat this procedure for 1,000 placebo cohorts, in total.²² Table 6 presents the estimates of one of these placebo regressions as an illustrative example. None of the coefficients of placebo peers' physical attractiveness is statistically significant, confirming that peers of the same cohort are the relevant group of reference. Figs. 1 and 2 plot the distribution of the coefficients of placebo peers' physical attractiveness and their associated t-statistics for the 1,000 estimates. Our benchmark coefficient estimate denoted by the vertical line in Fig. 1 is clearly an outlier in the distribution of estimated placebo coefficients for all three outcomes. Likewise, the t-statistic of our benchmark estimate is among the most negative ones for all three outcomes (Fig. 2). Therefore, it is unlikely that our estimated effects are driven by chance.

²⁰ The coefficients of GPA (based on transcripts) are slightly more noisy, particularly in the most demanding specification, i.e., when we include the AHPVT score in Wave I, which could be considered as a proxy of ability, as long as students took it at an early age (see, for example, Bifulco et al., 2011).

²¹ The only exception is when we include the well-groomed dummy, which is highly correlated with physical attractiveness ($\rho = 0.5$).

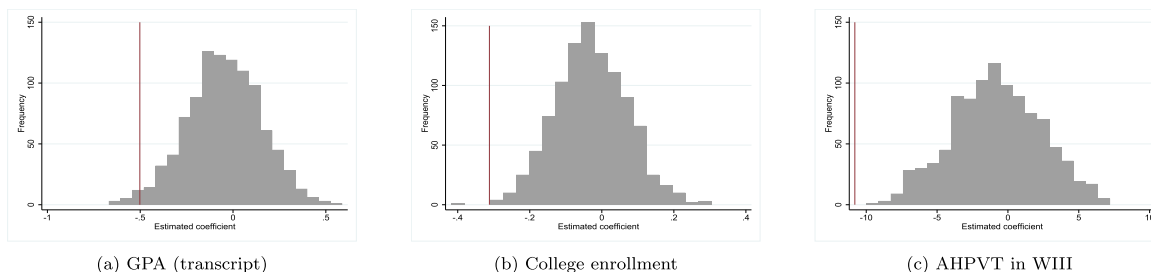
²² Our identification strategy, which is based on random variation in peer attractiveness across cohorts within school is valid also in the case of placebo peers.

Table 6
Effects on academic outcomes - placebo peers.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Boys			
Physically attractive	0.182*** (0.048)	0.069*** (0.023)	0.393 (0.774)
Prop. physically attractive placebo peers	0.155 (0.219)	0.069 (0.106)	-1.315 (2.622)
Attractive personality	0.119*** (0.042)	0.082*** (0.023)	2.049** (0.805)
Prop. placebo peers w. attractive personality	-0.324* (0.192)	-0.039 (0.101)	1.616 (2.668)
N	2,906	3,605	3,605
Panel B. Girls			
Physically attractive	0.027 (0.040)	0.017 (0.022)	-0.416 (0.705)
Prop. physically attractive placebo peers	-0.034 (0.189)	-0.050 (0.097)	3.394 (2.455)
Attractive personality	0.170*** (0.041)	0.080*** (0.022)	2.720*** (0.797)
Prop. placebo peers w. attractive personality	0.148 (0.163)	0.120 (0.096)	-2.780 (2.396)
N	3,277	4,013	4,013
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. Placebo peers are students from the same school as the respondent but from a different (randomly assigned) cohort. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.
** p < 0.05.
*** p < 0.01.

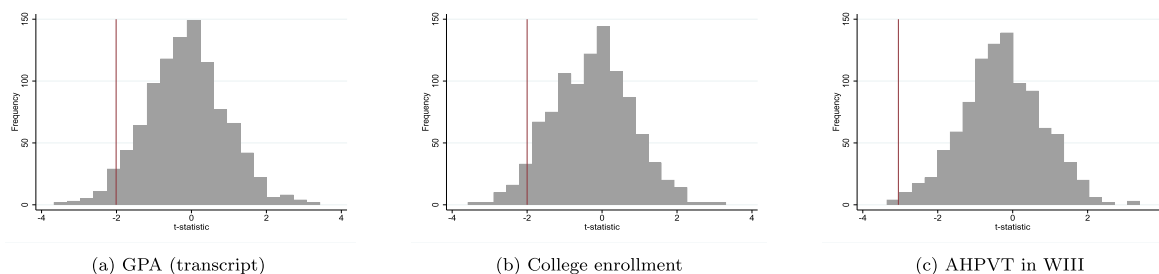


Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. Figure shows the estimated coefficients of the regressions when the placebo peers are used, and the procedure is repeated 1,000 times. Placebo peers are students from the same school as the respondent but from a different (randomly assigned) cohort. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. The vertical line represents the benchmark coefficient estimate presented in Table 2 Panel A for boys.

Fig. 1. Distribution of coefficient estimates of prop. of physically attractive placebo peers.

6. Mechanisms

What drives the negative effect of the proportion of physically attractive peers on boys’ academic outcomes? In this section, we explore different possible mechanisms by exploiting the rich information available in the Add Health survey data. One potential driving factor is self-confidence. Adolescent boys surrounded by many attractive peers may feel less confident about themselves, with negative implications on academic performance. Similarly, their college aspirations may be lowered. Another possible explanation is that they may exert less effort or have difficulties in doing homework. In extreme cases, students may demonstrate symptoms of depression. Lastly, another factor may be teachers’ behavior if attractiveness influences the way they treat or grade students.



Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. Figure shows the t-statistics associated with the estimated coefficients of the regressions when the placebo peers are used, and the procedure is repeated 1,000 times. Placebo peers are students from the same school as the respondent but from a different (randomly assigned) cohort. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. The vertical line represents the t-statistics obtained in the benchmark specification presented in Table 2 Panel A for boys.

Fig. 2. Distribution of t-statistic of prop. of physically attractive placebo peers.

We are able to explore each of these mechanisms using elicited information in our survey data. First, respondents were asked to evaluate in a six-point scale their own intelligence in comparison to that of other people in their age group. We use this information as a proxy for self-confidence. Second, respondents were asked to report in a five-point scale their desire to go to college, which we consider as a direct measure of their college aspirations. Third, respondents stated how frequently they have trouble getting homework done and how often they feel depressed. They were also asked whether they think that teachers at school treat students unfairly.

We test each mechanism by estimating a version of equation (1) for these mediating factors where the outcome variable is the considered factor.²³ Table 7, column 1 shows that a high proportion of physically attractive peers leads to a statistically significant decrease in self-confidence. College aspirations are also negatively affected although the coefficient in this case does not reach conventional levels of statistical significance (column 2). The estimates on difficulty with homework and depression are essentially null (columns 3 and 4). Lastly, we do not detect any statistically significant effect of peer physical attractiveness on respondents' perception of unfair treatment by teachers (column 5). However, we cannot exclude that students' physical attractiveness biases teachers' grading or the amount of attention they devote to different students based on their physical appearance (Hernández-Julián and Peters, 2018). Going back to our main estimates in Table 2, the coefficient of being physically attractive is positive and statistically significant for transcript GPA but not for the AHPVT score. Differently from the GPA, the score at the AHPVT is not at the discretion of the teacher. Hence, there is room for possible interventions which can ensure that students' physical attractiveness does not influence teachers' behavior (Hernández-Julián and Peters, 2017).

An alternative channel through which peer attractiveness could result in lower academic performance is risky or disruptive behavior. The idea is that boys with a high proportion of physically attractive peers may participate in physical fights or engage in activities like smoking or alcohol drinking in order to enhance their popularity. We test whether this alternative mechanism is plausible in Appendix Table A.12. The coefficient of the proportion of physically attractive peers is negligible in size and not statistically different from zero both for fighting (column 1) and smoking or drinking (columns 2 and 3). Hence, it is unlikely that disruptive or risky behavior drives the negative effect of peer physical attractiveness.

All in all, lower self-confidence appears to be the most compelling mechanism. To further support this argument, following Green et al. (2023), we conduct an additional exercise for boys in the spirit of a mediation analysis, in which the self-confidence variable is included as an additional control in our main specification (equation (1)) for each academic outcome considered. Table 8 reports the results. Since self-confidence is available for a smaller sample, in this table we also report the estimates excluding the self-confidence variable for this restricted sample. A comparison of columns for each outcome confirms that adding the self-confidence variable among the control variables mitigates the negative effects of the proportion of physically attractive peers for boys, particularly for transcript GPA (the coefficient estimate in column 2 becomes insignificant and reduces in absolute size compared to the benchmark estimate in column 1). This provides further supporting evidence for self-confidence as a plausible underlying mechanism and implies that part of the negative effect of the proportion of physically attractive peers on boys' high school performance is due to lower self-confidence.

To further support the argument that peer physical attractiveness negatively affects boys' academic performance by lowering their self-confidence, next, we focus on an aspect that is likely to be related with self-confidence, that is, physical maturity (Richards and Larson, 1993). To do so, we split the sample by less and more physically mature boys for their age as assessed by the interviewer.²⁴ Table 9 reports the estimates. We find that the proportion of physically attractive peers has negative consequences only for less

²³ As we do not find any statistically significant effect of peer attractiveness on girls' academic performance, our discussion here is exclusively focused on boys. For completeness, we nevertheless include the estimates for girls within Table 7 and Appendix Table A.12.

²⁴ In Wave I, at end of each in-home interview, the interviewers were asked to answer the following question: How physically mature was the respondent compared with other adolescents of their age? Possible ratings for this question are (1) very immature, (2) immature, (3) about average, (4) mature, and (5) very mature. We consider a respondent as physically mature if they received a rating of (4) or (5) (see Appendix Table A.1).

Table 7
Underlying mechanisms.

	(1) Self-confidence	(2) College aspir.	(3) Diffic. homework	(4) Depressed	(5) Unfair teacher
Panel A. Boys					
Physically attractive	0.085 (0.070)	0.034 (0.056)	-0.160** (0.066)	0.034 (0.040)	-0.007 (0.063)
Prop. physically attractive peers	-0.826** (0.344)	-0.570 (0.361)	0.070 (0.396)	-0.052 (0.217)	0.110 (0.370)
Attractive personality	0.233*** (0.062)	0.186*** (0.056)	-0.010 (0.069)	-0.023 (0.041)	-0.134 [†] (0.068)
Prop. peers w. attractive personality	-0.114 (0.338)	0.158 (0.360)	0.230 (0.397)	-0.143 (0.263)	-0.086 (0.367)
N	3,612	3,612	3,612	3,612	3,612
Panel B. Girls					
Physically attractive	0.043 (0.056)	0.099** (0.049)	-0.069 (0.057)	0.040 (0.042)	0.010 (0.056)
Prop. physically attractive peers	-0.091 (0.249)	0.300 (0.245)	0.130 (0.390)	-0.043 (0.205)	-0.001 (0.354)
Attractive personality	0.272** (0.052)	0.235*** (0.044)	-0.195*** (0.062)	-0.155*** (0.048)	-0.125 [†] (0.065)
Prop. peers w. attractive personality	-0.253 (0.367)	0.468 [†] (0.239)	-0.178 (0.352)	-0.062 (0.225)	0.255 (0.372)
N	4,018	4,018	4,018	4,018	4,018
School FE	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes

Note: Self-confidence is the self-assessment of own intelligence compared with that of people of the same age; College aspir. is the self-reported desire to go to college; Diffic. homework is the self-reported frequency of having trouble with getting homework done; Depressed is the self-reported frequency of feeling depressed in the past week; Unfair teacher is the respondents' assessment of whether teachers at school treat students unfairly. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.
** p < 0.05.
*** p < 0.01.

Table 8
Self-confidence as a mediating factor for boys' academic performance.

	GPA (transcripts)		College enrollment		AHPVT in WIII	
	(1)	(2)	(3)	(4)	(5)	(6)
Physically attractive	0.168*** (0.049)	0.141*** (0.046)	0.056** (0.022)	0.050** (0.022)	0.275 (0.761)	0.080 (0.743)
Prop. physically attractive peers	-0.495 [†] (0.250)	-0.331 (0.243)	-0.323** (0.158)	-0.267 [†] (0.154)	-10.759*** (3.541)	-8.944** (3.584)
Attractive personality	0.119*** (0.042)	0.069* (0.039)	0.075*** (0.022)	0.059*** (0.022)	1.866** (0.822)	1.348 [†] (0.788)
Prop. peers w. attractive personality	0.098 (0.253)	0.191 (0.251)	0.055 (0.165)	0.063 (0.164)	1.415 (4.612)	1.665 (4.594)
Self-confidence	-	0.233*** (0.020)	-	0.068*** (0.010)	-	2.226*** (0.276)
N	2,919	2,919	3,621	3,621	3,621	3,621
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII; Self-confidence is the self-assessment of own intelligence compared with that of people of the same age. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.
** p < 0.05.
*** p < 0.01.

Table 9
Heterogeneous effects on academic outcomes of boys - by physical maturity.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Less physically mature boys			
Physically attractive	0.144** (0.060)	0.034 (0.031)	0.835 (0.876)
Prop. physically attractive peers	-0.807** (0.324)	-0.436* (0.221)	-15.536*** (4.817)
Attractive personality	0.030 (0.054)	0.079*** (0.028)	1.169 (0.830)
Prop. peers w. attractive personality	0.270 (0.385)	0.252 (0.233)	6.823 (5.804)
N	1,812	2,278	2,278
Panel B. More physically mature boys			
Physically attractive	0.159 (0.108)	0.038 (0.044)	-0.986 (2.065)
Prop. physically attractive peers	-0.294 (0.536)	-0.087 (0.328)	-9.912 (8.410)
Attractive personality	0.262** (0.103)	0.069 (0.047)	2.895 (1.763)
Prop. peers w. attractive personality	0.261 (0.468)	-0.308 (0.302)	0.456 (9.558)
N	959	1,204	1,204
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. More physically mature if “mature” or “very mature” for their age (as assessed by the interviewer). The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.

** p < 0.05.

*** p < 0.01.

physically mature boys (Panel A). By contrast, more physically mature boys are essentially unaffected (Panel B).²⁵ These results indicate that peer physical attractiveness can be detrimental for adolescent boys who are less physically mature, and that the negative effect is driven by lower self-confidence, with consequences on their academic performance.

7. Conclusions

Using data from the Add Health, we explore the effect of own and peer attractiveness both in terms of physical appearance and personality on adolescents’ academic performance. As such, we contribute to the established literature on beauty premium and the growing literature on the impact of peer characteristics on academic performance by presenting new evidence on the effects of peer physical and personality attractiveness.

In our analysis, we exploit the unique features of the Add Health survey which follows multiple cohorts from the same school and includes rich information on respondents’ academic performance as well as the physical and personality attractiveness rated by the interviewer. We identify the effect of peer characteristics on academic performance using the random variation within schools across cohorts in adolescents’ physical and personality attractiveness. By focusing on the impact of the two aspects of attractiveness measured at least a few years prior to the realization of the considered outcomes, we mitigate potential simultaneity problems.

By considering a wide range of academic performance measures, we find significant gender differences in the effects of own and peer attractiveness both in terms of physical appearance and personality. Our results show that for girls only own personality attractiveness positively affects academic performance. For boys, both own physical and personality attractiveness boost academic outcomes and peer characteristics also matter. In particular, an increase in the fraction of physically attractive peers decreases boys’ academic performance. Our further analysis indicates that self-confidence is a potential factor through which this effect operates. Indeed, consistent with this argument, we find that a high proportion of physically attractive peers lowers boys’ self-confidence, and that the negative effect of peer physical attractiveness on high school GPA vanishes as soon as we include self-confidence as

²⁵ In Appendix Table A.13 we also conduct a heterogeneity analysis for girls by physical maturity. We do not find any statistically significant effect of peer physical attractiveness on GPA or AHPVT score in none of the two groups (columns 1, 2 and 4). There is a negative effect on the probability of college enrollment for more physically mature girls (column 3) but this is likely to be driven by an increase in the probability of early marriages (column 5).

an additional control. These findings stress the key role that teachers and school counselors/psychologists can play in supporting adolescents, especially regarding their confidence in their physical appearance and in creating an inclusive learning environment for all students.

Although rich information from the Add Health data enables us to control for a wide range of characteristics of adolescents and their peers and to account for potential interviewer effects and grade and school fixed effects, we cannot completely rule out possible selection of students into schools or selective attrition. In the context of physical and personality attractiveness though, these concerns are unlikely to bias our results. We confirm this through a balancing test and find no strong evidence of sorting by attractiveness. The absence of a significant effect of peer characteristics in our placebo exercise provides further support in this regard.

Understanding the reasons why peer physical appearance negatively affects boys' academic performance remains an area that deserves further scrutiny. While our findings suggest that the effect is likely to be mediated through a decrease in self-confidence rather than other factors such as difficulties with homework, depression, or risky behavior, we cannot rule out other alternative channels such as the role of teachers. Even though we do not find any statistically significant effect of peer physical attractiveness on respondents' perception of unfair treatment by teachers, it remains possible that students' physical attractiveness biases teachers' grading or the amount of attention they devote to different students.

Whilst our finding of the presence of gender differences in the impact of peer physical attractiveness is consistent with the psychological evidence and suggests a larger role of peer appearance culture among adolescent boys than girls, it may be the case that peer physical attractiveness matters for girls at earlier stages before adolescence –something that we are unable to test with our data. The gender difference in the effects of peer physical attractiveness that we have uncovered highlights the need for additional research for peer appearance culture among children.

Declaration of competing interest

Effrosyni Adamopoulou: Declaration of interest: none.

Ezgi Kaya: Declaration of interest: none.

Data availability

The authors do not have permission to share data.

Appendix A

Table A.1

Variable descriptions.

Variable description	Values
GPA (transcript): Cumulative high school GPA across all years (Wave III)	[0,4]
College enrollment: Whether the respondent has ever been enrolled in college by Wave III	$\left\{ \begin{array}{l} 0 \text{ if not enrolled in college} \\ 1 \text{ if enrolled in college} \end{array} \right.$
AHPVT in Wave III: Add Health Picture Vocabulary Test standardized score	[7,122]
Physically attractive: Interviewer's rating in Wave I	$\left\{ \begin{array}{l} 0 \text{ otherwise} \\ 1 \text{ if "attractive" or "very attractive"} \end{array} \right.$
Attractive personality: Interviewer's rating in Wave I	$\left\{ \begin{array}{l} 0 \text{ otherwise} \\ 1 \text{ if "attractive" or "very attractive"} \end{array} \right.$
Proportion of physically attractive peers in Wave I	[0,1]
Proportion of peers with attractive personality in Wave I	[0,1]
Age: Calculated age at time of interview in Wave III	[18, 25]
Race: Self-reported in Wave I	$\left\{ \begin{array}{l} 1 \text{ Non Hispanic white} \\ 2 \text{ Black or African American} \\ 3 \text{ Hispanic or Latino origin} \\ 4 \text{ other (Asian or Native)} \end{array} \right.$
Foreign-born: Whether the respondent was born in the US (self-reported in Wave I)	$\left\{ \begin{array}{l} 0 \text{ yes} \\ 1 \text{ no} \end{array} \right.$
Maternal education: Reported by the respondent's parent in Wave I	$\left\{ \begin{array}{l} 0 \text{ less than high school} \\ 1 \text{ high school or similar} \\ 2 \text{ more than high school} \\ 3 \text{ college or more} \end{array} \right.$
Household income: Reported by the respondent's parent in Wave I (in \$000)	[0,999]
Number of siblings: Constructed using the information on household roster in Wave I	[0, 12]
First-child: Constructed using the information on household roster in Wave I	$\left\{ \begin{array}{l} 0 \text{ otherwise} \\ 1 \text{ if first-born child in the family} \end{array} \right.$
Two-parent family: Constructed using the information on household roster in Wave I	$\left\{ \begin{array}{l} 0 \text{ otherwise} \\ 1 \text{ if co-resident with both mother and father} \end{array} \right.$

Table A.1 (continued)

Variable description	Values
GPA (self-reported): Average of the most recent grades in core subjects (Wave I)	1 (D or lower) to 4 (A)
Sports: During the past week played an active sport at least 1 or 2 times (Wave I)	{ 0 no 1 yes
Overweight: Constructed using the information on Body Mass Index (BMI) in Wave I	{ 0 otherwise 1 if BMI is 25 to < 30
Obese: Constructed using the information on Body Mass Index (BMI) in Wave I	{ 0 otherwise 1 if BMI is 30 or higher
Health: Self-reported general health in Wave I	{ 1 poor 2 fair 3 good 4 very good 5 excellent
Well-groomed: Interviewer's rating in Wave I	{ 0 otherwise 1 if "well-groomed" or "very well-groomed"
AHPVT in Wave I: Add Health Picture Vocabulary Test standardized score	[10,137]
Sexual activity: Have ever had sexual intercourse (self-reported in Wave I)	{ 0 no 1 yes
Physically mature: Interviewer's rating in Wave I	{ 0 otherwise 1 if "mature" or "very mature"
Self-confidence: Self-assessment of own intelligence compared with that of people of the same age (Wave I)	{ 1 moderately below average 2 slightly below average 3 about average 4 slightly above average 5 moderately above average 6 extremely above average
College aspirations: Self-reported desire to go to college (Wave I)	[1 low to 5 high]
Difficulty in homework: Self-reported frequency of having trouble getting homework done (Wave I)	{ 0 never 1 just a few times 2 about once a week 3 almost everyday 4 everyday
Depressed: Self-reported frequency of feeling depressed in the past week (Wave I)	{ 0 never or rarely 1 sometimes 2 a lot of the time 3 most of the time or all of the time
Unfair teacher: The respondents' assessment of whether teachers at school treat students unfairly (Wave I)	{ 1 strongly agree 2 agree 3 neither agree or disagree 4 disagree 5 strongly disagree
Physical fight: Self-reported frequency of having a physical fight in the past 12 months (Wave I)	{ 0 never 1 1 or 2 times 2 3 or 4 times 3 5 or more times
Smoking: Ever tried cigarette smoking (Wave I)	{ 0 no 1 yes
Drinking: Ever drunk alcohol more than 2 or 3 times (Wave I)	{ 0 no 1 yes

Table A.2
Distribution of attractiveness ratings.

Panel A. Benchmark sample				
Category	Physical appearance		Personality	
	Boys	Girls	Boys	Girls
1. Very unattractive	0.012	0.021	0.008	0.014
2. Unattractive	0.053	0.037	0.042	0.027
3. About average	0.507	0.364	0.501	0.389
4. Attractive	0.326	0.372	0.323	0.391
5. Very attractive	0.102	0.208	0.126	0.179

Panel B. GPA (transcripts) sample				
Category	Physical appearance		Personality	
	Boys	Girls	Boys	Girls
1. Very unattractive	0.011	0.022	0.008	0.014
2. Unattractive	0.054	0.037	0.040	0.027
3. About average	0.499	0.366	0.484	0.391
4. Attractive	0.331	0.372	0.330	0.394
5. Very attractive	0.105	0.203	0.138	0.175

Note: See text for sample restrictions and Appendix Table A.1 for the definitions of all variables. Corrected for the design effects of the Add Health sampling process.

Table A.3
Variance decomposition of physical and personality attractiveness in cohort-level means.

Variable	Within	Between	Total
Physically attractive	0.016	0.014	0.030
	45.20%	54.80%	
Attractive personality	0.016	0.015	0.031
	52.51%	47.49%	

Note: The variance decomposition is performed following Ammermueller and Pischke (2009) by first computing the cohort averages of each variable, and then decomposing the total variance in these cohort averages into within school and between school variances. There are 130 different schools and 462 different school-cohorts in the sample. See Appendix Table A.1 for the definitions of all variables.

Table A.4
Balancing tests.

	Prop. physically attractive peers		Prop. peers w. attractive personality	
	(1)	(2)	(3)	(4)
Physically attractive	-0.003 (0.004)	-0.003 (0.004)	-	-
Attractive personality	-	-	-0.006* (0.004)	-0.007* (0.004)
N	7,716	7,716	7,716	7,716
School FE	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes
Leave-out school average	Yes	Yes	Yes	Yes
Predetermined characteristics	No	Yes	No	Yes
p-value	-	0.949	-	0.401

Note: Unweighted balancing tests following the correction procedure in Guryan et al. (2009). Leave-out school average control in columns (1)-(2) is the proportion of physically attractive peers in the school, excluding individual i , and in columns (3)-(4) is the proportion of peers with attractive personality in the school, excluding individual i . Predetermined characteristics controls: gender, age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. The p-value represents the joint significance of predetermined characteristics controls. See Appendix Table A.1 for the definitions of all variables.

Table A.5
Effects on self-reported GPA.

	(1) GPA (self-reported)
Panel A. Boys	
Physically attractive	0.100 [*] (0.042)
Prop. physically attractive peers	-0.679 ^{***} (0.251)
Attractive personality	0.161 ^{**} (0.034)
Prop. peers w. attractive personality	0.258 (0.261)
N	3,626
Panel B. Girls	
Physically attractive	0.045 (0.036)
Prop. physically attractive peers	-0.168 (0.251)
Attractive personality	0.198 ^{**} (0.040)
Prop. peers w. attractive personality	-0.137 (0.220)
N	4,034
School FE	Yes
Cohort FE	Yes
Interviewer FE	Yes
Controls	Yes

Note: Self-reported GPA is based on the self-reported grade information from the most recent grading period at the time of the WI in-home interview. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

^{**} p < 0.05.

^{***} p < 0.01.

Table A.6
Effects on academic outcomes - full specification.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Boys			
Physically attractive	0.167 ^{***} (0.049)	0.057 ^{**} (0.022)	0.236 (0.761)
Prop. physically attractive peers	-0.502 ^{**} (0.250)	-0.312 ^{**} (0.156)	-10.804 ^{***} (3.545)
Attractive personality	0.119 ^{***} (0.041)	0.075 ^{***} (0.022)	1.897 ^{**} (0.821)
Prop. peers w. attractive personality	0.108 (0.252)	0.044 (0.163)	1.618 (4.563)
Age	-0.175 ^{***} (0.036)	-0.095 ^{***} (0.015)	-2.137 ^{***} (0.484)
Black or African American	-0.225 ^{**} (0.095)	0.035 (0.037)	-8.862 ^{***} (1.117)
Hispanic or Latino	-0.119 (0.078)	-0.043 (0.050)	-3.679 [*] (1.934)
Asian or Native	-0.016 (0.132)	0.033 (0.061)	-3.049 (2.021)
Foreign born	0.182 (0.150)	0.120 ^{**} (0.058)	1.034 (2.168)
Mother with high school degree	0.062 (0.071)	0.072 ^{**} (0.036)	5.221 ^{***} (1.383)
Mother with more than high school degree	0.095 (0.070)	0.128 ^{***} (0.036)	6.522 ^{***} (1.421)

Table A.6 (continued)

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Mother with college degree or more	0.439 ^{***} (0.078)	0.311 ^{***} (0.039)	8.845 ^{***} (1.558)
Gross household income in thousand \$	0.002 ^{***} (0.001)	0.001 ^{***} (0.000)	0.002 (0.006)
Number of siblings	0.007 (0.023)	-0.014 (0.009)	-0.506 (0.316)
First born	0.081 ^{**} (0.038)	0.036 [*] (0.020)	1.689 ^{**} (0.700)
Two-parent family	0.216 ^{***} (0.046)	0.081 ^{***} (0.023)	0.833 (0.660)
N	2,924	3,626	3,626
Panel B. Girls			
Physically attractive	0.007 (0.038)	0.006 (0.024)	-0.746 (0.682)
Prop. physically attractive peers	0.019 (0.201)	-0.232 [*] (0.140)	-3.067 (2.937)
Attractive personality	0.159 ^{***} (0.040)	0.077 ^{***} (0.022)	2.835 ^{***} (0.801)
Prop. peers w. attractive personality	-0.039 (0.219)	0.162 (0.143)	-0.097 (3.571)
Age	-0.160 ^{***} (0.028)	-0.112 ^{***} (0.014)	-2.465 ^{***} (0.461)
Black or African American	-0.266 ^{***} (0.055)	0.044 (0.036)	-6.566 ^{***} (1.930)
Hispanic or Latino	-0.329 ^{***} (0.073)	0.013 (0.043)	-4.170 ^{***} (1.066)
Asian or Native	0.071 (0.110)	0.097 (0.061)	-3.298 [*] (1.690)
Foreign born	0.173 (0.091)	-0.012 (0.047)	-2.796 [*] (1.449)
Mother with high school degree	0.158 ^{**} (0.075)	0.131 ^{***} (0.033)	2.899 ^{***} (0.943)
Mother with more than high school degree	0.218 ^{***} (0.073)	0.221 ^{***} (0.035)	4.571 ^{***} (0.937)
Mother with college degree or more	0.526 ^{***} (0.073)	0.335 ^{***} (0.037)	7.395 ^{***} (1.046)
Gross household income in thousand \$	0.001 ^{***} (0.000)	0.000 ^{**} (0.000)	0.011 ^{**} (0.005)
Number of siblings	0.005 (0.017)	-0.015 [*] (0.009)	-0.663 ^{**} (0.300)
First born	0.045 (0.037)	0.024 (0.022)	0.952 [*] (0.548)
Two-parent family	0.152 ^{**} (0.039)	0.090 ^{***} (0.023)	1.076 (0.649)
N	3,295	4,034	4,034
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. The regressions include school, cohort and interviewer fixed effects. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.

** p < 0.05.

*** p < 0.01.

Table A.7
Effects on academic outcomes - alternative definition of own and peer attractiveness.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Boys			
Physical attractiveness above average	0.160*** (0.051)	0.053** (0.022)	0.195 (0.733)
Physical attractiveness below average	-0.049 (0.089)	-0.028 (0.047)	-0.116 (1.628)
Prop. peers w. above average physical attractiveness	-0.609** (0.256)	-0.314* (0.159)	-11.329*** (3.755)
Prop. peers w. below average physical attractiveness	-0.764 (0.585)	-0.017 (0.260)	-4.608 (8.048)
Personality attractiveness above average	0.102** (0.043)	0.071*** (0.023)	1.774** (0.808)
Personality attractiveness below average	-0.165 (0.101)	-0.053 (0.057)	-1.493 (1.780)
Prop. peers w. above average personality attractiveness	0.053 (0.260)	0.029 (0.169)	2.316 (4.596)
Prop. peers w. below average personality attractiveness	-0.344 (0.601)	-0.181 (0.317)	9.151 (6.604)
N	2,924	3,626	3,626
Panel B. Girls			
Physical attractiveness above average	-0.005 (0.039)	-0.001 (0.024)	-0.821 (0.755)
Physical attractiveness below average	-0.058 (0.083)	-0.040 (0.045)	-0.784 (1.935)
Prop. peers w. above average physical attractiveness	-0.025 (0.209)	-0.239* (0.144)	-2.115 (3.098)
Prop. peers w. below average physical attractiveness	-0.387 (0.447)	-0.060 (0.235)	7.861 (7.532)
Personality attractiveness above average	0.149*** (0.040)	0.073*** (0.023)	2.763*** (0.809)
Personality attractiveness below average	-0.099 (0.101)	-0.032 (0.055)	-0.195 (1.651)
Prop. peers w. above average personality attractiveness	-0.051 (0.224)	0.154 (0.142)	-0.310 (3.502)
Prop. peers w. below average personality attractiveness	0.025 (0.457)	-0.029 (0.330)	-3.579 (7.059)
N	3,295	4,034	4,034
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. Omitted categories for own and peer attractiveness: about average. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

Table A.8
Effects on academic outcomes - non-linearities in peer variables.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII
Panel A. Boys			
Physically attractive	0.161*** (0.049)	0.055** (0.022)	0.250 (0.760)
2nd quintile of prop. physically attractive peers	-0.109 (0.077)	-0.013 (0.039)	-1.355 (1.095)
3rd quintile of prop. physically attractive peers	-0.136 (0.086)	-0.079* (0.044)	-0.506 (1.129)
4th quintile of prop. physically attractive peers	-0.189** (0.085)	-0.072 (0.048)	-1.895 (1.198)
5th quintile of prop. physically attractive peers	-0.191* (0.097)	-0.112** (0.056)	-3.541** (1.467)
Attractive personality	0.112*** (0.042)	0.076*** (0.022)	1.934** (0.838)
2nd quintile of prop. peers w. attractive personality	0.128 (0.088)	0.064 (0.040)	-2.248* (1.241)
3rd quintile of prop. peers w. attractive personality	0.056 (0.083)	-0.002 (0.041)	-0.924 (1.353)
4th quintile of prop. peers w. attractive personality	0.133 (0.096)	0.046 (0.049)	-0.352 (1.523)
5th quintile of prop. peers w. attractive personality	0.020 (0.100)	0.026 (0.057)	0.192 (1.711)
N	2,924	3,626	3,626
Panel B. Girls			
Physically attractive	0.008 (0.038)	0.007 (0.023)	-0.754 (0.686)
2nd quintile of prop. physically attractive peers	-0.051 (0.051)	0.007 (0.034)	-2.813*** (1.021)
3rd quintile of prop. physically attractive peers	-0.037 (0.069)	0.014 (0.038)	-0.069 (0.920)
4th quintile of prop. physically attractive peers	-0.080 (0.069)	-0.023 (0.034)	-1.213 (0.966)
5th quintile of prop. physically attractive peers	-0.060 (0.077)	-0.068 (0.046)	-2.197* (1.146)
Attractive personality	0.155*** (0.040)	0.075*** (0.022)	2.806*** (0.776)
2nd quintile of prop. peers w. attractive personality	0.037 (0.070)	-0.050 (0.044)	0.382 (0.995)
3rd quintile of prop. peers w. attractive personality	0.084 (0.060)	0.005 (0.034)	0.076 (1.095)
4th quintile of prop. peers w. attractive personality	0.021 (0.068)	-0.007 (0.039)	-0.382 (1.391)
5th quintile of prop. peers w. attractive personality	-0.042 (0.087)	0.022 (0.053)	-0.489 (1.419)
N	3,295	4,034	4,034
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. Omitted categories for peer attractiveness: 1st quintile. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.

** p < 0.05.

*** p < 0.01.

Table A.9
Effects on GPA (transcripts) of boys - robustness exercises with additional controls.

	(1) GPA (transcripts)	(2) GPA (transcripts)	(3) GPA (transcripts)	(4) GPA (transcripts)	(5) GPA (transcripts)	(6) GPA (transcripts)	(7) GPA (transcripts)	(8) GPA (transcripts)
Physically attractive	0.166 ^{***} (0.048)	0.166 ^{***} (0.049)	0.183 ^{***} (0.051)	0.154 ^{***} (0.049)	0.086 (0.054)	0.157 ^{***} (0.049)	0.175 ^{***} (0.048)	0.168 ^{***} (0.049)
Prop. physically attractive peers	-0.502 ^{**} (0.250)	-0.508 ^{**} (0.246)	-0.520 ^{**} (0.253)	-0.508 ^{**} (0.249)	-0.472 [*] (0.247)	-0.366 (0.252)	-0.472 [*] (0.250)	-0.469 [*] (0.243)
Attractive personality	0.120 ^{***} (0.041)	0.119 ^{***} (0.042)	0.113 ^{***} (0.042)	0.102 ^{**} (0.041)	0.067 (0.042)	0.092 ^{**} (0.044)	0.111 ^{**} (0.043)	0.115 ^{***} (0.042)
Prop. peers w. attractive personality	0.112 (0.253)	0.109 (0.251)	0.109 (0.251)	0.088 (0.253)	0.099 (0.253)	-0.074 (0.264)	0.069 (0.261)	0.037 (0.246)
N	2,924	2,924	2,897	2,924	2,923	2,797	2,911	2,909
Extra controls	Cohort size	Sports	BMI var.	Health	Grooming	AHPVT in WI	Sexual activ.	Contextual var.
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. Extra controls: Col. (1) Cohort size; Col. (2) Sports participation; Col. (3) Obese, overweight; Col. (4) Self-reported health status; Col. (5) Grooming assessed by the interviewer; Col. (6) Standardized score of the Peabody vocabulary test that respondents took in WI; Col. (7) Whether the respondent was sexually active; Col. (8) Contextual (peer) characteristics: gender, race, foreign born, parental income, maternal education, first born, number of siblings, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.

** p < 0.05.

*** p < 0.01.

Table A.10
Effects on college enrollment of boys - robustness exercises with additional controls.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	College enrollment	College enrollment	College enrollment	College enrollment	College enrollment	College enrollment	College enrollment	College enrollment
Physically attractive	0.057** (0.022)	0.053** (0.022)	0.050** (0.022)	0.050** (0.021)	0.021 (0.023)	0.060*** (0.023)	0.057** (0.022)	0.060*** (0.022)
Prop. physically attractive peers	-0.312** (0.156)	-0.341** (0.151)	-0.299* (0.159)	-0.316** (0.155)	-0.314** (0.156)	-0.278* (0.159)	-0.312** (0.156)	-0.261* (0.146)
Attractive personality	0.075*** (0.022)	0.075*** (0.022)	0.078*** (0.021)	0.066*** (0.021)	0.050** (0.023)	0.063*** (0.022)	0.072*** (0.022)	0.075*** (0.022)
Prop. peers w. attractive personality	0.043 (0.163)	0.041 (0.160)	0.074 (0.165)	0.031 (0.163)	0.036 (0.167)	-0.007 (0.167)	0.040 (0.162)	0.003 (0.157)
N	3,626	3,626	3,583	3,626	3,625	3,469	3,605	3,610
Extra controls	Cohort size	Sports	BMI var.	Health	Grooming	AHPVT in WI	Sexual activ.	Contextual var.
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by VIII. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. Extra controls: Col. (1) Cohort size; Col. (2) Sports participation; Col. (3) Obese, overweight; Col. (4) Self-reported health status; Col. (5) Grooming assessed by the interviewer; Col. (6) Standardized score of the Peabody vocabulary test that respondents took in WI; Col. (7) Whether the respondent was sexually active; Col. (8) Contextual (peer) characteristics: gender, race, foreign born, parental income, maternal education, first born, number of siblings, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* p < 0.10.

** p < 0.05.

*** p < 0.01.

Table A.11
Effects on AHPVT in WIII of boys - robustness exercises with additional controls.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	AHPVT in WIII	AHPVT in WIII	AHPVT in WIII	AHPVT in WIII	AHPVT in WIII	AHPVT in WIII	AHPVT in WIII	AHPVT in WIII
Physically attractive	0.242 (0.761)	0.348 (0.766)	0.246 (0.726)	0.361 (0.751)	-0.191 (0.799)	0.532 (0.681)	0.249 (0.764)	0.296 (0.766)
Prop. physically attractive peers	-10.823*** (3.537)	-9.970*** (3.415)	-10.797*** (3.628)	-10.643*** (3.572)	-10.928*** (3.605)	-6.087* (3.317)	-10.962*** (3.597)	-10.257*** (3.557)
Attractive personality	1.883** (0.824)	1.909** (0.816)	1.870** (0.813)	2.001** (0.809)	1.570* (0.846)	0.399 (0.822)	1.750** (0.828)	1.888** (0.829)
Prop. peers w. attractive personality	1.563 (4.557)	1.706 (4.470)	2.831 (4.541)	1.621 (4.583)	1.552 (4.617)	-2.829 (4.035)	1.285 (4.663)	3.086 (4.727)
N	3,626	3,626	3,583	3,626	3,625	3,469	3,605	3,610
Extra controls	Cohort size	Sports	BMI var.	Health	Grooming	AHPVT in WI	Sexual activ.	Contextual var.
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. Extra controls: Col. (1) Cohort size; Col. (2) Sports participation; Col. (3) Obese, overweight; Col. (4) Self-reported health status; Col. (5) Grooming assessed by the interviewer; Col. (6) Standardized score of the Peabody vocabulary test that respondents took in WI; Col. (7) Whether the respondent was sexually active; Col. (8) Contextual (peer) characteristics: gender, race, foreign born, parental income, maternal education, first born, number of siblings, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

Table A.12
Disruptive/risky behavior as alternative mechanism.

	(1) Fight	(2) Smoking	(3) Drinking alcohol
Panel A. Boys			
Physically attractive	0.076 (0.049)	0.018 (0.028)	0.009 (0.026)
Prop. physically attractive peers	0.008 (0.327)	-0.021 (0.144)	-0.027 (0.146)
Attractive personality	-0.123** (0.050)	-0.026 (0.029)	-0.027 (0.029)
Prop. peers w. attractive personality	0.080 (0.346)	-0.091 (0.177)	-0.149 (0.167)
N	3,596	3,596	3,596
Panel B. Girls			
Physically attractive	0.012 (0.035)	0.059** (0.023)	0.067** (0.026)
Prop. physically attractive peers	0.204 (0.197)	0.095 (0.137)	0.159 (0.178)
Attractive personality	-0.079*** (0.029)	-0.064** (0.025)	-0.048** (0.022)
Prop. peers w. attractive personality	0.171 (0.181)	-0.083 (0.162)	-0.145 (0.182)
N	4,009	4,009	4,009
School FE	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: Fight is the self-reported frequency of having a physical fight in the past 12 months; Smoking is a dummy variable that takes the value 1 if the respondent reports that he/she has ever tried cigarette smoking; Drinking is a dummy variable that takes the value 1 if the respondent reports that he/she drinks alcohol more than 2 or 3 times in their life. The regressions include school, cohort and interviewer fixed effects. Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

** p < 0.05.

*** p < 0.01.

Table A.13
Heterogeneous effects on academic outcomes of girls - by physical maturity.

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII	(4) Married in WIII
Panel A. Less physically mature girls				
Physically attractive	0.008 (0.063)	0.057 [†] (0.033)	-0.376 (0.891)	-0.013 (0.027)
Prop. physically attractive peers	-0.004 (0.313)	-0.056 (0.166)	-8.550 [†] (4.943)	-0.108 (0.154)
Attractive personality	0.180*** (0.065)	0.034 (0.034)	2.887*** (0.879)	0.055** (0.025)
Prop. peers w. attractive personality	0.142 (0.328)	0.049 (0.202)	2.721 (5.510)	0.123 (0.163)
N	1,772	2,208	2,208	2,208
Panel B. More physically mature girls				
Physically attractive	-0.015 (0.069)	-0.075* (0.039)	-1.933* (1.113)	-0.006 (0.033)
Prop. physically attractive peers	0.279 (0.372)	-0.445** (0.208)	0.637 (5.974)	0.330* (0.189)
Attractive personality	0.147 [†] (0.076)	0.126*** (0.039)	2.424* (1.337)	-0.039 (0.030)
Prop. peers w. attractive personality	-0.086 (0.415)	0.377 (0.240)	0.162 (6.332)	-0.275 (0.232)
N	1,407	1,729	1,729	1,729

(continued on next page)

Table A.13 (continued)

	(1) GPA (transcripts)	(2) College enrollment	(3) AHPVT in WIII	(4) Married in WIII
School FE	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Note: GPA (transcripts) is the high school cumulative GPA based on transcripts; College enrollment is a dummy that takes the value 1 if the respondent has ever been enrolled in college by WIII; AHPVT in WIII is the standardized score of the Peabody vocabulary test that respondents took in WIII. The regressions include school, cohort and interviewer fixed effects. More physically mature if “mature” or “very mature” for their age (as assessed by the interviewer). Additional controls: age, race, foreign-born, maternal education, parental income, number of siblings, first born, two-parent family. See Appendix Table A.1 for the definitions of all variables. Standard errors clustered at the school level in parentheses.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

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