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Beauty, Underage Drinking, and Adolescent Risky Behaviours

Colin P. Green, Luke B. Wilson, and Anwen Zhang[†]

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Abstract

Physically attractive individuals experience a range of advantages in adulthood including higher earnings; yet, how attractiveness influences earlier consequential decisions is not well understood. This paper estimates the effect of attractiveness on engagement in risky behaviours in adolescence. We find marked effects across a range of risky behaviours with notable contrasts. Attractive adolescents are *more* likely to engage in drinking; the gap between attractive and unattractive adolescents in terms of propensity to drink constitutes about one fifth of the baseline mean. In contrast, more attractive adolescents are *less* likely to smoke, use drugs, or practice unprotected sex. Investigation into the underlying channels reveals that physically attractive adolescents are more popular, have higher self-esteem and personality attractiveness. Popularity leads to a higher likelihood of engagement in “cool” risky behaviours and a lower likelihood for “uncool” behaviours, while self-esteem and personality generally predict a lower likelihood in engaging in all risky behaviours. Our findings suggest physical attractiveness in adolescence carries long-lasting consequences over the life course.

Keywords: beauty, risky behaviours, adolescent development

JEL Codes: I12, J10

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1 Introduction

Physically attractive¹ adults have better labour market outcomes, earn more, and have a range of improved life outcomes (Hamermesh and Biddle, 1994; Biddle and Hamermesh, 1998; Hamermesh, 2011; Mobius and Rosenblat, 2006; Ling et al., 2019; Scholz and Sicinski, 2015; Hale et al., 2021). For example, both Biddle and Hamermesh (1998) and Fletcher (2009) demonstrate substantial wage premia attached to beauty. These premia remain after attempts to control for ability, though Stinebrickner et al. (2018) demonstrate that these premia are concentrated in jobs with substantial amounts of interpersonal interaction. In academia, attractive researchers receive more citations for their research (Hale et al., 2021), and attractive female professors receive more favourable teaching evaluations (Babin et al., 2020). In other aspects of life, more attractive adults are happier (Hamermesh and Abrevaya, 2013), and more attractive political candidates experience greater electoral success (King and Leigh, 2009; Berggren et al., 2010; Jones and Price, 2017),

Together, this literature provides a compelling view that more attractive adults experience better life outcomes. What is less well understood is how attractiveness influences earlier, consequential, decisions. The literature described above seeks to provide, in essence, the effect of attractiveness on labour market and other outcomes conditional on individual characteristics, both demographic and “pre-market”. However, attractiveness is also likely to change both the opportunities and costs of a variety of behaviours during adolescence. This includes a range of risky behaviours such as under-age drinking, smoking, illicit substance use and under-age sexual activity that, in and of themselves, have implications for both labour market performance and important pre-market investments, most notably education (Carneiro et al., 2007; Heck-

¹We use the expressions “beauty” and “physical attractiveness” interchangeably.

man and Rubinstein, 2001; Heckman et al., 2006). Along these lines, Mocan and Tekin (2010) demonstrate how unattractiveness during adolescence influences later criminal behaviour, and argue that this reflects the impact of beauty on human capital formation, while recently Hamermesh et al. (2019) show that beauty leads to higher educational attainment amongst students. At the same time, adolescent risky behaviours are of importance insofar as they predict later behaviours that generate negative outcomes over the life course (Cawley and Ruhm, 2011).

We contribute to this literature by using rich survey data containing information on beauty to investigate how this influences adolescent risky behaviours. We use the Add Health data and initially focus on the effect of beauty on one particular risky behaviour, underage alcohol consumption. We demonstrate that more attractive adolescents are more likely to engage in under-age drinking. We then contrast this to a range of other risky behaviours (smoking, illegal substance use, and teenage sexual activity) where we demonstrate different effects insofar as being unattractive often increases these behaviours. We do this using a range of approaches that aim to reduce obvious sources of bias, and in a series of robustness checks we demonstrate that these effects do not reflect a range of likely confounders.

This raises the question of what mechanisms generate these effects? While, we are unable to be exhaustive in this regard we examine a number of channels that seem likely ex-ante to be important: popularity, self-esteem, and the “attractiveness” of an individual’s personality. For instance, previous research has demonstrated that retrospective measures of school friendship network size are related to both social skills and later life outcomes (Conti et al., 2013). We use similar, but contemporaneous, information on popularity to investigate its potential mediating effect with respect to attractiveness and risky behaviours. We demonstrate that attractive adolescents are more popular, and this is associated with a greater likelihood of underage drinking. Yet, we con-

tinue to demonstrate direct effects of attractiveness on drinking. On the other hand, physically attractive adolescents also have higher self-esteem and higher personality attractiveness, both predict less engagement in risky behaviours. Thus a number of channels operate simultaneously in nuanced ways in mediating the relationship between attractiveness and risky behaviours. Shedding light on these channels helps to further understand various factors tied with health behaviours and risk taking.

Finally, we seek to explore whether these teenage behaviours predict later life behaviours. We provide suggestive evidence that adolescent attractiveness is predictive of alcohol consumption behaviour in early adulthood. This suggests that these earlier behavioural effects are consequential for both current and later life outcomes.

2 Data

2.1 Add Health

We use data from the restricted-use version of the National Longitudinal Study of Adolescent to Adult Health (Add Health). Add Health is a school-based longitudinal study of a nationally representative sample of adolescents in grades 7–12 in the United States during the 1994–95 school year. Add Health combines longitudinal survey data on respondents’ social, economic, psychological and physical well-being with contextual data on the family, neighbourhood, and school. This provides unique opportunities to study how social environments and behaviours in adolescence are linked to health and achievement outcomes in young adulthood. The novel design of Add Health allows us to estimate the influence of beauty on risky behaviours such as smoking, under-age drinking, illegal substance use, and teenage sexual activity.

Add Health started with an in-school questionnaire which collected data from over

90,000 students in 144 schools (including high schools and their feeder schools) in 1994–95. The selection of schools followed a primary sampling frame based on a database collected by Quality Education Data, to ensure that the selected high schools were representative of schools in the United States with respect to region of country, urbanicity, size, type, and ethnicity. After the in-school survey, the study then followed up with a series of more detailed in-home interviews of a stratified random sub-sample of the in-school survey students in subsequent waves. Students in each school were stratified by grade and sex. This resulted in a representative sample of 20,745 adolescents in grades 7–12 in the Wave I in-home survey in 1994/95, of which 14,738 were followed up in the Wave II in-home survey in 1996. Add Health further conducted Wave III interviews in 2001/02 when respondents were young adults (aged 18–26), and Wave IV in 2007/08 when most respondents finished their education (aged 24–32).

Our data on beauty and risky behaviours are drawn from the in-home section of the survey. For the purpose of our study we focus on adolescence² and pool together Waves I & II of the in-home surveys, with an initial sample size of 35,483. Although the in-home surveys have a panel structure, we do not follow an individual fixed effects approach, as beauty is primarily a fixed physical characteristic and there is little variation across the two waves.³ After dropping missing values, our baseline sample includes 30,888 observations.

²Mean age is 16.24 for females and 16.36 for males. The youngest interviewed was 13, and the oldest was 19.

³Of 11,810 adolescents who were observed in both Waves I & II, 47.6% had the same beauty rating in Wave II, and another 41.9% had a one-point change on a five-point scale from Wave I to Wave II.

2.2 Risky health behaviours

While our primary focus is on underage drinking, we examine six different types of risky behaviours in total: drinking, binge drinking, smoking, substance use, unprotected sex, and pregnancy.⁴ Waves I and II of the in-home survey asked adolescents about both their engagement in and frequency of consumption for these activities where relevant. For all of these topics in the interview, the respondents listened to recorded questions through headphones and entered their responses independently on the computer. The interviewer did not see or hear the questions, nor the responses of the interviewee. As the respondent has full anonymity during the interview, this Audio Computer-Assisted Self-Interview (Audio CASI) data collection method helps reduce concerns of under-reporting that is often present in studies that examines risky and illicit behaviour.

For our analysis, we focus on the engagement in and frequency of each risky behaviour. Our primarily focus is on drinking behaviours:

- *Drinking*: During the past 12 months, on how many days did you drink alcohol? (Responses range from 0 = never, 1 = one or two days, 2 = once a month or less, to 6 = everyday or almost everyday)
- *Binge drinking*: Over the past 12 months, on how many days did you drink five or more drinks in a row? (Responses range from 0 = never, 1 = one or two days, 2 = once a month or less, to 6 = everyday or almost everyday)

Other risky behaviours we examine include:

- *Smoking*: During the past 30 days, on how many days did you smoke cigarettes? (Responses range from 0 to 30 days)

⁴To alleviate reverse causality issues, we dropped 75 observations who were in late pregnancy (7 to 9 months) at the time of the interview.

- *Substance Use*: During the past 30 days, how many times did you use marijuana/cocaine /inhalants/other drugs? (Responses range from 0 to 900)
- *Unprotected Sex*: Did you or your partner use any method of birth control when you had sexual intercourse most recently? What proportion of the time have you used birth control? (Responses range from 0 = none of the time, 1 = some of the time, to 5 = all of the time)
- *Pregnancy*: Have you ever been pregnant? How many times have you been pregnant? (Responses range from 0 to 9 times)

As a result, for all six behaviours, we have both a dummy variable that represents engagement in the activity (=1 if answer > 0) on the extensive margin, as well as a variable that captures the frequency of this behaviour on the intensive margin. We provide estimates for both of these to gauge the effects for the onset as well as intensity of risky behaviours.

Beyond adolescence, we also observe whether respondents experience drinking problems when they reach adulthood in Waves III (age 18–26) & IV (age 24–32). Similarly with the above, we construct two measures of long-run drinking problems, one on the extensive margin, and the other on the intensive margin. Details of definitions of these variables are available in Appendix Table [A1](#).

2.3 Physical attractiveness

The key independent variable throughout our analysis is the physical attractiveness of the respondent. This information is recorded by the interviewer immediately after the interview. While we do not have a detailed information on each interviewer, we know that interviewers were predominantly female as well as which interviewer conducted which interview. The interviewer was asked to describe the respondent,

the neighbourhood, the circumstances, and the surroundings of the interview. With respect to the question on physical attractiveness, the interviewer was asked “*How physically attractive is the respondent?*” This is measured on a 1–5 scale, with 1 being “very unattractive” and 5 being “very attractive”. The mean score on the 1–5 scale is 3.57, with a standard deviation of 0.84, where within-interviewer variation is 0.76 and between-interviewer variation is 0.47.

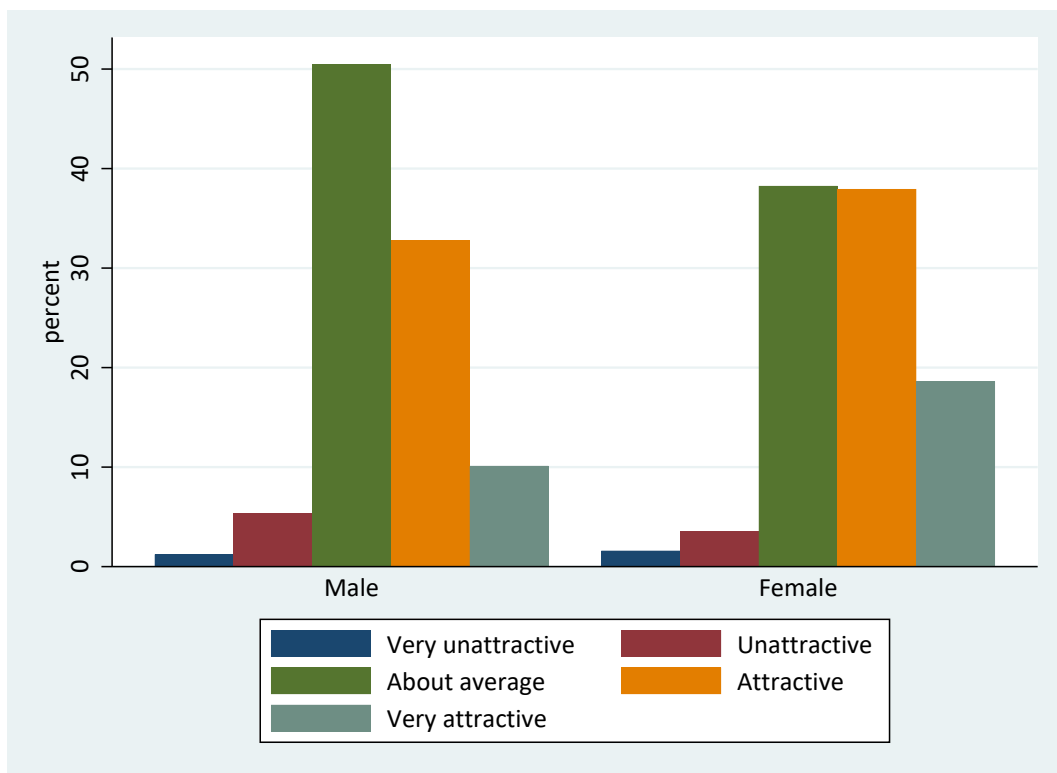


Figure 1: Distributions of beauty by sex

Figure 1 depicts the distributions of beauty by sex. On average, girls score a rating of 3.69 and boys 3.45. While magnitudes vary, the distribution of beauty ratings are similar for girls and boys. First, for both sexes, the most likely rating is “about average” (50.5% for girls and 44.2% for boys), followed by “attractive”, “very attractive”, and “unattractive” in order, and least likely rating is “very unattractive”. Second, “very unattractive” and “unattractive” make up a much smaller proportion (combined, this

is 5.16% for girls and 6.59% for boys) than “very attractive” and “attractive” (combined, 56.58% for girls and 42.94% for boys). In particular, “very unattractive” contribute to a very small proportion of the observations (1.23% for girls and 1.60% for boys). Considering the small sample size, it is difficult to make meaningful inference for this group and as a result we exercise caution in interpreting estimates for these individuals. While we do not know whether the “true” underlying distribution of beauty is symmetric or normally distributed, this could indicate a reluctance of interviewers to give low ratings about the respondent, prompting a concern for measurement error. That said, the top three categories are much larger in size and present more variation, which may alleviate this concern. It is also worth noting that the distribution of beauty we observe is similar to the patterns reported by [Hamermesh and Abrevaya \(2013\)](#) for a range of different data sources. For later analysis, we create five dummies variables indicating each category of physical attractiveness.

2.4 Other variables

We use popularity, self-esteem and personality attractiveness to investigate their mediating effect with respect to physical attractiveness and risky behaviours. In order to measure popularity, we use information from self-defined friendship nominations. Each respondent was asked to nominate their top 5 male and top 5 female friends. From this we proxy popularity with the logarithm of in-degree, i.e. the number of times the respondent has been nominated as a friend by their peers. Self-esteem is measured with an index on a scale of 4 to 20 by summing up the responses to four questions relating to the respondent’s subjective evaluation of their own worth, with higher score indicating higher self-esteem.⁵ Personality attractiveness is rated by inter-

⁵Respondents are asked how strongly they agree or disagree with the following statements, on a scale of 1 to 5, with 1 = strongly disagree and 5 = strongly agree: (1) You have a lot to be proud of; (2) You like yourself just the way you are; (3) You feel like you are doing everything just about right; (4) You have a

viewers on a similar five-point scale as physical attractiveness, based on their responses to the question: “How attractive is the respondent’s personality?”

Table 1 presents summary statistics for the selected sample stratified by gender. The sample consists of 15,795 female and 15,093 male respondents. Add Health allows us to create a rich set of family background information which we use as covariates. These include: the adolescent’s race, age and its squared term, whether mother is absent from home, mother’s education levels, whether father is absent from home, father’s education levels, and household income.⁶

Table 1: Summary statistics by sex

	Female (51.1%)		Male (48.9%)		Total	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
<i>Beauty</i>						
Physical attractiveness (scale 1–5)	3.685	(0.869)	3.453	(0.794)	3.571	(0.842)
Very attractive	0.186	(0.389)	0.101	(0.302)	0.145	(0.352)
Attractive	0.379	(0.485)	0.328	(0.470)	0.354	(0.478)
About average	0.383	(0.486)	0.505	(0.500)	0.442	(0.497)
Unattractive	0.036	(0.185)	0.054	(0.225)	0.044	(0.206)
Very unattractive	0.016	(0.126)	0.012	(0.110)	0.014	(0.118)
<i>Risky behaviour</i>						
Drinking	0.458	(0.498)	0.454	(0.498)	0.456	(0.498)
Binge drinking	0.241	(0.428)	0.295	(0.456)	0.267	(0.443)
Smoking	0.279	(0.449)	0.288	(0.453)	0.284	(0.451)
Illegal drugs	0.151	(0.358)	0.183	(0.386)	0.167	(0.373)
Unprotected sex	0.119	(0.324)	0.107	(0.309)	0.113	(0.317)

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lot of good qualities.

⁶To avoid dropping those who have missing values for household income, a binary indicator of missing household income is included in the regression, and missing values are recoded to zero.

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	Female (51.1%)		Male (48.9%)		Total	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
Ever pregnant	0.071	(0.257)			0.071	(0.257)
Drinking (Frequency)	0.998	(1.371)	1.152	(1.581)	1.073	(1.479)
Binge drinking (Frequency)	0.538	(1.159)	0.799	(1.475)	0.665	(1.329)
Smoking (Days)	4.527	(9.793)	4.622	(9.842)	4.573	(9.817)
Drugs (log number of times)	0.263	(0.750)	0.369	(0.950)	0.315	(0.855)
Unprotected sex (frequency)	0.134	(0.590)	0.109	(0.526)	0.122	(0.560)
Pregnancies (number of times)	0.085	(0.347)			0.085	(0.347)
<i>Covariates</i>						
White	0.518	(0.500)	0.521	(0.500)	0.519	(0.500)
Black	0.210	(0.407)	0.193	(0.395)	0.202	(0.401)
Hispanic	0.161	(0.368)	0.168	(0.374)	0.164	(0.371)
Other ethnicity	0.111	(0.314)	0.118	(0.322)	0.114	(0.318)
Age	16.243	(1.534)	16.355	(1.520)	16.298	(1.528)
Age-sq./10	26.619	(4.939)	26.981	(4.911)	26.796	(4.929)
Mother not present	0.058	(0.235)	0.065	(0.246)	0.062	(0.240)
Mother no high school	0.150	(0.357)	0.131	(0.337)	0.141	(0.348)
Mother high school or some college	0.502	(0.500)	0.488	(0.500)	0.495	(0.500)
Mother degree and above	0.250	(0.433)	0.264	(0.441)	0.257	(0.437)
Mother education missing	0.040	(0.195)	0.052	(0.223)	0.046	(0.209)
Father not present	0.315	(0.464)	0.272	(0.445)	0.294	(0.456)
Father no high school	0.101	(0.302)	0.100	(0.300)	0.101	(0.301)
Father high school or some college	0.330	(0.470)	0.352	(0.478)	0.341	(0.474)
Father degree and above	0.210	(0.407)	0.230	(0.421)	0.220	(0.414)
Father education missing	0.044	(0.206)	0.045	(0.207)	0.045	(0.207)
Log household income	7.783	(4.595)	8.002	(4.482)	7.890	(4.541)
Income missing	0.254	(0.435)	0.234	(0.423)	0.244	(0.430)

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	Female (51.1%)		Male (48.9%)		Total	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
Wave I	0.580	(0.494)	0.589	(0.492)	0.585	(0.493)
Wave II	0.420	(0.494)	0.411	(0.492)	0.415	(0.493)
<i>Additional variables (numbers of observations are smaller)</i>						
Third person at interview	0.232	(0.422)	0.213	(0.409)	0.223	(0.416)
Ever had sex	0.390	(0.488)	0.415	(0.493)	0.402	(0.490)
Most recent GPA	2.885	(0.747)	2.663	(0.772)	2.777	(0.768)
Log in-degree	1.535	(0.677)	1.393	(0.740)	1.466	(0.712)
Personality attractive	0.558	(0.497)	0.446	(0.497)	0.504	(0.500)
Self-esteem	16.053	(2.654)	16.785	(2.369)	16.411	(2.545)
Drinking problem incidents at Wave 3	1.243	(1.686)	1.805	(2.092)	1.505	(1.907)
Any drinking problems at Wave 3	0.472	(0.499)	0.574	(0.495)	0.519	(0.500)
Drinking problem incidents at Wave 4	1.104	(2.027)	1.798	(2.555)	1.426	(2.313)
Any drinking problems at Wave 4	0.312	(0.463)	0.435	(0.496)	0.369	(0.483)
<i>N</i>	15,795		15,093		30,888	

Notes: This table reports the means and standard deviations of variables in the analysis by sex. Standard deviations are in parentheses.

Source: Authors' calculation based on Add Health data.

2.5 Profiles by beauty

Table 2 presents demographic and socio-economic profiles by physical attractiveness. In general, attractive girls are more likely to be white, tend to come from better-educated and higher-income family background, and perform better academically. There are less clear racial background patterns for attractive boys, but they also tend to

Table 2: Demographic and socio-economic profiles by attractiveness

	V. unattractive	Unattractive	About average	Attractive	V. attractive
<i>Female</i>					
White	0.419 (0.494)	0.480 (0.500)	0.484 (0.500)	0.544 (0.498)	0.550 (0.498)
Age	16.408 (1.519)	16.235 (1.536)	16.199 (1.539)	16.244 (1.533)	16.318 (1.525)
Mother degree and above	0.245 (0.431)	0.192 (0.394)	0.223 (0.417)	0.262 (0.440)	0.292 (0.455)
Father degree and above	0.206 (0.405)	0.165 (0.372)	0.180 (0.384)	0.228 (0.420)	0.242 (0.429)
Log household income	10.398 (0.797)	10.177 (0.846)	10.331 (0.841)	10.486 (0.820)	10.567 (0.767)
Most recent GPA	2.853 (0.743)	2.678 (0.810)	2.806 (0.753)	2.930 (0.736)	2.997 (0.723)
<i>Male</i>					
White	0.541 (0.500)	0.556 (0.497)	0.512 (0.500)	0.532 (0.499)	0.512 (0.500)
Age	16.231 (1.700)	16.490 (1.494)	16.321 (1.499)	16.365 (1.538)	16.442 (1.549)
Mother degree and above	0.238 (0.427)	0.215 (0.411)	0.239 (0.427)	0.295 (0.456)	0.320 (0.467)
Father degree and above	0.243 (0.430)	0.159 (0.366)	0.205 (0.404)	0.262 (0.440)	0.289 (0.453)
Log household income	10.383 (0.892)	10.329 (0.764)	10.388 (0.820)	10.526 (0.807)	10.553 (0.844)
Most recent GPA	2.716 (0.786)	2.472 (0.798)	2.600 (0.770)	2.741 (0.758)	2.808 (0.762)

Notes Cells present means, standard deviations are in parentheses.

come from better-educated and higher-income family background, and perform better academically. Notably, both very unattractive girls and boys stand out from these general patterns, although they are very small groups in size. In terms of age, physical attractiveness does not seem to change substantially during adolescence years. Overall, these profiles largely present a positive correlation between beauty and socio-economic background.

3 Empirical Strategy

Our baseline regression model takes the form of the following equation

$$Y_i = \alpha_{svt} + \sum_{j=1,2,4,5} \beta_j \text{Attractiveness}_i^j + X_i \gamma + \varepsilon_i, \quad (1)$$

where Y_i denotes the risky behaviour outcome of interest for student i , α_{svt} are fixed effects at the school-by-interviewer level (absorbing year fixed effects as interviewers are different across years),⁷ X_i a vector of individual characteristics, and ε_i the error term. $\text{Attractiveness}_i^j$ is a series of binary indicators of attractiveness (e.g. $j = 5$ for “very attractive”) where we omit category three, “average looking”, as the reference group. Unless indicated otherwise, standard errors are clustered at the school-by-interviewer level to allow for within-cluster correlation of the error term.

A challenge for a causal interpretation of beauty effects on risky behaviours is that attractiveness may proxy for a range of family background characteristics that are also correlated with risky behaviours, resulting in an omitted variable bias. The inclusion of a rich set of socio-economic background covariates in X_i , helps deal with selection on observables. The inclusion of school-by-interviewer fixed effects α_{svt} , further deals with some selection on unobservables. For instance, there may be selection into schools based on family background, interviewers may judge physical attractiveness in an idiosyncratic way, or respondents may misreport to different degrees depending on the interviewer.

In particular, our key variable of interest, physical attractiveness, reflects judgements of the survey interviewers. This naturally leads to a range of concerns regarding the

⁷There are 144 schools in the sample. There are 563 interviewers in Wave I, and 401 interviewers in Wave 2. An average interviewer interviews 32 students. Overall these lead to 2,094 school-by-interviewer groups, with an average group size of 15 students.

extent to which this measure may reflect other factors that are correlated with the propensity to undertake risky behaviours. For instance, interviewers may either vary in their judgement of attractiveness and/or they may receive a non-random selection of respondents in terms of attractiveness and propensity to engage in risky behaviour. Controlling for school-by-interviewer fixed effects allows us to account for these unobservable differences and isolate the variation in risky behaviours within the school and interviewer that can be attributed to physical attractiveness.

We run a few further checks for robustness. First, there could be a concern relating to measurement error, that a third person present at the interview might bias the adolescent's reporting of risky behaviours or the interviewer's rating of the respondent's physical attractiveness. On this point we check if the results are robust when excluding those who had interrupted interviews.⁸ Lastly, we check for robustness to nonlinear estimation strategies using logistic and Poisson models instead of least squares. Second, there could be reverse causality, in that risky behaviours, for instance smoking, changes the adolescent's physical attractiveness. With respect to this, we examine if the results are robust where lagged beauty is used. Lastly, we check for robustness using a nonlinear model.

Next we seek to explore the mechanisms underlying the relationships between physical attractiveness and risky behaviours. Figure 2 summarizes our empirical framework to understand how adolescent beauty affects health outcomes in adolescence and adulthood. We consider social networks and personality traits as potential mechanisms. Previous research demonstrate that friendships may strongly influence risky behaviours, particularly during adolescence (Lundborg, 2006; Clark and Lohéac, 2007), while Conti et al. (2013) and Fletcher (2014) examine the role of high school popularity

⁸An interrupted interview is where the interview was paused due to respondent taking telephone call, visitors to the house, household member passed through, respondent attended to child or household responsibilities or environmental distractions

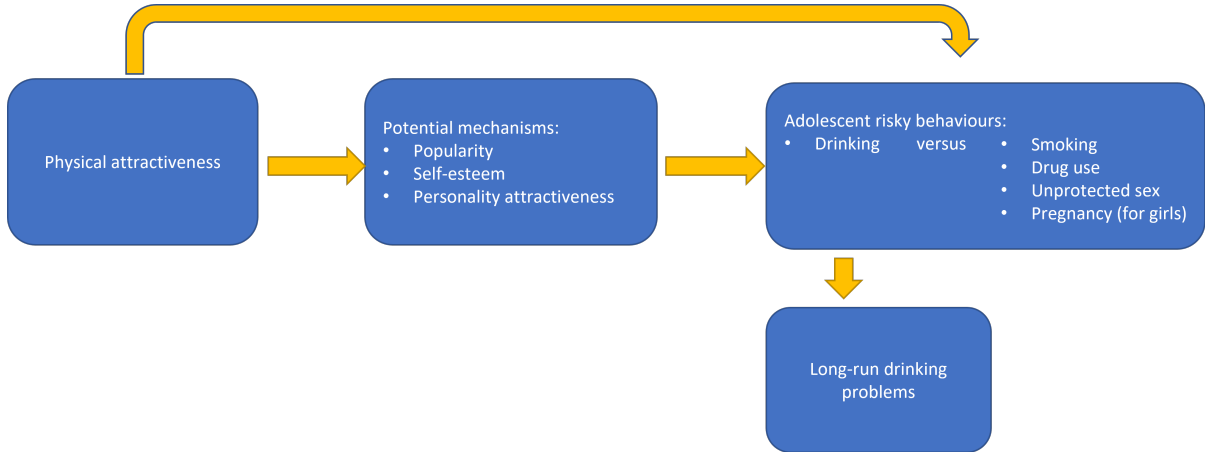


Figure 2: Empirical analysis framework

on later earnings. Attractive adolescents may find it easier to make friends in school. This popularity then could influence both the propensity and opportunities to engage in risky behaviours. Meanwhile, less popular adolescents may be more likely to engage in certain risky behaviours to, for instance, to increase acceptance amongst their peers. Hence, in practice the effect of popularity on risky behaviours is an empirical question. Beyond social circles, physical attractiveness can also play a role in the development of personality traits, which in turn are manifested in behavioural patterns. For instance, physical attractiveness can lend an adolescent higher self-esteem, who would feel less need to engage in risky behaviours to appear “cool”.

Empirically, we use information on popularity, personality attractiveness, and self-esteem in the data, as three measures of these different mechanisms. To understand the direct effects of attractiveness on these variables, we replace the dependent variable in the baseline model with each mechanism variable, in the following form:

$$M_i = \alpha_{svt} + \sum_{j=1,2,4,5} \beta_j \text{Attractiveness}_i^j + X_i \gamma + \varepsilon_i, \quad (2)$$

where M_i denotes the mechanism variable. Next, we rerun the baseline model, with

risky behaviours as dependent variables, while controlling for the three mechanisms, to examine the extent to which these mechanisms explain away the effects of physical appearance on risky behaviours:

$$Y_i = \alpha_{svt} + \sum_{j=1,2,4,5} \beta_j \text{Attractiveness}_i^j + M_i \delta + X_i \gamma + \varepsilon_i, \quad (3)$$

In the last step of our analysis, we examine whether adolescent beauty leads to long-run consequences on health outcomes. We estimate analogous version of Equation (1) but here the outcomes are two measures of long-term drinking problems, at two time points of early adulthood (age 18–26 and 24–32).

4 Results

4.1 Beauty and drinking

We begin by reporting the results of a number of specification checks in Table 3. Column (1) only controls for socio-economic observables, columns (2) and (3) further controls for school and interviewer fixed effects respectively, column (4) includes all previous controls, and column (5) further include school-by-interviewer fixed effects. The dependent variable is engagement in drinking (dummy variables) in all specifications.

The patterns in terms of magnitude and statistical significance of the estimated coefficients are very similar across specifications. All specifications show that very attractive and attractive adolescents are statistically significantly more likely to engage in drinking than average-looking school peers by 1.8–3.7 percentage points, against a baseline mean of 45.6%. Unattractive adolescents are less likely to drink by 3.8–4.9 percentage points. Very unattractive adolescents, are not statistically different from the average-

looking group in terms of propensity to drink. We note, as reported earlier, this is a very small group.

In terms of precision of estimates, the inclusion of school fixed effects seems to reduce it (from column 1 to 2), while the inclusion of interviewer fixed effects improves it (from column 1 to 3). In terms of magnitude, the coefficient on “very attractive” vary to some extent across specifications, while the other three coefficients remain similar. The results are stable on both magnitude and precision once interviewer fixed effects are included (from column 3 onwards), and essentially unchanged whether school or school-by-interviewer fixed are further added in. We choose column (5) as our preferred specification, which includes school-by interviewer fixed effects as illustrated in Equation 1.

All specifications show evidence of clear differences in the likelihood of underage alcohol consumption by attractiveness. Based on results of our preferred specification, very attractive adolescents are 8.6 percentage points in absolute terms, or 19% in relative terms, more likely to engage to engage in drinking than unattractive ones. The same gap between attractive and unattractive adolescents is 7.7 percentage points or 17%.

In results reported in Appendix Table A2, we check for robustness on nonlinear modeling, self-reporting concerns, and lagged beauty, and the findings are qualitatively similar.

4.2 Gender heterogeneity

Pooling girls and boys together masks potential gender heterogeneity. Summary statistics in Table 1 suggest clear differences in both physical attractiveness and risky behaviours by gender. Table 4 presents estimates of the effect of adolescent attractive-

Table 3: Specification checks

	Dep. var. = drinking				
	(1)	(2)	(3)	(4)	(5)
Very attractive	0.020** (0.009)	0.018* (0.010)	0.038*** (0.010)	0.037*** (0.010)	0.037*** (0.010)
Attractive	0.030*** (0.006)	0.025*** (0.006)	0.028*** (0.007)	0.027*** (0.007)	0.028*** (0.007)
Unattractive	-0.038*** (0.014)	-0.040** (0.016)	-0.050*** (0.014)	-0.049*** (0.014)	-0.049*** (0.014)
Very unattractive	-0.003 (0.023)	-0.012 (0.026)	0.013 (0.025)	0.012 (0.025)	0.005 (0.025)
Obs.	30,888	30,888	30,888	30,888	30,888
Dep. var. mean	0.456	0.456	0.456	0.456	0.456
Dep. var. SD	0.498	0.498	0.498	0.498	0.498
Controls	Yes	Yes	Yes	Yes	Yes
School FE	No	Yes	No	Yes	Absorbed
Interviewer FE	No	No	Yes	Yes	Absorbed
SchXIntvw FE	No	No	No	No	Yes
SE cluster	Individual	School	Interviewer	Interviewer	SchXIntvw

Notes This table reports the regression results of the relationship between drinking and physical attractiveness, using a range of specifications based on combined data from Waves I and II of Add Health. Drinking is defined as a dummy variable indicating ever drinking or not in the past 12 months. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include gender, race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy indicator missing income, and where appropriate, a school-year dummy (absorbed when interviewer fixed effects are included as interviewers are different across school-years). ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) are in parentheses, with the level indicated in the “SE cluster” row.

ness on the likelihood of underage drinking for girls and boys separately. For the rest of the paper we provide estimates separately by gender.

Table 4: Beauty and prevalence of drinking

	Dep. var. = drinking		
	(1) All	(2) Female	(3) Male
Very attractive	0.037*** (0.010)	0.052*** (0.013)	0.018 (0.017)
Attractive	0.028*** (0.007)	0.035*** (0.010)	0.022** (0.010)
Unattractive	-0.049*** (0.014)	-0.047** (0.024)	-0.067*** (0.019)
Very unattractive	0.005 (0.025)	0.006 (0.034)	0.016 (0.042)
Obs.	30,888	15,795	15,093
Dep. var. mean	0.456	0.458	0.454
Dep. var. SD	0.498	0.498	0.498
Controls	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the regression results of the relationship between drinking and physical attractiveness, for females and males combined (column 1) and separately (columns 2 and 3). Drinking is defined as a dummy variable indicating ever drinking or not in the past 12 months. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include gender (column 1 only), race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

Estimates split by gender reveal some heterogeneity in the relationship between beauty and drinking. Column (2) shows that both attractive and very attractive girls are more likely to drink, while unattractive females are less likely to drink. The gaps in the

propensity between very attractive (attractive) and unattractive girls are 9.9 (8.2) percentage points in absolute terms or 21.6% (17.9%) in relative terms. Results for boys in column (3) show that there is no effect for very attractive males, but large differences are apparent across attractive and unattractive males, with a gap of 8.9 percentage points or 19.6%. Overall, we find a clear and sizeable effect of physical attractiveness on the propensity of adolescent drinking for both girls and boys. The gap in the propensity to drink between attractive and unattractive adolescents constitutes about one fifth of the baseline mean.

In exploring further potential heterogeneity by racial and age groups in Appendix Table A3, we find some evidence that beauty effects on drinking are more pronounced for white females, while in other regards we find no evidence of heterogeneity by race and age.

Alcohol harms are concentrated in heavy drinking. Appendix Table A4 reports equivalent estimates to Table 4, but where the dependent variable is binge drinking, i.e. whether the individual has drunk five or more drinks in a single sitting in the past twelve months. The results show that while the earlier patterns hold qualitatively, they are less precise. Heavier drinking is higher amongst very attractive females (column 2), and lower for unattractive males (column 3). The gaps in the propensity of binge drinking between attractive and unattractive adolescents are 2.9 percentage points (or 12.0%) for girls and 8.0 percentage points (27.1%) for boys.

To further investigate the effects on the intensive margin, Appendix Table A5 reports the estimates for frequency of drinking. When non-drinkers are included in the analysis (columns 1 and 2), the patterns are similar to earlier results but less precise. When they are excluded (columns 3 and 4), the patterns do not hold. In column 3, attractive girls drink fewer times than the average-looking reference group; in column 4, no

groups are statistically different from the reference group.

With all results combined, there is clear and strong evidence that physical attractiveness is mainly associated with more engagement in alcohol consumption on the extensive margin, and less clear or weaker evidence on the intensive margin or drinking more heavily or frequently.

4.3 Drinking vs other risky behaviours

Naturally, underage drinking represents just one of many potential risky behaviours that adolescents might engage in. Table 5 presents estimates for a range of additional behaviours: smoking (column 2); substance use (column 3); unprotected sex (column 4); unprotected sex conditional on ever having had sex (column 4); and pregnancy (column 6).

What is clear is that these demonstrate strikingly contrasting patterns to those for drinking (also presented for comparison in column 1). For girls, very attractive and attractive adolescents are less likely to smoke, use illicit substance, engage in unprotected sex or to have been pregnant. For boys, the evidence is less strong in terms of statistical significance, but general patterns follow that very attractive and attractive adolescents engage less in these other risky behaviours.

While all examined behaviours are risky health behaviours, the contrasts between drinking and others are noteworthy, and suggest that beauty affects these behaviours through varying channels. For instance, risky behaviours can carry different social implications. Having unprotected sex can be a social stigma for girls, but among boys it may be viewed favourably by peers. We next turn to understand the potential mechanisms beauty affects different risky health behaviours.

Table 5: Comparison of beauty effects on drinking and other risky behaviors

	Risky behaviors					
	(1) Drink	(2) Smoke	(3) Substance use	(4) Unprotected sex	(5) Unprotected sex if ever had sex	(6) Pregnancy
<i>Panel A: Female subsample, dep. var. = engagement in risky behaviour</i>						
Very attractive	0.052*** (0.013)	-0.027** (0.012)	-0.019* (0.010)	-0.022*** (0.008)	-0.083*** (0.020)	-0.017** (0.007)
Attractive	0.035*** (0.010)	-0.019** (0.009)	-0.016** (0.007)	-0.007 (0.006)	-0.041*** (0.015)	-0.010** (0.005)
Unattractive	-0.047** (0.024)	0.027 (0.021)	0.014 (0.017)	-0.007 (0.015)	0.025 (0.038)	0.005 (0.013)
Very unattractive	0.006 (0.034)	-0.038 (0.030)	-0.040* (0.023)	-0.015 (0.024)	-0.026 (0.058)	-0.018 (0.016)
Obs.	15,795	15,795	15,795	15,795	6,132	15,795
Dep. var. mean	0.458	0.279	0.151	0.119	0.306	0.071
Dep. var. SD	0.498	0.449	0.358	0.324	0.461	0.257
Controls	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw
<i>Panel B: male subsample, dep. var. = engagement in risky behaviour</i>						
Very attractive	0.018 (0.017)	-0.026* (0.015)	-0.014 (0.013)	-0.006 (0.010)	-0.022 (0.025)	
Attractive	0.022** (0.010)	-0.025*** (0.009)	-0.012 (0.008)	-0.001 (0.007)	-0.011 (0.016)	
Unattractive	-0.067*** (0.019)	0.009 (0.019)	-0.008 (0.016)	0.019 (0.013)	0.062** (0.028)	
Very unattractive	0.016 (0.042)	0.008 (0.036)	0.017 (0.030)	0.026 (0.027)	0.089 (0.062)	
Obs.	15,093	15,093	15,093	15,093	6,219	
Dep. var. mean	0.454	0.288	0.183	0.107	0.260	
Dep. var. SD	0.498	0.453	0.386	0.309	0.439	
Controls	Yes	Yes	Yes	Yes	Yes	
School FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	
SchXIntvw FE	Yes	Yes	Yes	Yes	Yes	
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	

Notes This table reports the regression results of the relationship between a range of risky behaviours (as indicated in column heading) and physical attractiveness. Dependent variables are engagement in a certain risky behavior, coded as dummy variables. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

5 Mechanisms

Recent research on adolescence (Clark and Lohéac, 2007; Gardner and Steinberg, 2005) has focused on risk-taking behaviour by an individual caused by emotional and social factors, such as peer effects. While adolescents spend a substantial proportion of their time with their peers at school, thus are likely to be influenced by them, there is more to the decision-making process including factors such as genetics (Anokhin et al., 2009). The health literature seeks to pin down determinants of risky behaviour to genetic, social environmental and personality factors. While we cannot provide a detailed explanation of the role genetics play, we provide evidence on two potential mechanisms through which attractiveness might effect risky behaviours, namely the social environmental and personality factors. Specifically, we examine three variables as mechanisms: popularity (measured with log in-degree of the adolescent's friendship network), personality attractiveness (reported by the interviewer), and self-esteem (reported by the adolescent).

In investigating the underlying mechanism through which beauty might affect risk behaviours, our main approach involves two parts. First, we regress the mechanism variables onto attractiveness and covariates, to gauge the direction and magnitude beauty affects these variables; next, we regress drinking onto attractiveness and covariates, with the mechanism variables as additional control variables, to understand how coefficients on attractiveness changes with such additions.

Results are presented in Table 6, where columns (1)–(4) report the results for females, and columns (5)–(8) for males. First, we look at the role of popularity in the relationship between physical attractiveness and drinking. Results in columns (1) and (5) suggest that attractiveness is positively correlated with popularity, consistent with the notion that attractive adolescents are more likely to be invited to social events. Further,

Table 6: Beauty effects on popularity, personality attractiveness, and self-esteem

	Dep. var. =							
	Female				Male			
	(1) Log in-degree	(2) Personality attractiveness	(3) Self- esteem	(4) Drink	(5) Log in-degree	(6) Personality attractiveness	(7) Self- esteem	(8) Drink
Very attractive	0.276*** (0.021)	0.537*** (0.012)	0.383*** (0.074)	0.062*** (0.016)	0.289*** (0.029)	0.597*** (0.013)	0.453*** (0.079)	0.028 (0.020)
Attractive	0.183*** (0.016)	0.405*** (0.011)	0.221*** (0.053)	0.039*** (0.012)	0.174*** (0.018)	0.410*** (0.011)	0.219*** (0.049)	0.045*** (0.013)
Unattractive	-0.237*** (0.037)	-0.031 (0.021)	-0.412*** (0.143)	-0.025 (0.030)	-0.182*** (0.036)	-0.074*** (0.018)	-0.355*** (0.100)	-0.088*** (0.025)
Very unattractive	0.069 (0.053)	-0.033 (0.032)	0.224 (0.193)	-0.002 (0.040)	-0.084 (0.072)	-0.033 (0.035)	0.235 (0.217)	-0.026 (0.046)
Log in-degree				0.073*** (0.008)				0.047*** (0.007)
Personality attractive				-0.048*** (0.013)				-0.025** (0.012)
Self-esteem				-0.025*** (0.002)				-0.019*** (0.002)
Obs.	11,182	15,794	15,760	11,161	10,451	15,093	15,061	10,433
Dep. var. mean	1.535	0.558	16.053	0.456	1.393	0.446	16.785	0.446
Dep. var. SD	0.677	0.497	2.654	0.498	0.740	0.497	2.369	0.497
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the regression results of the relationship between mechanism variables and physical attractiveness. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

results in column (4) and (8) show that popularity predicts more drinking, although it does not fully explain the effects of attractiveness on drinking.

Next, we consider how socio-emotional and personality traits and skills may be an underlying mechanism to mediate the effects of beauty on risky behaviours. A growing body of research highlights the importance of non-cognitive traits and skills in the formation and development of human capital ([Heckman and Rubinstein, 2001](#); [Cunha and Heckman, 2007](#); [Kautz et al., 2014](#)). These non-cognitive traits and skills can be linked to physical attractiveness in various ways. Individuals who are physically more attractive may have different risk attitudes in general due to their personality. Physically attractive individuals tend to be more likely perceived as having an attractive personality and to have higher than average levels of self-esteem. For instance, existing evidence shows that physically attractive workers tend to be more confident and higher confidence increases wages ([Mobius and Rosenblat, 2006](#)). Similarly in our setting, these personality traits can be linked directly to risky health behaviours, for instance, adolescents with high self-esteem are less likely to try illegal substance or have unprotected sex ([Mendolia and Walker, 2014](#)). Another example is self-efficacy, which leads to more exercising and less drinking ([Chiteji, 2010](#)). These traits are not necessarily related to popularity but may lead individuals to form different time preferences and risk attitudes, thus making different health behavioural choices.

Consistent with existing evidence, the results suggest that attractiveness is positively correlated with perceived personality attractiveness (see Table 6 columns 2 and 6) and self-reported self-esteem (see Table 6 columns 3 and 7). Further, we find that these personality traits predict less drinking (columns 4 and 7), suggesting they offer a protective role in preventing underage drinking behaviours, to the opposite direction of the role of popularity.

These results suggest that attractiveness affects risky behaviours in a number of nuanced ways, some of which may cancel the others out as they operate in opposite directions. Of the three channels we examine, in general, popularity makes adolescents more likely to engage in risky behaviours, whereas self-esteem and attractive personality make them less likely to participate in risky behaviours.

We add a caveat that these analyses are imperfect tests of underlying mechanisms. An alternative interpretation could be that these characteristics represent confounding factors such as family background and socio-economic status not captured by the observables, which lead to endogeneity concerns on omitted variables or reverse causation. In this case, controlling for these variables as in columns (4) and (8) would reduce the endogeneity bias. From this perspective, the remaining effects of attractiveness point to a separate effect of physical attractiveness on drinking that are not explained by popularity, personality attractiveness, and self-esteem. While these variables provide insights into how attractiveness affects or is associated with underage drinking, they do not provide a full picture of all causal paths. Understanding the complex underlying mechanisms would be a potential direction for future research.

For comparison, we present in Table 7 analogous estimates for other risky behaviours. The key point is that the patterns of mediation are heterogeneous across risky behaviours. In general personality attractiveness and self-esteem reduce these risky behaviours. Yet, popularity increases the likelihood of some risky behaviours which can be seen as “cool” (drinking, smoking, and taking drugs for both genders, having unprotected sex for boys), but has no or negative effects on others which can be seen as not “cool” (unprotected sex and pregnancy for girls).

In summary, attractiveness affects adolescent risky behaviours in nuanced ways, with differences across different types of behaviours and across genders. That said, a com-

Table 7: Mechanism analysis for attractiveness and other risky behaviours

	Dep. var. =						
	Female				Male		
	(1) Smoke	(2) Drugs	(3) Unprotected sex	(4) Pregnancy	(5) Smoke	(6) Drugs	(7) Unprotected sex
Very attractive	0.027* (0.016)	-0.003 (0.012)	0.004 (0.011)	-0.004 (0.008)	0.007 (0.020)	0.007 (0.016)	0.008 (0.014)
Attractive	0.017 (0.011)	0.000 (0.009)	0.013 (0.008)	-0.003 (0.006)	-0.006 (0.012)	-0.004 (0.010)	0.014* (0.008)
Unattractive	0.014 (0.026)	-0.007 (0.020)	-0.014 (0.018)	0.000 (0.015)	-0.002 (0.025)	-0.030 (0.020)	0.001 (0.015)
Very unattractive	-0.035 (0.038)	-0.029 (0.028)	0.011 (0.028)	-0.008 (0.018)	-0.010 (0.041)	0.000 (0.035)	0.034 (0.032)
Log in-degree	0.021*** (0.007)	0.024*** (0.006)	0.001 (0.005)	-0.015*** (0.004)	0.015** (0.007)	0.026*** (0.006)	0.015*** (0.004)
Personality attractive	-0.064*** (0.011)	-0.037*** (0.009)	-0.031*** (0.008)	-0.012* (0.006)	-0.036*** (0.012)	-0.024*** (0.009)	-0.012 (0.008)
Self-esteem	-0.023*** (0.002)	-0.017*** (0.002)	-0.006*** (0.001)	-0.003*** (0.001)	-0.022*** (0.002)	-0.017*** (0.002)	-0.006*** (0.001)
Obs.	11,161	11,161	11,161	11,161	10,433	10,433	10,433
Dep. var. mean	0.270	0.142	0.114	0.061	0.270	0.168	0.099
Dep. var. SD	0.444	0.349	0.317	0.240	0.444	0.374	0.299
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the regression results of the effects of physical attractiveness, conditional on log in-degree, personality attractiveness, and self-esteem, for females and males separately. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

mon mechanism is that non-cognitive abilities such as personality attractiveness and self-esteem offer a protective role against the onset of adolescent risky behaviours. From a policy perspective, interventions that help build self-esteem, can help adolescents stay away from engaging with risky health behaviours, particularly those that have life-long consequences such as unprotected sex and teenage pregnancy.

6 Long-Run Effects

Finally, while adolescent drinking and risky behaviours are in and of themselves important for a range of reasons, one clear concern are life cycle effects on risky behaviours. We face restrictions due to data on the extent to which we can explore this. However, in later waves of Add Health when the respondents reached adulthood,⁹ we do observe relevant outcomes, where respondents were asked if they had any of a series of nine drinking problems in the last twelve months (Wave III) or ever (Wave IV). Based on this, we construct two measures of long-run drinking problems, one defined as whether or not the respondent had any drinking problem, and the other defined as number of incidences.

The results are reported in Table 8 and reveal a number of points. There appears to be links between adolescent attractiveness and later drinking problems. These broadly follow the patterns observed for underage drinking, although the effects may be at different margins for girls and boys. Very attractive or attractive girls are more likely than average-looking peers to develop drinking problems in adulthood, and unattractive boys are less likely than average-looking peers to develop these issues.

In general, these results provide suggestive evidence that the effects of adolescent at-

⁹Wave III took place in 2001–2002, when respondents were aged 18–26; Wave IV took place in 2007–08, when respondents were aged 24–32.

Table 8: The long-run effects of adolescent beauty on drinking problems

	Dep. var. = long-run outcomes			
	at Wave III (aged 18–26)		at Wave IV (aged 24–32)	
	(1) Any drink problem	(2) Drinking problem incidents	(3) Any drink problem	(4) Drinking problem incidents
<i>Female</i>				
Very attractive	0.042*** (0.015)	0.141*** (0.051)	0.023* (0.013)	0.083 (0.060)
Attractive	0.007 (0.011)	0.033 (0.038)	0.017* (0.010)	0.106** (0.045)
Unattractive	-0.035 (0.027)	-0.130 (0.087)	-0.017 (0.023)	-0.067 (0.095)
Very unattractive	0.054 (0.038)	0.113 (0.115)	-0.016 (0.033)	-0.083 (0.132)
Obs.	12,331	12,331	12,939	12,939
Dep. var. mean	0.472	1.243	0.312	1.104
Dep. var. SD	0.499	1.686	0.463	2.027
Controls	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw
<i>Male</i>				
Very attractive	0.009 (0.020)	0.088 (0.092)	0.007 (0.019)	-0.039 (0.099)
Attractive	0.016 (0.012)	0.063 (0.048)	0.004 (0.012)	-0.039 (0.064)
Unattractive	-0.091*** (0.023)	-0.458*** (0.082)	-0.088*** (0.022)	-0.417*** (0.121)
Very unattractive	0.007 (0.050)	-0.109 (0.204)	-0.079* (0.046)	-0.344* (0.208)
Obs.	10,767	10,767	11,156	11,156
Dep. var. mean	0.574	1.805	0.435	1.798
Dep. var. SD	0.495	2.092	0.496	2.555
Controls	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the regression results of the effects of adolescent physical attractiveness in adolescence (aged 13–18) on long-run outcomes at Waves III (aged 18–26) and IV (aged 24–32) from Add Health. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include gender (column 1 only), race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

tractiveness on adolescent risky behaviours are likely to continue at least into early adulthood. Insofar as this is a critical period for a range of skill formation and early labour market attachment, this in turn seems likely to influence labour market returns.

7 Conclusion

This paper examines how beauty influences a range of adolescent risky behaviours in the United States. We exploit unique and rich information from Add Health to understand these relationships between beauty and risky behaviours, and investigate underlying mechanisms and long-run effects. Our main finding is that attractiveness of adolescents has marked effects on a range of risky behaviours. Attractiveness is associated with higher teen alcohol consumption. Attractive females, in particular, are substantially more likely to have consumed alcohol in the past twelve months, than those of or below average attractiveness. At the same time, more attractive teens are less likely to engage in other types of risky behaviours such as smoking, drug use, unprotected sex, and pregnancy. These results are robust to a range of alternative estimation approaches and attempts to rule out confounders. We further demonstrate a number of likely underlying mechanisms. Popularity, self-esteem, and personality attractiveness are important mediators of the effect of attractiveness, none of which alone can explain the full effects. These mechanisms operate in different directions and may offset each other, producing varying net effects on different risky behaviours.

These results are important for a number of inter-related reasons. Previous labour market research demonstrates marked effects of attractiveness. Our results suggest important pre-market effects of attractiveness on individual behaviour likely to be consequential for both labour market performance and important pre-market investments. Further, our findings suggest that physical attractiveness, and its associated

characteristics, provide another avenue for understanding non-cognitive traits that are important in child and adolescent development and carry life-time consequences. For instance, nourishing adolescent self-esteem could prove useful for preventing the onset of risky behaviour. Finally, these risky behaviours are themselves of importance due to their link to negative outcomes both in adolescence and across the life course. Our results suggest that pre-determined (at least prior to adolescence) traits have marked effects on these behaviours and related outcomes.

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A Appendix

Table A1: Definitions of long-run drinking problems

Variable	Definition
Any drinking problem at Wave 3	<p>Dummy variable, = 1 if respondent answers once or more for any of the following problems in the past twelve months (except for the last item, which refers to “since 1995”):</p> <ul style="list-style-type: none"> • You had problems at school or work because you had been drinking. • You had problems with your friends because you had been drinking. • You had problems with someone you were dating because you had been drinking. • How many times were you hung over? • how many times were you sick to your stomach or threw up after drinking? • How many times did you get into a sexual situation that you later regretted because you had been drinking? • How many times did you get into a physical fight because you had been drinking? • How many times were you drunk at school or work? • Since June 1995, have you driven while drunk?
Drinking problem incidents at Wave 3	Number of items the respondent answers once or more to the nine drinking problems above in the past twelve months, scale 0–9

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Variable	Definition
Any drinking problem at Wave 4	Dummy variable, = 1 if respondent answers once or more for any of the following problems: <ul style="list-style-type: none">• How often has your drinking interfered with your responsibilities at work or school?• How often have you been under the influence of alcohol when you could have gotten yourself or others hurt, or put yourself or others at risk, including unprotected sex?• How often have you had legal problems because of your drinking, like being arrested for disturbing the peace or driving under the influence of alcohol, or anything else?• How often have you had problems with your family, friends, or people at work or school because of your drinking?• Did you continue to drink after you realized drinking was causing you problems with family, friends, or people at work or school?• Have you ever found that you had to drink more than you used to in order to get the effect you wanted?• Has there ever been a period when you spent a lot of time drinking, planning how you would get alcohol, or recovering from a hangover?• Have you often had more to drink or kept drinking for a longer period of time than you intended?• Have you ever continued to drink after you realized drinking was causing you any emotional problems (such as feeling irritable, depressed, or uninterested in things or having strange ideas) or causing you any health problems (such as ulcers, numbness in your hands/feet or memory problems)?
Drinking problem incidents at Wave 4	Number of items the respondent answers once or more to the nine drinking problems above, scale 0–9

Notes: Wave 3 takes place in 2001–2002, when respondents are aged 18–26; Wave 4 takes places in 2007–08, when respondents are aged 24–32.

Table A2: Robustness checks on the relationship between beauty and drinking

	Dep. var. = drinking					
	Female			Male		
	(1) Odds ratio	(2) Drop interrupted	(3) Lagged beauty	(4) Odds ratio	(5) Drop interrupted	(6) lagged beauty
Very attractive	1.163*** (0.058)	0.051*** (0.015)	0.061*** (0.019)	1.016 (0.063)	0.004 (0.019)	0.028 (0.022)
Attractive	1.145*** (0.045)	0.044*** (0.011)	0.019 (0.015)	1.115*** (0.044)	0.023** (0.011)	0.048*** (0.015)
Unattractive	0.847* (0.085)	-0.045 (0.028)	-0.015 (0.039)	0.813*** (0.063)	-0.061*** (0.022)	-0.003 (0.030)
Very unattractive	0.948 (0.121)	0.016 (0.041)	-0.040 (0.048)	1.095 (0.191)	0.022 (0.047)	0.119** (0.056)
Obs.	15,619	12,133	6,084	14,909	11,876	5,726
Dep. var. mean	0.457	0.469	0.445	0.454	0.467	0.432
Dep. var. SD	0.498	0.499	0.497	0.498	0.499	0.495
Controls	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the regression results of the relationship between drinking and physical attractiveness in a number of robustness checks. Drinking is defined as a dummy variable indicating ever drinking or not in the past 12 months. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Columns (1) & (4) report the odds ratios from a logistic regression, where average drinking (excluding oneself) at the school-by-interviewer level is included as a proxy for fixed effects. Columns (2) & (5) report the baseline regression results on a sample that were free from interruptions during the interview. Columns (3) & (6) report the baseline regression results with lagged physical attractiveness at Wave I. Control variables include race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

Table A3: Heterogeneity by race and age

	Dep. var. = drinking			
	Female		Male	
	(1) By race	(2) By age	(3) By race	(4) By age
Attractive or very attractive	0.066*** (0.012)	0.051*** (0.012)	0.031*** (0.012)	0.029** (0.012)
Interaction term with non-white	-0.047*** (0.016)		-0.008 (0.018)	
Non-white	-0.105*** (0.019)		-0.087*** (0.019)	
Interaction term with age above median		-0.015 (0.016)		-0.004 (0.016)
Age above median		0.002 (0.018)		0.000 (0.017)
Obs.	15,795	15,795	15,093	15,093
Dep. var. mean	0.458	0.458	0.454	0.454
Dep. var. SD	0.498	0.498	0.498	0.498
Controls	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the heterogeneous effects by race and age in the relationship between drinking and physical attractiveness. Drinking is defined as a dummy variable indicating ever drinking or not in the past 12 months. Physical attractiveness is measured with a dummy variable indicating attractive or very attractive. Control variables include race dummies, age and its squared term, mother's absence and education levels, father's absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

Table A4: Beauty and prevalence of binge drinking

	Dep. var. = binge drinking		
	(1) All	(2) Female	(3) Male
Very attractive	0.016* (0.009)	0.021* (0.011)	0.008 (0.015)
Attractive	0.008 (0.006)	0.004 (0.008)	0.011 (0.009)
Unattractive	-0.043*** (0.013)	-0.025 (0.019)	-0.069*** (0.018)
Very unattractive	0.024 (0.023)	0.038 (0.029)	0.010 (0.037)
Obs.	30,888	15,795	15,093
Dep. var. mean	0.267	0.241	0.295
Dep. var. SD	0.443	0.428	0.456
Controls	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the regression results of the relationship between binge drinking and physical attractiveness, for females and males combined (column 1) and separately (columns 2 and 3). Binge drinking is defined as a dummy variable indicating ever having five or more drinks in a row or not in the past 12 months. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include gender (column 1 only), race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.

Table A5: Beauty and frequency of drinking

	Dep. var. = frequency of drinking			
	All		Drinkers only	
	(1) Female	(2) Male	(3) Female	(4) Male
Very attractive	0.094** (0.037)	0.067 (0.054)	-0.037 (0.052)	0.072 (0.077)
Attractive	0.054** (0.027)	0.048 (0.031)	-0.067* (0.039)	-0.024 (0.041)
Unattractive	-0.062 (0.070)	-0.151** (0.064)	0.056 (0.115)	0.046 (0.088)
Very unattractive	-0.059 (0.086)	0.085 (0.142)	-0.241** (0.122)	0.177 (0.207)
Obs.	15,795	15,093	7,233	6,857
Dep. var. mean	0.998	1.152	2.179	2.536
Dep. var. SD	1.371	1.581	1.237	1.411
Controls	Yes	Yes	Yes	Yes
School FE	Absorbed	Absorbed	Absorbed	Absorbed
Interviewer FE	Absorbed	Absorbed	Absorbed	Absorbed
SchXIntvw FE	Yes	Yes	Yes	Yes
SE cluster	SchXIntvw	SchXIntvw	SchXIntvw	SchXIntvw

Notes This table reports the regression results of the relationship between frequency of drinking and physical attractiveness. Frequency of drinking is measured on a scale of 0 – 6 in the past 12 months, from 0 = never to 6 = everyday or almost everyday. Physical attractiveness is measured with dummy variables indicating each of five levels, with “about average” as the reference group. Control variables include race dummies, age and its squared term, mother’s absence and education levels, father’s absence and education levels, log household income and a dummy variable indicating missing income. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels respectively. Clustered standard errors (SE) at the school-by-interviewer levels are in parentheses.