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Keywords: Beauty, BMI, Height, Weight, Wage, Spousal Education
JEL Classification: D1, J1

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Abstract

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1 Introduction

The salience of physical attributes to economic behavior and socioeconomic outcomes is well-established in the social sciences, where research consistently reports that physical attributes such as "beauty" (attractiveness) and anthropometric measures (height, weight, and body mass index[1]) are significantly related to human capital accumulation, labor and marriage market outcomes.[2] Not only "beauty pays", the attractive earn higher wages and have higher educated spouses and better dates (Biddle and Hamermesh, 1998; Hamermesh and Biddle, 1994; Hitsch, Hortaçsu and Ariely, 2010; Mobius and Rosenblat, 2006), but also anthropometry does. Indeed, taller individuals earn higher wages (Case and Paxson, 2008; Lundborg, Nystedt and Rooth, 2014), heavier women tend to earn lower wages (Cawley, 2004), and heavier individuals tend to marry less educated and heavier spouses (Averett and Korenman, 1996; Chiappori, Oreffice and Quintana-Domeque, 2012).

Although the existing research has unveiled several interesting patterns using either attractiveness or anthropometric measures, it suffers from two potential limitations. First and foremost, most studies assess attractiveness using (facial) frontal photographs often rated by undergraduate students (Biddle and Hamermesh, 1998; Hitsch, Hortaçsu and Ariely, 2010; Mobius and Rosenblat, 2006; Rooth, 2009), self-ratings (Hitsch, Hortaçsu and Ariely, 2010), or interviewer ratings at the end or during the interview (Hamermesh and Biddle, 1994; Hamermesh, Meng and Zhang, 2002). It is well-known that frontal photographs do not provide all the relevant information on "beauty" and that later-in-the-interview ratings also reflect other respondents' characteristics well beyond attractiveness (Biddle and Hamermesh, 1998), while undergraduate students may not be the relevant population of interest to assess physical attractiveness (Conley and McCabe, 2011).

Furthermore, all this work on physical attributes and socioeconomic outcomes typically uses *either* anthropometric *or* "beauty" measures, but not *both* types of measures in a *na-*

[1] BMI is defined as the individual's body weight (in kg) divided by the square of his/her height (in meters).

[2] Attractiveness has even been linked to criminal behavior (Mocan and Tekin, 2010).

tionally representative sample. This is unfortunate, because it has not been established yet whether the observed anthropometric "premia" (or "penalties") in the labor and marriage markets are indeed reflecting "beauty premia".[3]

In this paper we break new ground in the analysis of anthropometry and attractiveness in economic research. First, we use nationally representative data where the respondents provide information on their anthropometric attributes (height and weight) and the interviewer assesses their attractiveness *at the start* of the interview on an 11-point Likert scale. The fact that our measure of attractiveness is based on the assessment of the interviewer *seeing* the individual and rating his/her overall attractiveness rather than a photograph of part of his/her body, that this happens at the start of the interview, and that our sample is nationally representative, allows us to provide a reliable answer to the following questions: *Do anthropometric characteristics explain attractiveness? When and to what extent?*

Second, we use anthropometric measures (weight, height, and body mass index) *together* with attractiveness ratings to circumvent potential omitted variable biases of relying only on one of these measures. Specifically, we present evidence on whether anthropometric measures, attractiveness ratings, or both, are associated with "premia" in the labor market, in terms of hourly wages, and in the marriage market, in terms of spousal socioeconomic "quality" measured by his/her education. Indeed, we can provide a plausible answer to one of the open questions in the social sciences regarding attractiveness and socioeconomic outcomes: *Is it attractiveness, anthropometry or both that matter(s) for socioeconomic outcomes? When and why?*

Our analysis uses the German General Social Survey (ALLBUS) data for 2008 and 2012, two nationally representative cross-sections of the German population. We run least squares regressions of attractiveness on anthropometric measures and several groups of control variables, including age, region, year, interviewer fixed effects, number of children, and health status. No matter which combination of controls we use, we find that height,

[3]These drawbacks are present in economic studies as well as in sociology and evolutionary psychology, where samples tend to be small and very selected (e.g., Tovée et al., 1991).

weight, body mass index (BMI) and obesity (BMI ≥ 30) *all* strongly contribute to male and female attractiveness when attractiveness is rated by *opposite*-sex interviewers, whereas only female anthropometric measures are relevant when attractiveness is assessed by *same*-sex interviewers. To the best of our knowledge, we are the first to show that anthropometric characteristics are *irrelevant* to male interviewers in assessing male attractiveness, while they are *important* for both male and female interviewers in assessing female attractiveness, using nationally representative data, a reliable attractiveness measure, and interviewer fixed effects.

This is a new and intriguing finding that may suggest an explanation for the commonly observed *gender-asymmetric* relationship between BMI (or weight controlling for height) and hourly wages, and the instead *similar* correlation between own BMI and spousal socioeconomic status of both men and women. For instance, Cawley (2004) shows that BMI is negatively related to wages for (white) women, but not for men, in the US,[4] while Chiappori, Oreffice and Quintana-Domeque (2012) show that heavier individuals (men or women) tend to have less educated and heavier spouses. We contend that BMI (or weight controlling for height) is in general negatively valued in the marriage market because individuals in the *heterosexual* marriage market are of *opposite*-sex with respect to potential spouses, whereas in the labor market potential employers could be of any gender, and if anything, more likely to be male, so that BMI is less likely to be perceived as a bad attribute for male workers.

One immediate concern regarding our evidence on the role of the gender of the interviewer in predicting attractiveness from anthropometric measures is that (on average) individuals interviewed by same-sex individuals may be *different* than those interviewed by opposite-sex interviewers.[5] However, when testing for mean differences of respondents by sex of the interviewer (individually or simultaneously), and separately for men and women, we find

[4]Garcia and Quintana-Domeque (2006) report different qualitative relationships between weight (controlling for height) and hourly wages for men (null or positive) and women (negative) in Austria, Denmark and Portugal.

[5]In particular for men, where the role of anthropometric characteristics in explaining attractiveness depends on the gender of the interviewer.

that individuals interviewed by same-sex interviewers have the *same* average characteristics as those interviewed by opposite-sex interviewers. In other words, sex of the interviewer can be thought of as being as good as randomly assigned across respondents. Another issue is that "contextual" effects could be affecting the way interviewers assess attractiveness. To account for this possibility, we add characteristics of the context in which the interview is taking place. Reassuringly, all of our previous findings are robust to this additional adjustment.

In the second part of our analysis, we look for the presence of attractiveness and anthropometric "premia" in the labor and marriage markets, considering *both* types of measures at the same time and disentangling their roles for the first time in a nationally representative data set. We show that for both men and women *attractiveness* and *height*, but not weight, are positively related to hourly wage rates, consistent with the well-documented beauty and height "premia" in earnings (e.g., Case and Paxson, 2008; Hamermesh, 2011; Lundborg, Nystedt and Rooth, 2014). Regarding spousal socioeconomic "quality", we find that *heavier* individuals, both men and women, tend to have less educated spouses irrespective of their rated attractiveness, highlighting the importance of BMI in the marriage market and showing that a low BMI does not simply represent a beauty "premium". We also compute the trade-off between the attributes of own BMI and own education, and find that it is the same for married men and women. What is more, this evidence strengthens the interpretation that BMI is perceived as one of the relevant dimensions of attractiveness in the marriage market for both men and women, in line with the recent findings in Chiappori, Oreffice and Quintana-Domeque (2012), and earlier evidence that heavier women tend to have poorer husbands (Averett and Korenman, 1996).

To the best of our knowledge, this is the first study to document that attractiveness and anthropometry may both play a relevant but different role in explaining labor and marital outcomes, and to specifically show the extent of this influence for men and women in a nationally representative sample. In particular, our findings suggest that the more superficial

attribute of rated attractiveness influences employment relationships but not the deeper one-to-one long-term ones that marriages represent, where instead body shape rather than rated attractiveness matters. Overall, this analysis represents a step toward our understanding of the evaluation and role of different physical attributes in explaining socioeconomic outcomes, by being able to compare both types of physical attributes (anthropometry and beauty) in two different markets. More generally, our work is part of a growing empirical literature on the role of "non-economic" characteristics in both the labor and the marriage markets, which encompasses economics and other social sciences.

To emphasize the relevance of our contributions to the literature, we refer to the main aspects in Hamermesh, Meng and Zang (2002) and Hitsch, Hortaçsu and Ariely (2010). Hamermesh, Meng and Zang (2002) consider *end*-of-interview ratings, which may be affected by other factors related to the interview process per se, and anthropometric measures as health controls, *without* reporting their point estimates of the latter, to analyze primping and beauty of working women from Shangai. Hitsch, Hortaçsu and Ariely (2010) estimate mate preferences and sorting patterns using attractiveness and anthropometric measures from an online dating service in the US. However, theirs is not a nationally representative data source, attractiveness is *self*-rated, and profile photographs are uploaded by users and then rated by students, with photographs available *only* for 27.5% of the sample. Moreover, although the authors claim that height and weight are self-reported with "only small levels of misrepresentation", the nature of measurement error in an online dating service is worrisome. If anything we would expect these measures to be reported with non-classical errors, that is, people over-reporting their heights (and their other "good" traits) and under-reporting their weights (and their other "negative" attributes).[6]

The paper is organized as follows. Section 2 describes the data. Section 3 estimates when and to what extent anthropometric characteristics explain physical attractiveness. Section 4 considers the interplay of anthropometric measures and attractiveness on socioeconomic

[6]In particular, this is a concern also for the self-reported annual income of the users' profiles, with this variable being available for only 50% of the sample.

outcomes. Section 5 concludes the paper.

2 Data Description

Estimation is carried out on the German General Social Survey (ALLBUS) data, a biennial survey that started in 1980 on "the attitudes, behaviour, and social structure of persons resident in Germany": a nationally representative cross-section of the German population is questioned every two years, and detailed demographic and socioeconomic information at the individual and household level is collected for thousands of respondents. In addition, the interviewer's identifier and main demographic characteristics (e.g., age and sex) are also recorded, which would prove useful in our present analysis.[7]

We use the cumulative series ALLBUS GESIS-Cumulation 1980-2012, focusing our study on the waves of 2008 and 2012, i.e., the *only* waves containing information on *both* attractiveness and anthropometric measures.[8] Our main variables of interest are height (in cm), weight (in kg), and BMI (body mass index) of the respondent as well as his/her attractiveness, which is rated by the interviewer. The respondent's attractiveness is available in all recent waves, is reported on an 11-point (Likert) scale from 1 to 11 (from unattractive to attractive), and is asked to the interviewer both at the start and at the end of the interview. To use a measure of physical attractiveness not contaminated by the interviewing process per se, we follow Gehrsitz (2014) and Hamermesh and Abrevaya (2013) and use the measure recorded *at the start* of the interview, along with the numerical identifier of the interviewer.

In particular, when we analyze attractiveness and estimate its determinants, we will control for interviewer fixed effects, and further distinguish observations by opposite- and same-sex pairs of interviewer-respondents, whereas when we consider attractiveness as ex-

[7] Interviews are performed with CAPI (computer assisted personal interviewing).

[8] In the ALLBUS some questions are asked in some or alternate waves. The anthropometric measures are not available in 2010 or in the years before 2008, so that we use the waves of 2008 and 2012, the latter being the most recently released. An additional feature of these anthropometric measures is that they are not asked in the basic questionnaire but in the rotating ISSP modules "Health" or "Leisure time and sports" to about 50% of the respondents in selected years (other respondents are asked other "split" questionnaires).

planatory variable for marital and labor outcomes, we will standardize it by subtracting the average attractiveness rating of the corresponding interviewer from each rating, and divide this difference by the standard deviation of his/her rating, in the same vein as in Mobius and Rosenblat (2006) or Hitsch, Hortaçsu and Ariely (2010).

To perform our analysis, we work with an additional set of variables: age, gender, a West-East region and a 2008-2012 year dummy-variable indicators, along with self-reported health status (we construct a dummy variable equal to 1 for satisfactory health status or better), number of biological and non-biological children, and education. In the ALLBUS data, educational attainment is measured through a series of yes/no questions on the attainment of specific types of certificates in schools and universities according to the features and dual paths of the German education system. We construct a binary variable which takes value of 1 if the respondent has a university or polytechnic degree, or a master/technician college certificate (i.e., "some college and above"), and 0 otherwise.[9]

To be able to measure socioeconomic outcomes of respondents and their spouses, we also consider the respondent's own net monthly income and hours worked per week to generate the log of the hourly wage rate (own net monthly income divided by hours worked), and the spouse's education. Note that neither own net monthly income nor hours worked per week is available for the spouse.

The main analysis considers men and women who are German citizens born in Germany, between 25 and 50 years of age and with BMI in the range 18.5 to 39.99, to keep uniform reference groups with respect to attractiveness and marital and labor market outcomes, and to exclude (medically) morbid obese or underweight individuals (WHO, 2009). The restriction on place of birth and German citizenship is prompted by the fact that being foreign-born may be related differently to attractiveness. Finally, observations are weighed by the available East-West weight to adjust for the oversample of East German respondents and make the sample nationally representative.

[9]This schooling variable and the related dummy are not defined for those respondents who are still in school.

Table 1 presents the descriptive statistics for female and male respondents, separately. The average age is about 39, and 80% of the sample lives in the former West Germany. Women report being on average slightly less healthy and less educated than men, while men exhibit a higher average BMI but a lower average attractiveness than women. Men are slightly overweight (with an avearage BMI of 26.2 and an obesity rate of 14%), and their mean attractiveness rating is 7.7, while women score 8.2 on average, although the rating standard deviations are the same. This higher mean female rating is consistent with a large body of findings across disciplines and data sets, reporting that on average women are rated more attractive than men (e.g., Doorley and Sierminska, 2012; Gehrsitz, 2014; Hamermesh and Biddle, 1994).

[Table 1 about here]

The features in Table 1 indicate that the ALLBUS nationally representative data are reliable and of high quality. First, there are very few missing values (1.17% for education, 0.04% for health, 2.66% for BMI, and 0% for attractiveness). Second, and perhaps more important, the distribution of key variables, such as anthropometric measures, are realistic and comparable to other well-known German data sets (e.g., GSOEP) and stylized facts (OECD, 2014). In addition, although not reported in the table, the observable characteristics of our interviewers clearly reveal that they are not undergraduates: they are on average 59 years old. Moreover, 40% of them are women and their average schooling level is 2.6 (on a scale from 1 to 5). Hence, they are older than our respondents, whose average age is 39, less likely to be female than our respondents (48%), and also less educated than them (3.4).

Finally, it is worth emphasizing that attractiveness is measured here *at the start* of the interview and on an 11-point scale in a nationally representative sample, rather than by a later-in-the-interview rating (Hamermesh and Biddle, 1994; Hamermesh, Meng and Zhang, 2002), a self-assessed one (Hitsch, Hortaçsu and Ariely, 2010), or a (facial) photograph (Biddle and Hamermesh, 1998; Hitsch, Hortaçsu and Ariely, 2010; Mobius and Rosenblat, 2006). In particular, Biddle and Hamermesh (1998) state that "a photograph captures

only facial features and to some extent grooming, and captures them imperfectly", while an attractiveness rating (during or at the end of the interview) would be "contaminated by other information about the subject obtained during an interview", which are exactly the drawbacks that our empirical analysis overcomes.

3 Do Anthropometric Measures influence Attractiveness?

This section provides evidence on the relationship between anthropometric characteristics and attractiveness. We assess the predictive power of (self-)reported anthropometric measures in explaining attractiveness as rated by the interviewer at the start of the interview.

3.1 Main results: all interviewers

Table 2 displays a series of least square regressions of attractiveness on anthropometric measures for men and women, separately. There are three types of regressions (depending on the control variables used), grouped into three different panels according to the anthropometric measure(s) being used: panel A, panel B, and panel C.[10]

[Table 2 about here]

Panel A contains the point estimates of regressions of attractiveness on height and weight, which indicate that taller female and male respondents are both ranked as being more attractive by the interviewers, while weight plays a role only in explaining female attractiveness: heavier females are ranked as being less attractive by the interviewers. In columns (1) and (2), we report the estimates corresponding to the baseline regression, which

[10]Heteroskedasticity robust standard errors clustered at the interviewer's level are used in all the empirical analysis.

only controls for the age of the respondent, a West-East dummy-variable indicator and a 2008-2012 year dummy-variable indicator. If we control for interviewer fixed effects, columns (3) and (4), the results are robust and even stronger (the size of the coefficients –in absolute value– increases). Finally, controlling for a healthy dummy variable and the number of children does not change our findings, as we can see in columns (5) and (6). Panel B displays the point estimates of regressions of attractiveness on BMI. Interestingly, BMI is *uncorrelated* with male attractiveness, but is negatively correlated with female attractiveness. In panel C we report the estimated coefficients associated to the obesity indicator: they are all negative and statistically significant for both men and women.

It is worth noting that the statistical significant associations exhibit sizable point estimates. For example, column (1) in panel A indicates that for women, a one standard deviation increase in weight is associated to a 0.29 standard deviation decrease in attractiveness, that a one standard deviation increase in height is associated to a 0.17 standard deviation increase in attractiveness, while panel B indicates that a one standard deviation increase in BMI is associated to a 0.27 standard deviation decrease in attractiveness. In panel C we can see that going from non-obese to obese leads to a 0.64 standard deviation decrease in attractiveness for women and a 0.44 standard deviation decrease in attractiveness for men.

3.2 Additional results: opposite-sex versus same-sex interviewers

Taken at face value, the results in Table 2 indicate that, while weight is relevant in explaining female attractiveness, its role in explaining male attractiveness is null, except for the particular case of obesity that matters for both genders. Hence, one may be tempted to conclude that BMI is a good proxy for female attractiveness, but not for male attractiveness. Albeit this gender asymmetry may seem a reasonable finding (e.g., Tovée et al., 1998, 1999; and Swami, 2008), it is at odds with the recent empirical evidence on attractiveness and marriage market patterns in the US. In this regard, Chiappori et al. (2012) using PSID

data, find that both heavier men and women tend to have "worse" spouses in terms of socioeconomic (lower education/wage) and anthropometric (higher BMI) characteristics.

The empirical analysis in this subsection is developed to explore these issues and reconcile our apparently contradictory patterns, without simply resorting to the argument that tastes for female and male characteristics are different in the US and Germany. An alternative explanation to *de gustibus non est disputandum* is that the *gender of the interviewer* is playing a role in assessing attractiveness and in how it is related to height and weight. To explore such a possibility, we re-estimate the regressions of Table 2 splitting our sample of respondents according to whether they were interviewed by *opposite*-sex individuals, Table 3, or by *same*-sex interviewers, Table 4.

[Table 3 about here]

Once we perform the analysis by allowing different coefficients depending on the gender of the interviewer, we find that female (male) interviewers *do* take into account weight, BMI, and obesity in assessing male (female) attractiveness: *once we focus on opposite-sex interviewers, both male and female BMI measures significantly affect physical attractiveness.*

Interestingly enough, the point estimates and statistically significance for women in Table 3 are basically the same as in Table 2, suggesting that both male and female interviewers assess their anthropometric features similarly (as it can be confirmed in Table 4). Conversely, for men, Table 3 shows a significant influence of weight and BMI on their attractiveness, while Table 2 reports none, and larger estimated coefficients on the obesity indicator in Table 3 than in Table 2.

[Table 4 about here]

Indeed, Panel B in Table 4 shows that the point estimates for BMI regarding male physical attractiveness are virtually zero, while those regarding female attractiveness are a bit smaller than those in Table 3 but very close to those in Table 2; for obesity, the same

patterns of results are observed in panel C. Male interviewers do not consider weight, BMI, or obesity, when assessing male respondents.[11]

In summary, anthropometric characteristics are "irrelevant" to male interviewers in assessing male attractiveness, while they are important for female interviewers in assessing both male and female attractiveness. These are quite remarkable findings, and this paper is the first to document them on a nationally representative sample.

We conclude this subsection with a remark. Hamermesh and Biddle (1994) write that "within a culture and at a point in time there is tremendous agreement on standards of beauty". Our analysis helps to clarify such a statement: we show that these standards and their anthropometric determinants may differ by *gender*.

3.3 Bias from the respondent or the interviewer

One may be concerned that the sex of the interviewer affects the way the respondent reports his/her anthropometric measures, namely height and weight (BMI is constructed). Table 5 reports the respondents' mean characteristics by interviewer's sex. Remarkably enough, the means of weight, height, BMI and obesity are the same for those interviewed by same-sex interviewers and those interviewed by opposite-sex interviewers: there is no evidence that the sex of the interviewer is related to the way the respondent reports his/her anthropometric measures. Indeed, one can see in Table 5 that all the average characteristics for both men and women interviewed by same- and opposite-sex interviewers are the same. If anything, sex of the interviewer can be thought of as being as good as randomly assigned across respondents.

[Table 5 about here]

[11]The fact that BMI has a stronger impact on female than male attractiveness is consistent with evolutionary psychology. For instance, Tovée et al. (1998, 1999) find that BMI is the primary determinant of female sexual attractiveness, and Swami (2008) compares the relevance of BMI to other body shape measures between genders, in small samples. Also, focusing only on female attractiveness measured with photograph ratings, Conley and McCabe (2011) report that male ratings are negatively affected by BMI, while Tovée and Cornelissen (2001) that there is no difference between the ratings of male and female undergraduate students.

While we can control for interviewer fixed effects, the context in which the interview is performed may be different within interviewers. If the way an interviewer assesses attractiveness is context-dependent, this may lead to biases. To assess the importance of these potential biases, we check the robustness of our results to controlling for characteristics of the context in which the interview is taking place. We try to capture these contextual effects by including dummy variables for the type of building where the respondent lives. The results of this analysis are reported in Table 6. In this Table, we re-estimate Tables 2, 3 and 4, and display the estimates corresponding to the most complete specification (columns (5) and (6)). If anything, our results are robust to contextual effects.

[Table 6 about here]

4 Attractiveness, Anthropometric Measures and Socioeconomic Outcomes

While in the first part of the paper we analyzed the power of anthropometric measures in predicting attractiveness, we now *simultaneously* consider the role of anthropometric measures and attractiveness in explaining two important outcomes in the labor and the marriage market, namely, wages and spousal education.

A large body of literature in the social sciences has studied how physical attributes affect such outcomes, typically considering *either* anthropometric *or* beauty measures, but not both simultaneously. Studies on obesity, wages and employment use an obesity indicator or BMI (or weight controlling for height) to estimate labor market penalties for heavier (females) individuals (Cawley, 2004; Garcia and Quintana-Domeque, 2007; Rooth, 2009), finding somewhat mixed results. On the other hand, papers on height and the labor market find an earnings "premium" for taller individuals (Case and Paxson, 2008; Lundborg, Nystedt and Rooth, 2014). Moreover, recent work on attractiveness and the marriage market links these anthropometric measures to matching patterns and spouse quality (Chiappori,

Oreffice and Quintana-Domeque, 2012; Oreffice and Quintana-Domeque, 2010). On the other hand, since the seminal work by Hamermesh and Biddle (1994), a literature on the "economics of beauty" has developed, estimating a beauty "premium" in the labor or marriage markets (Hamermesh and Biddle, 1994; Mobius and Rosenblat, 2006; Doorley and Sierminska, 2012; Gehrsitz, 2014) and in online dating (Hitsch, Hortaçsu and Ariely, 2010).

4.1 Attractiveness, Anthropometric Measures and Wages

In this subsection, we focus on the relationship between attractiveness, anthropometric measures and wages conditional on working full-time. We want to measure these correlations depending on whether we include either attractiveness or anthropometric measures, or both. Specifically, we present least square regressions where the dependent variable is the log hourly wage rate, with five different specifications according to whether we include standardized attractiveness and/or anthropometric measures (weight and height, or BMI), grouped into two different panels according to the additional controls being used: panel A and panel B. Given the asymmetric relationships found in the literature by gender (Averett and Korenman, 1996; Cawley, 2004), we conduct our analysis separately for men and women, with findings for women in Table 7 and for men in Table 8.

Table 7 shows that both height and attractiveness are positively and significantly related to hourly wage rates, also when controlling for BMI. Although in panel B the estimated coefficient of attractiveness loses significance when more controls are included, its point estimates remain similar across all specifications, with the significance loss most likely due to lack of power. As to the anthropometric measures, for working women, height is always relevant and positively related to wages, whereas BMI is not. This is consistent with Garcia and Quintana-Domeque (2007) not finding a clear penalty for heavier women, although we also control for attractiveness and height, which seems to be the key trait here. The height "premium" in wages is consistent with Case and Paxson (2008), while the beauty "premium" is well-known (Hamermesh and Biddle, 1994). It is fair to say that the sample

of women is much smaller due to the selection into working, which appears to be much more stringent in Germany than in the US. Indeed, the following evidence on working men presents a similar but more significant relevance and comparison among physical attributes.

[Table 7 about here]

In Table 8, one can see that attractiveness is the most significant physical attribute in explaining male wages, followed by height, whereas weight and BMI do not play any role. This pattern holds across all specifications and panels. More attractive and taller workers earn higher hourly wages, and this is true for both men and women. In the appendix, Table A1, we present the same type of analysis, with the obesity indicator instead of the variable BMI. The estimated coefficients reflect the same qualitative results as in Tables 7 and 8.

[Table 8 about here]

These findings are in line with the obesity literature, which does not tend to find any heavy weight penalty for men (e.g., Cawley, 2004), and with the evidence on the height premium (Case and Paxson, 2008; Lundborg, Nystedt and Rooth 2014), although here we control for attractiveness in addition to anthropometric measures, and attractiveness exhibits a strong significance. In turn, the evidence on the positive influence of attractiveness on wages is consistent with the literature using beauty ratings instead of anthropometric measures to assess the relevance of attractiveness on labor outcomes, since the seminal work by Hamermesh and Biddle (1994). For instance, Mobius and Rosenblat (2006) find a sizable beauty "premium" in wages in a lab experimental setting, while Gehrsitz (2014) reports that good looks improve labor market outcomes for both men and women, as do Doorely and Sierminska (2012) but focusing only on women.

Overall, two aspects of our empirical analysis stand out. First, it is remarkable that height is positively related to the wages of both men and women even after conditioning on attractiveness. Second, it is attractiveness rather than BMI or weight that relates to wages,

suggesting that low BMI may be appreciated in the labor market, as other studies report, not because it reflects fitness and health, but as a pure physical attribute (looks). In the next subsection, we turn to the implications of the same physical attributes in a different market, characterized by one-to-one long-term relationships.

4.2 Attractiveness, Anthropometric Measures and Spousal Education

In this subsection, we look at the relationship between attractiveness, anthropometric measures and spousal educational attainment, which is considered an important proxy for the socioeconomic "quality" of the spouse in the marriage market (e.g., Browning, Chiappori and Weiss, 2014). We present least square regressions where the dependent variable is spousal education (a binary indicator for some college and above), with five different specifications according to whether we include standardized attractiveness and/or anthropometric measures (weight and height, or BMI), grouped into two different panels according to the additional controls being used: panel A and panel B. We perform our estimations separately by gender, with findings for women in Table 9 and for men in Table 10.

Table 9 shows that thinner women tend to have better educated husbands, with the effect of BMI or weight statistically significant at least at the 5% level across specifications. It is interesting to note that female weight and BMI are predictors of her husband's education even after accounting for her education and attractiveness. Our findings suggest that what makes a woman attractive in the marriage market is not what is perceived attractive by an interviewer, which could simply capture a superficial visual assessment and not the actual quality of a potential mate in one-to-one long-term relationships.

[Table 9 about here]

Results for men are reported in Table 10 and are remarkably similar. Here again, attractiveness per se does not play any role in terms of spousal quality, while weight and BMI

do in general. In the appendix, Table A2, we present the same type of analysis, with the obesity indicator instead of the variable BMI. The estimated coefficients reflect the same qualitative results as in Tables 9 and 10.

[Table 10 about here]

It is reassuring that the above evidence on men and women is consistent with the marriage market patterns in the US. Specifically, our evidence strengthens recent findings on matching in the marriage market, where male and female BMI, proxying physical attractiveness, significantly shapes matching patterns: heavier men and women tend to sort with heavier and less educated spouses (Chiappori, Oreffice and Quintana-Domeque, 2012), while previous work showed that own (female) weight is negatively associated to spousal education (Averett and Korenman, 1996).

Our novel comparison of the role of anthropometric measures with that of interviewers' attractiveness ratings in the marriage market is also informative to interpret previous findings on beauty and marital outcomes (Hamermesh and Biddle, 1994; Gehrsitz, 2014). The evidence presented here shows that a pivotal role in the relationship between beauty and actual attractiveness is played by BMI, possibly a more objective conveyor and "sufficient statistic" of an individual's characteristics than rated beauty. Indeed, the key force in spousal physical attractiveness seems to be body shape, suggesting that beauty measures may capture this type of attractiveness when they are found to be significantly related to marital outcomes.

Finally, our finding that BMI is a relevant determinant of attractiveness is consistent with the evolutionary psychology literature, where it emerges that BMI is a major factor in determining female (sexual) attractiveness, and that BMI should be a more important attribute in women since it is related to reproductive fitness (e.g., Tovée et al., 1998, 1999). The interesting twist is that, with nationally representative data, we show that this influence of BMI on physical attractiveness holds also for men and it is significantly strong for men and women also when we control for other demographic, physical, and socioeconomic

characteristics. The comparison of these assessments of attractiveness and anthropometric measures in different markets seems to indicate that these physical attributes have different implications for individual outcomes once it is possible to analyze them all simultaneously, as we do here.

4.2.1 Is the trade-off between BMI and education similar for men and women?

Under certain assumptions[12], the rate at which the marriage market allows an individual to trade-off own BMI and own education can be measured by the ratio of the coefficients of BMI and education. In Table 11 we test whether the ratio of the estimated coefficients on BMI and education is the same for married women and men, that is, whether the trade-off between BMI and education is the same across genders. The test is performed after simultaneously estimating the regressions in column (5) of panel B in Tables 9 and 10. Surprisingly enough, the Adjusted Wald Test has an F-statistic of 0.24 (p-value=0.6223), so that we cannot reject the null hypothesis that the ratio of these coefficients is the same for women and men. This is an interesting result on how the marriage market perceives individual attributes.

[Table 11 about here]

5 Conclusions

We examine how attractiveness rated at the start of the interview is related to weight (controlling for height), BMI, and obesity, separately by gender and also accounting for interviewer fixed effects, in a nationally representative sample. Using the German General

[12]Chiappori, Oreffice and Quintana-Domeque (2012) show that two crucial assumptions are required. The first is separability: the observable characteristics for women (respectively for men) matter only through a one-dimensional index. The second one is conditional independence: conditional on the female index (respectively male index), the distribution of female unobservable characteristics (respectively male unobservable characteristics) is independent of the female observable characteristics (respectively male unobservable characteristics).

Social Survey (ALLBUS) data for 2008 and 2012, we run least squares regressions of attractiveness on anthropometric measures and several groups of control variables, including age, region, year, interviewer fixed effects, number of children, and health status. No matter which combination of controls we use, we find that height, weight, body mass index (BMI), and obesity *all* strongly contribute to male and female attractiveness when attractiveness is rated by *opposite*-sex interviewers, whereas only female anthropometric measures are relevant when attractiveness is assessed by *same*-sex interviewers. To the best of our knowledge, we are the first to show that anthropometric characteristics are *irrelevant* to male interviewers in assessing male attractiveness, while they are *important* for both male and female interviewers in assessing female attractiveness.

Moreover, we estimate the interplay of these attractiveness and anthropometric measures in labor and marital outcomes such as hourly wage and spousal education, considering *both* types of measures at the same time and disentangling their roles for the first time in a nationally representative data set. We show that both attractiveness and height matter in the labor market, whereas both male and female BMI are valued in the marriage market instead of attractiveness.

These findings are consistent with the well-documented beauty and height "premia" in earnings (e.g., Case and Paxson, 2008; Hamermesh, 2011; Lundborg, Nystedt and Rooth, 2014; Mobius and Rosenblatt, 2006) as well as with the role of BMI as one of the relevant dimensions of attractiveness in the marriage market for both men and women (Chiappori, Oreffice and Quintana-Domeque, 2012) and earlier evidence that heavier women tend to have poorer husbands (Averett and Korenman, 1996). However, none of the previous studies considers both anthropometric measures and attractiveness (beauty) simultaneously in a nationally representative data set, with attractiveness measured at the start of the interview.

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Table 1. Summary statistics. ALLBUS: 2008, 2012.

Panel A. Women	N	Mean	SD	Min	Max
Age	514	39.1	7.5	25	50
Height (cm)	514	167.6	5.9	150	186
Weight (kg)	514	67.5	12.5	48	120
BMI (kg / m^2)	514	24.0	4.2	18.5	38.87
Obese (BMI ≥ 30)	514	0.11	0.31	0	1
Attractiveness (1-11)	514	8.2	1.8	1	11
West	514	0.82	0.39	0	1
Health Status (at least satisfactory)	514	0.90	0.30	0	1
Education (some college and above)	494	0.26	0.44	0	1
Number of Biological Children	511	1.45	1.18	0	6
Number of Non-Biological Children	511	0.01	0.12	0	2
Panel B. Men	N	Mean	SD	Min	Max
Age	561	39.4	7.4	25	50
Height (cm)	561	180.2	6.7	158	200
Weight (kg)	561	85.0	12.5	53	135
BMI (kg / m^2)	561	26.2	3.6	18.52	39.85
Obese (BMI ≥ 30)	561	0.14	0.35	0	1
Attractiveness (1-11)	561	7.7	1.8	1	11
West	561	0.81	0.40	0	1
Health Status (at least satisfactory)	561	0.92	0.27	0	1
Education (some college and above)	551	0.37	0.48	0	1
Number of Biological Children	553	1.11	1.15	0	5
Number of Non-Biological Children	553	0.09	0.39	0	3

Note: We focus our analysis on German citizens born in Germany, aged 25-50 and with BMI in the range 18.5-39.99. Attractiveness is assessed by the interviewer at the start of the interview. Observations have been weighted to adjust for the oversample of East German respondents. See *ALLBUS: German General Social Survey-Cumulation 1980-2012.*

Table 2. LS regressions of attractiveness on anthropometric measures.

	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Panel A.						
Weight	–0.042***	–0.009	–0.048***	–0.014	–0.044***	–0.013
	(0.009)	(0.008)	(0.013)	(0.011)	(0.013)	(0.011)
Height	0.053***	0.047***	0.073***	0.063***	0.066***	0.066***
	(0.017)	(0.014)	(0.020)	(0.021)	(0.020)	(0.021)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.10	0.05	0.41	0.30	0.43	0.30
Panel B.						
BMI	–0.117***	–0.032	–0.140***	–0.043	–0.128***	–0.042
	(0.027)	(0.024)	(0.036)	(0.036)	(0.035)	(0.035)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.09	0.03	0.41	0.26	0.42	0.27
Panel C.						
Obese	–1.15***	–0.793***	–1.42***	–0.843***	–1.34***	–0.828***
	(0.34)	(0.24)	(0.42)	(0.29)	(0.39)	(0.29)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.06	0.05	0.36	0.29	0.39	0.29
Observations	514	561	514	561	511	553
Clusters	215	211	215	211	213	211

Note: Baseline controls: age, West region dummy variable and 2012 year dummy variable. Additional controls: health dummy variable (1 if at least satisfactory, 0 otherwise), number of biological children and number of non-biological children. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3. LS regressions of attractiveness on anthropometric measures where attractiveness is assessed by *opposite*-sex interviewers.

	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Panel A.						
Weight	–0.044***	–0.025**	–0.053***	–0.032*	–0.049***	–0.037**
	(0.011)	(0.012)	(0.012)	(0.017)	(0.012)	(0.018)
Height	0.054***	0.084***	0.071***	0.096***	0.063***	0.107***
	(0.016)	(0.022)	(0.022)	(0.031)	(0.022)	(0.035)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.11	0.12	0.48	0.30	0.49	0.31
Panel B.						
BMI	–0.123***	–0.080**	–0.152***	–0.093*	–0.139***	–0.103*
	(0.033)	(0.039)	(0.035)	(0.055)	(0.035)	(0.053)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.10	0.08	0.47	0.25	0.49	0.25
Panel C.						
Obese	–1.12***	–1.25***	–1.38***	–1.45***	–1.32***	–1.48***
	(0.42)	(0.38)	(0.32)	(0.42)	(0.29)	(0.45)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.05	0.11	0.40	0.30	0.43	0.30
Observations	281	246	281	246	278	243
Clusters	130	85	130	85	128	85

Note: Baseline controls: age, West region dummy variable and 2012 year dummy variable. Additional controls: health dummy variable (1 if at least satisfactory, 0 otherwise), number of biological children and number of non-biological children. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4. LS regressions of attractiveness on anthropometric measures where attractiveness is assessed by *same*-sex interviewers.

	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Panel A.						
Weight	–0.039***	0.003	–0.042*	0.003	–0.038*	0.006
	(0.014)	(0.010)	(0.022)	(0.014)	(0.022)	(0.013)
Height	0.049*	0.021	0.067*	0.041	0.057	0.040
	(0.029)	(0.017)	(0.036)	(0.027)	(0.036)	(0.029)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.07	0.02	0.34	0.30	0.34	0.31
Panel B.						
BMI	–0.110***	0.008	–0.124**	–0.000	–0.111*	0.008
	(0.040)	(0.028)	(0.061)	(0.041)	(0.060)	(0.040)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.07	0.01	0.34	0.28	0.34	0.29
Panel C.						
Obese	–1.17**	–0.467	–1.44*	–0.313	–1.34*	–0.256
	(0.52)	(0.30)	(0.72)	(0.35)	(0.68)	(0.31)
Baseline controls?	YES	YES	YES	YES	YES	YES
Interviewer FE?	NO	NO	YES	YES	YES	YES
Additional controls?	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.05	0.02	0.32	0.29	0.34	0.29
Observations	233	315	233	315	233	310
Clusters	85	126	85	126	85	126

Note: Baseline controls: age, West region dummy variable and 2012 year dummy variable. Additional controls: health dummy variable (1 if at least satisfactory, 0 otherwise), number of biological children and number of non-biological children. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5. Respondents' mean characteristics by interviewer's sex.

Panel I. One-by-one estimation	Women			Men		
	Interviewer's sex			Interviewer's sex		
	Same	Opposite	*Difference*	Same	Opposite	*Difference*
Age	39.5	38.8	–0.7	39.8	39.0	–0.8
			(0.7)			(0.7)
Height	167.1	167.9	0.8	180.2	180.3	0.1
			(0.5)			(0.6)
Weight	68.1	67.1	–1.0	85.0	85.0	0.0
			(1.2)			(1.1)
BMI	24.4	23.8	–0.6	26.2	26.1	–0.1
			(0.4)			(0.3)
Obese	0.13	0.09	–0.04	0.15	0.13	–0.02
			(0.03)			(0.03)
Attractiveness	8.08	8.25	0.17	7.64	7.73	0.09
			(0.24)			(0.21)
West	0.81	0.82	0.01	0.78	0.83	0.05
			(0.05)			(0.06)
Year 2012	0.48	0.50	0.02	0.52	0.52	0.00
			(0.07)			(0.08)
Health status (at least satisfactory)	0.90	0.90	0.00	0.92	0.93	0.01
			(0.03)			(0.02)
Education (some college and above)	0.31	0.23	–0.08*	0.35	0.41	0.06
			(0.04)			(0.05)
Number of Biological Children	1.40	1.48	0.08	1.11	1.10	–0.01
			(0.12)			(0.10)
Number of Non-Biological Children	0.013	0.013	0.000	0.08	0.10	0.02
			(0.010)			(0.03)
Panel II. Simultaneous estimation						
Adjusted Wald Test			$F_{12,203} = 1.15$			$F_{12,199} = 0.58$
			p-value = 0.3200			p-value = 0.8541

Note: The means in Panel I are obtained from individual regressions of each of the variables in the column on an interviewer's sex indicator. *Difference* is the coefficient on the interviewer's sex indicator (the difference in means between respondents interviewed by opposite-sex interviewers and those interviewed by same-sex interviewers). Panel II contains the result of the Adjusted Wald Test (Ho: no mean differences in *any* of these characteristics) after simultaneous estimation of all the previous individual regressions and its associated p-value. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

Table 6. LS regressions of attractiveness on anthropometric measures after accounting for contextual variables.

	Attractiveness assessed by:					
	Interviewers of any sex		*Opposite*-sex interviewers		Same-sex interviewers	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Panel A.						
Weight	–0.040***	–0.011	–0.038***	–0.035*	–0.041*	0.008
	(0.013)	(0.012)	(0.014)	(0.019)	(0.023)	(0.012)
Height	0.065***	0.063***	0.071***	0.105***	0.069*	0.037
	(0.021)	(0.021)	(0.023)	(0.036)	(0.039)	(0.026)
F-test contextual variables	$F_{7,212} = 1.95$	$F_{7,210} = 7.02$	$F_{6,127} = 1.81$	$F_{6,84} = 1.47$	$F_{7,84} = 16.25$	$F_{7,125} = 4.29$
p-value	0.0635	0.0000	0.1020	0.1991	0.0000	0.0003
Adjusted R-squared	0.46	0.32	0.53	0.31	0.45	0.35
Panel B.						
BMI	–0.114***	–0.036	–0.114***	–0.099*	–0.111*	0.016
	(0.037)	(0.037)	(0.042)	(0.058)	(0.060)	(0.035)
F-test contextual variables	$F_{7,212} = 1.81$	$F_{7,210} = 2.57$	$F_{6,127} = 1.29$	$F_{6,84} = 2.55$	$F_{7,84} = 17.56$	$F_{7,125} = 2.17$
p-value	0.0858	0.0147	0.2674	0.0259	0.0000	0.0415
Adjusted R-squared	0.45	0.29	0.52	0.25	0.44	0.33
Panel C.						
Obese	–1.24***	–0.800**	–1.12***	–1.42***	–1.27*	–0.245
	(0.42)	(0.31)	(0.38)	(0.50)	(0.67)	(0.32)
F-test contextual variables	$F_{7,212} = 2.86$	$F_{7,210} = 2.28$	$F_{6,127} = 2.06$	$F_{6,84} = 2.78$	$F_{7,84} = 17.40$	$F_{7,125} = 2.05$
p-value	0.0071	0.0295	0.0625	0.0162	0.0000	0.0535
Adjusted R-squared	0.43	0.31	0.48	0.29	0.42	0.33
Observations	510	553	278	243	232	310
Clusters	213	211	128	85	85	126

Note: All regressions include age, a West region dummy variable, a 2012 year dummy variable, a health dummy variable (1 if at least satisfactory, 0 otherwise), the number of biological children, the number of non-biological children, and contextual variables are 7 dummy variables for the type of building where the respondent lives. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

Table 7. LS regressions of log hourly wage rate on attractiveness and anthropometric measures. Women.

	(1)	(2)	(3)	(4)	(5)
Panel A.					
Attractiveness Standardized	0.065*		0.051		0.060*
	(0.035)		(0.035)		(0.035)
Weight		–0.002	–0.001		
		(0.003)	(0.003)		
Height		0.012**	0.010*		
		(0.005)	(0.005)		
BMI				–0.006	–0.003
				(0.007)	(0.008)
Education	0.316***	0.330***	0.305***	0.341***	0.312***
	(0.065)	(0.061)	(0.066)	(0.060)	(0.065)
Observations	279	309	279	309	279
Clusters	138	163	138	163	138
Adjusted R-squared	0.16	0.18	0.17	0.17	0.16
Panel B.					
Attractiveness Standardized	0.056*		0.044		0.053
	(0.034)		(0.033)		(0.034)
Weight		–0.001	–0.000		
		(0.003)	(0.003)		
Height		0.011**	0.009*		
		(0.005)	(0.005)		
BMI				–0.004	–0.002
				(0.007)	(0.008)
Education	0.306***	0.326***	0.298***	0.335***	0.304***
	(0.067)	(0.063)	(0.068)	(0.061)	(0.067)
Observations	279	309	279	309	279
Clusters	138	163	138	163	138
Adjusted R-squared	0.16	0.18	0.17	0.17	0.16

Note: Attractiveness standardized is obtained by subtracting from an individual's attractiveness rating the average rating of the corresponding interviewer, and dividing this difference by the standard deviation of these ratings. Panel A includes baseline controls. Panel B includes baseline and additional controls. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

Table 8. LS regressions of log hourly wage rate on attractiveness and anthropometric measures. Men.

	(1)	(2)	(3)	(4)	(5)
Panel A.					
Attractiveness Standardized	0.097***		0.092***		0.096***
	(0.028)		(0.028)		(0.028)
Weight		–0.002	–0.002		
		(0.002)	(0.002)		
Height		0.009***	0.006*		
		(0.003)	(0.003)		
BMI				–0.009	–0.007
				(0.007)	(0.007)
Education	0.269***	0.288***	0.262***	0.293***	0.265***
	(0.054)	(0.051)	(0.054)	(0.051)	(0.054)
Observations	384	415	384	415	384
Clusters	156	185	156	185	156
Adjusted R-squared	0.20	0.19	0.20	0.19	0.20
Panel B.					
Attractiveness Standardized	0.101***		0.100***		0.101***
	(0.028)		(0.028)		(0.028)
Weight		–0.002	–0.001		
		(0.002)	(0.002)		
Height		0.009**	0.007*		
		(0.004)	(0.004)		
BMI				–0.008	–0.006
				(0.007)	(0.007)
Education	0.269***	0.287***	0.261***	0.293***	0.264***
	(0.056)	(0.053)	(0.055)	(0.053)	(0.055)
Observations	378	409	378	409	378
Clusters	156	185	156	185	156
Adjusted R-squared	0.20	0.20	0.21	0.20	0.21

Note: Attractiveness standardized is obtained by subtracting from an individual's attractiveness rating the average rating of the corresponding interviewer, and dividing this difference by the standard deviation of these ratings. Panel A includes baseline controls. Panel B includes baseline and additional controls. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

Table 9. LS regressions of spousal education on attractiveness and anthropometric measures. Women.

	(1)	(2)	(3)	(4)	(5)
Panel A.					
Attractiveness Standardized	0.044		0.011		0.018
	(0.031)		(0.035)		(0.033)
Weight		–0.007***	–0.007**		
		(0.003)	(0.003)		
Height		0.009	0.012*		
		(0.006)	(0.007)		
BMI				–0.019***	–0.021**
				(0.007)	(0.008)
Education	0.435***	0.412***	0.404***	0.417***	0.410***
	(0.065)	(0.065)	(0.068)	(0.063)	(0.065)
Observations	262	291	262	291	262
Clusters	130	156	130	156	130
Adjusted R-squared	0.15	0.17	0.17	0.17	0.17
Panel B.					
Attractiveness Standardized	0.038		0.010		0.016
	(0.033)		(0.036)		(0.035)
Weight		–0.006**	–0.007**		
		(0.003)	(0.003)		
Height		0.009	0.011		
		(0.006)	(0.007)		
BMI				–0.018**	–0.019**
				(0.007)	(0.008)
Education	0.437***	0.416***	0.412***	0.422***	0.418***
	(0.066)	(0.067)	(0.070)	(0.064)	(0.067)
Observations	261	289	261	289	261
Clusters	129	154	129	154	129
Adjusted R-squared	0.16	0.17	0.19	0.17	0.17

Note: Attractiveness standardized is obtained by subtracting from an individual's attractiveness rating the average rating of the corresponding interviewer, and dividing this difference by the standard deviation of these ratings. Panel A includes baseline controls. Panel B includes baseline and additional controls. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

Table 10. LS regressions of spousal education on attractiveness and anthropometric measures. Men.

	(1)	(2)	(3)	(4)	(5)
Panel A.					
Attractiveness Standardized	–0.025		–0.034		–0.031
	(0.028)		(0.028)		(0.028)
Weight		–0.004	–0.006**		
		(0.003)	(0.003)		
Height		0.010*	0.009*		
		(0.005)	(0.006)		
BMI				–0.013	–0.019**
				(0.008)	(0.008)
Education	0.251***	0.273***	0.249***	0.275***	0.250***
	(0.047)	(0.047)	(0.048)	(0.047)	(0.047)
Observations	230	251	230	251	230
Clusters	125	145	125	145	125
Adjusted R-squared	0.10	0.13	0.12	0.13	0.12
Panel B.					
Attractiveness Standardized	–0.036		–0.044		–0.042
	(0.030)		(0.030)		(0.030)
Weight		–0.003	–0.006**		
		(0.003)	(0.003)		
Height		0.008	0.007		
		(0.005)	(0.005)		
BMI				–0.011	–0.017**
				(0.008)	(0.008)
Education	0.270***	0.283***	0.264***	0.288***	0.266***
	(0.049)	(0.048)	(0.048)	(0.048)	(0.049)
Observations	226	247	226	247	226
Clusters	125	145	125	145	125
Adjusted R-squared	0.11	0.13	0.13	0.13	0.13

Note: Attractiveness standardized is obtained by subtracting from an individual's attractiveness rating the average rating of the corresponding interviewer, and dividing this difference by the standard deviation of these ratings. Panel A includes baseline controls. Panel B includes baseline and additional controls. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

Table 11. Do women and men face similar trade-offs? Simultaneous estimation of spousal education on attractiveness, BMI and education.

	Women	Men
Attractiveness Standardized	0.016	–0.042
	(0.034)	(0.029)
BMI	–0.019**	–0.017**
	(0.008)	(0.008)
Education	0.418***	0.266***
	(0.066)	(0.048)
Observations	487	
Clusters	165	
Ratio of coefficients		
BMI/Education	–0.046*	–0.064**
	(0.023)	(0.030)
Adjusted Wald Test	$F_{1,164} = 0.24$	
	p-value = 0.6223	

Note: Attractiveness standardized is obtained by subtracting from an individual's attractiveness rating the average rating of the corresponding interviewer, and dividing this difference by the standard deviation of these ratings. Regressions include: age, a West region dummy variable, a 2012 year dummy variable, a health dummy variable (1 if at least satisfactory, 0 otherwise), the number of biological children and the number of non-biological children. (Linearized) standard errors that take into account the survey design (clusters and weights) are reported in parentheses. Observations have been weighted to adjust for the oversample of East German respondents. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

APPENDIX

Table A1. LS regressions of log hourly wage rate on attractiveness and obesity.

	(1) Female	(2) Female	(3) Male	(4) Male
Panel A.				
Attractiveness Standardized		0.061		0.094***
		(0.037)		(0.028)
Obese	–0.076	–0.046	–0.136**	–0.109*
	(0.088)	(0.097)	(0.062)	(0.063)
Education	0.343***	0.313***	0.293***	0.264***
	(0.060)	(0.065)	(0.051)	(0.054)
Observations	309	279	415	384
Clusters	163	138	185	156
Adjusted R-squared	0.17	0.16	0.19	0.20
Panel B.				
Attractiveness Standardized		0.051		0.098***
		(0.035)		(0.027)
Obese	–0.071	–0.048	–0.143**	–0.117*
	(0.089)	(0.096)	(0.062)	(0.065)
Education	0.336***	0.303***	0.293***	0.263***
	(0.061)	(0.067)	(0.052)	(0.055)
Observations	309	279	409	378
Clusters	163	138	185	156
Adjusted R-squared	0.17	0.16	0.20	0.21

Note: Attractiveness standardized is obtained by subtracting from an individual's attractiveness rating the average rating of the corresponding interviewer, and dividing this difference by the standard deviation of these ratings. Panel A includes baseline controls. Panel B includes baseline and additional controls. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

Table A2. LS regressions of spousal education on attractiveness and obesity.

	(1) Female	(2) Female	(3) Male	(4) Male
Panel A.				
Attractiveness Standardized		0.031		–0.028
		(0.031)		(0.027)
Obese	–0.253***	–0.247**	–0.038	–0.102
	(0.089)	(0.100)	(0.079)	(0.069)
Education	0.429***	0.422***	0.278***	0.252***
	(0.060)	(0.064)	(0.048)	(0.048)
Observations	291	262	251	230
Clusters	156	130	145	125
Adjusted R-squared	0.17	0.17	0.12	0.10
Panel B.				
Attractiveness Standardized		0.027		–0.039
		(0.033)		(0.029)
Obese	–0.234**	–0.236**	–0.026	–0.093
	(0.093)	(0.102)	(0.080)	(0.070)
Education	0.431***	0.426***	0.291***	0.270***
	(0.062)	(0.065)	(0.049)	(0.049)
Observations	289	261	247	226
Clusters	154	129	145	125
Adjusted R-squared	0.17	0.17	0.12	0.11

Note: Attractiveness standardized is obtained by subtracting from an individual's attractiveness rating the average rating of the corresponding interviewer, and dividing this difference by the standard deviation of these ratings. Panel A includes baseline controls. Panel B includes baseline and additional controls. Observations have been weighted to adjust for the oversample of East German respondents. Standard errors clustered at the interviewer level are reported in parentheses. *** p-value < 0.01 , ** p-value < 0.05, * p-value < 0.1

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