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Are the Effects of Height on Well-being a Tall Tale?

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Are the effects of height on well-being a tall tale?

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Numerous papers have documented a positive association between height and good physical health and also with good economic outcomes such as earnings. A smaller number have argued for an association with well-being. In this paper, cross-country data from Europe is used to analyse whether individuals' height is associated with higher or lower levels of life-satisfaction. In simple models there is a positive but concave relationship between height and life satisfaction. However it is shown that the results are quite sensitive to the inclusion of controls reflecting demographics, human capital and health status. Where effects do exist, it is predominantly at low to medium levels of height. There is also evidence of heterogeneity across countries.

Keywords: height, stature, well-being, life satisfaction, health

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1. Introduction

There is a longstanding interest by economists in the height of humans particularly its effect on labour market outcomes such as earnings for example Persico *et al.* (2004), Case and Paxson (2008) or Rashad (2008). Economic historians are also interested in height since it can be used as a proxy for the standard of living given the influence that nutrition has, for example Steckel (1995). This is a particularly useful strategy when conventional measure of prosperity are limited or non-existent, see for example Scheidel (2010) who uses height data from skeletal remains to measure height as a proxy for well-being in ancient Rome.

One of the reasons why one might be interested in labour market effects is the view that ultimately height affects well-being and more recently a number of researchers have addressed this directly. Deaton and Arora (2009) uses a large US dataset, the Gallup-Healthways Well-being index. The outcome studied is the Cantril “self-anchoring striving scale” (Cantril (1965)) in which individuals identify where they are on a notional ladder with the top (11^{th}) rung corresponding to the “best possible life” and the bottom rung corresponding to the “worst possible life”. They find that height is indeed associated with a higher place in this index and, moreover that it is almost entirely due to the association between height and both earnings and education. Carrieri and De Paola (2012) study the relationship between height and subjective well-being in a large Italian sample. They consider both absolute height and height relative to a peer group. Interestingly, they find that the latter matters only for males and they conjecture, plausibly, that this is associated with an effect of self-esteem or social dominance on well-being. They also find that controls for human capital and health account for a large part of the positive effect of height on well-being. Sohn (2014) finds that education and earnings can explain much of the relationship between happiness and height

Alongside these papers there is a substantial medical and psychological literature investigating whether height predicts mental health. For example Stack and Wasserman (1996) found that shorter people were more likely to attempt suicide as do Magnusson *et al*. (2005) while Bjerkeset *et al.* (2008) find no association with either depression or suicidality. However, some of the studies in this area are primarily concerned with those who are abnormally short (particularly children) arising from conditions such as growth hormone deficiency and are less concerned with variation in the normal range, see Law (1987) for a review. The study by Rees, Sabia and Argys (2009) found in a sample of US adolescents the existence of a small height premium, in the form of fewer symptoms of depression. This was present only for older females (ages 17-19) but all males (ages 12-19). They find no effects on self-esteem. This paper has the merit of using longitudinal data which allows it control for fixed effects though this turns out not to be critical.

A very useful recent overview of the many possible pathways between height and both physical and mental health is provided by Batty *et al.* (2009). They note that there are both costs and benefits to height so while chronic heart disease is more common amongst short people certain cancers are actually less common. This suggests that one should be alert to possible non-linear relationships when looking at the effect on well-being since, conceivably, the effect of height, to the extent that it is a health effect, may be non-monotonic. Non-monotonic associations with regard to height have been found in some studies. For example Nettle (2002) looks at the reproductive success of a cohort of British males and finds that while tall men are more likely to have a long term partner and less likely to be childless than short men, extremely tall men have an excess of health problems and are more likely to be childless. An analogous pattern is found by Hübler (2009) who finds a non-monotonic height-earnings premium for males with short and very tall men earning less than those in between. Heineck (2008) finds a similar non-monotonic earnings-height relationship.

A fundamental question arises in this literature, namely, what is(are) the mechanism(s) behind these height effects? It is difficult to give a precise answer to this and most papers are suitably circumspect. Another way of putting this is to ask whether height is acting as a proxy for events that happen *before* height is determined (such as poor early life nutrition) or is it acting as a proxy for variables that are determined *after* height is determined (such as self-esteem, stigmatization or income) which directly affect the outcome? In principle, one could address this by directly controlling for these variables. In practice one is likely to be quite constrained in what is available so that limits the extent to which one can isolate the mechanism. There is also a clear asymmetry between these two possibilities. This paper and the two most closely related, Deaton and Arora (2009) and Carrieri and De Paola (2012), take the approach of noting the consequences of adding controls (such as education or income) which occur after height is determined. This tells one something about the mechanism if these controls reduce or eliminate the estimated effect of height (as indeed is the case). However it is uninformative about the possibility that height is a proxy for early life conditions. Better data, such as birth cohort studies, should be useful in this regard.

This paper adds to these findings on well-being. It uses a large representative sample from 12 European countries which is drawn from the population of over 50 year olds. It considers a measure of life satisfaction as the outcome since this is closest to the economists' concept of utility, see for example Easterlin (2003) who takes the view that "the terms happiness, utility, well-being, life satisfaction, and welfare to be interchangeable".

This paper does not consider measures of affect (such as depression) which, though interesting in its own right, should not generally be thought of as simply the converse of well-being.[1]

2. Data

The dataset used is SHARE: the Survey of Ageing, Health and Retirement in Europe. This collects data from nationally representative samples of the non-institutional population aged 50 years and older. The data is a random sample where the primary sampling unit is a household and all individuals in the household who are in the target age category are interviewed. This paper used release 2 of wave 1 of the dataset which includes 12 countries which was collected between 2004 and 2006. See Boersch-Supan & Juerges (2005) for details of the methodology behind the dataset. The countries are Austria, Belgium, Denmark, France, Germany, Greece, Italy, Netherlands, Spain, Sweden and Switzerland.

The outcome studied in the paper is a question on life satisfaction and is based on responses to the question "How satisfied are you with your life in general?" and is coded from 0 (lowest) to 3 (highest).

[1] A much earlier version of this paper, Denny (2010) considered depression as an additional outcome.

The marginal distribution for this variable for the sample used in the data analysis is shown in Figure 1. The independent variable of interest is the person's self-reported height measured in centimetres. Kernel density estimates for the distribution of height for males and females are shown in Figure 2. There is evidence of bimodality for both sexes which may reflect "digital preference" with large numbers reporting values at particular values of height relative to adjacent values.

All models contain a set of country dummy variables (not shown in the tables) and a dummy variable for being female. Controls are classified into three groups, demographics, human capital and health. Demographic controls consist of age (in years) and a set of dummies for marital status. Since the age range in the sample is small higher powers of the age variable are not statistically significant. Human capital controls consists of annual income (in €/10000), years of education and a measure of verbal fluency. Income is self-reported and is the sum of all income from employment, pensions and other sources. It refers to the individual. The majority (88%) of those reporting no income are female. Adding a control for income of others in the household, while it has a direct effect on the outcome, has no consequences for the parameters of interest.

The verbal fluency is a test whereby the individuals had one minute to name as many animal species as possible. Since a considerable proportion of the sample is reported to have zero income, a dummy for zero income is included. The health controls consists of the number of chronic diseases ever experienced, a measure of grip strength (using a dynamometer), and two measures of their physical infirmity. One is whether they report limitations of their activities by the IADL criterion (instrumental activities of daily living). Respondents were asked about seven activities and a variable coded one if they report limitations with one or more of these is used. The second measure, labelled "GALI", is a binary variable indicating whether they have felt limited in their daily activities based on the question "For the past six months at least, to what extent have you been limited because of a health problem in activities people usually do?" Although IADL and GALI appear to be directed at the same phenomenon, empirically they have independent effects. Using either of them, without the other, has no significant effect on the parameters of interest. Controls for weight/obesity are not included in the main analysis here because of their potential endogeneity, this is addressed separately in section 3.2 below.

Missing values (i.e. item non-response) are treated by case-wise deletion. This is likely to be a relatively small problem since SHARE imputed missing values for many key demographic and economic variables, see Christelis (2008, 2011). Descriptive statistics for the sample used are in Table 1 including the correlation between the variable of interest, height, and all the other variables in the models. Estimation takes account of the complex survey design using the supplied probability weights. The primary sampling units are households and countries are treated as strata. The weights were calibrated to take account of non-response by individuals. All estimation uses Stata, version 12.

3. Results

Since the outcome is ordered, the models are estimated by ordered probit. Ordered logit gives rise to essentially the same results. I start with the most general model. For the j'th observation:

$$\Pr(\boldsymbol{outcome}_j = \boldsymbol{i}) = \Pr\left(\boldsymbol{\kappa}_{i-1} < \boldsymbol{\alpha}_1 \boldsymbol{height}_j + \boldsymbol{\alpha}_2 \frac{\boldsymbol{height}_j^2}{100} + \boldsymbol{\beta X}_j + \boldsymbol{u}_j \leq \boldsymbol{\kappa}_i\right)$$

Where i= 1…4, u_j is assumed to be distributed normally. The estimated cut-off points are not reported here. X_j is a vector of controls. Subsequent models eliminate sets of variables from X_j. The model is estimated by Maximum Likelihood using standard methods. I report Wald tests for the joint significance of α_1 and α_2. Average marginal effects for most models are shown: these show the effect of a change in height of one centimetre on the probability of each outcome occurring, taking into account the quadratic specification. Standard errors are calculated using the delta method.

3.1 Ordered probit models of life satisfaction

A general model of life satisfaction is presented first. Then a series of special cases, deleting distinct sets of variables, is presented to examine the robustness of the parameters of interest. This is important as it is not clear what the mechanism through which height affects well-being is. In all cases height is entered as a quadratic function to allow for possible non-linearity. Adding a cubic term does not change the results.

The main results are shown in Table 2. For the three models (columns 1 to 3) that contain the health or human capital indicators the two height variables are not jointly statistically significant at the 5% level. However excluding both sets (columns 4 and 5) ensures that the height variables are statistically significant- this result is consistent with Deaton and Arora (2009) in the sense that they find that the positive effect of height on their well-being measure was largely mediated by income. Probably the most noticeable change occurs when the health variables are added (compare columns 3 and 4). Of these four variables, grip strength has the highest correlation with height (0.6325) and it is the addition of this that is largely driving this change in the statistical significance of height. Grip strength is not likely to be included in many datasets since measurement requires equipment and typically another person to do the measuring (it can be self-measured but in this case it was the interviewer). The results here therefore provide a cautionary note about the consequences of using data without a rich set of heath controls especially variables known to have a strong correlation with height. Although one cannot tell from this data, one can conjecture that the correlation with grip is smaller with a younger population so its omission there may be less important. This result, along with previous studies, helps clarify why other researchers may sometimes observe a positive height/well-being association. One other result that is worth noting is that the commonly observed higher level of well-being amongst women (e.g. Zweig 2014) is not robust, as shown in columns 4 and 5. See also Table 6 for further evidence on this.

Kahneman and Deaton (2010) who also use the Gallup-Healthways data find that income has a highly non-linear effect on the Cantril scale described in section 1. For this reason I experimented with non-linear functions of income for this outcome but found no evidence that it mattered. However this may be a reflection of how income is measured in the SHARE data. I also used the level of income of other household members and, again, it had no significant effect on the size of the height parameters or their statistical significance.

Estimates of average marginal effects for the ordered choice models are shown in Table 2b. The coefficients give the effect on the probability of each of the four outcomes occurring due to a unit (1cm) change in height. These changes sum to zero. Most of these marginal effects are not statistically significant and where they are, it would require a large difference in height to generate an appreciable change in the probability of one of the outcomes. The largest marginal effects are in the most parsimonious specification (model 5). In that case a one standard deviation increase in height is associated with around a 2% (=.0023622 x 8.969) higher probability of an individual being very satisfied with their life. However once a reasonable set of controls is introduced, it is clear that the effects are small and not well determined.

Given the quadratic relationship and the ordered outcome, it is useful to plot the average marginal effects across the range of height for a given model. This is shown in Figure 3 using the results from the most parsimonious model, column 5 in Table 2a. There is one graph for each of the four possible categories and the sum of the value of the curves (for any given height) across all four will equal zero. In general these marginal effects are larger in magnitude and significantly different from zero at low to medium heights. Since the marginal effect of height increases with height for the first three categories, it necessarily decreases for the last ("very satisfied") category. Hence one can infer that height is most likely to be important, if it is important, if an individual is short.

3.2 Alternative models

The analysis so far has not included individuals' weight as a control. The economics literature on height is somewhat divided on this. Some papers include it, such as Sargent and Blanchflower (1994) and Rees, Sabia and Argys (2009) whereas Case and Paxson (2008), Deaton and Arora (2009) do not for example. The argument in favour of inclusion is simple: people's well-being (or earnings for that matter) may be influenced by their weight and height is likely to be correlated with weight and is correlated with Body Mass Index (BMI) by construction. Numerous papers show that obesity and affective disorders such as depression are co-morbid but establishing causation is much more difficult, for example Stunkard, Faith and Allison (2003) and Onyike *et al.* (2003).

Clearly omitting BMI could generate a spurious association between the outcome considered here and height. There is an important distinction between height and weight however, namely that while one might think of height as exogenous, it seems very plausible that weight is not. Individual's activity levels and eating behaviour may be affected by their mood for example. If so, and in the absence of some adequate control for endogeneity, not only will the parameters associated with weight be biased but so too will the parameters on other variables (contamination bias). The issue becomes even more complicated if one allows for height to be endogenous as Schultz (2002) has argued in a developing country context.

For this reason, BMI has not been included in Table 2. Nonetheless it is worth briefly examining what the consequences are of its inclusion. The general model for both, i.e. with all the controls, is re-estimated with BMI and its square (in column 1) and with dummy variables for individuals being under-weight, over-weight and obese using the standard World Health Organisation BMI thresholds (in column 2).[2]

The results are presented in Table 3. Only the coefficients for height, the BMI variables and sex are shown. The addition of BMI controls makes very little difference to the effects of height. So while the coefficients may be of interest in their own right, their inclusion or otherwise appears to have negligible consequences for the estimated effect of height – to this author's surprise. A satisfactory treatment of the joint effects of height and weight on

[2] Under-weight: <18.5; 18.5 ≤ Normal ≥ 18.5 & <25; Over-weight: ≥ 25 & <30 ; Obese ≥30.

well-being requires one to have some way of isolating exogenous variation in people's weight although it is not clear what this might be. Instrumental variable approaches could address this issue if one can identify credible instruments. Parental BMI, if available, might satisfy the requirements of a valid instrumental variable. Randomized control trials of weight loss interventions might also be useful in this regard although these are likely to involve only those with high BMI levels so the results might not generalize to the wider population.

The models estimated so far are pooled over ten countries. It is possible that there is heterogeneity between these countries. So I estimate the most general model and the most parsimonious model (i.e. the specifications in Columns 1, 5 in Table 2 respectively) for each country separately. Table 4 reports the p values of an F test for the joint significance of the height variables for both specifications for each country. There is clear evidence of heterogeneity across country. Even in the parsimonious models, height is not statistically significant in many of the countries: only 3 at the 5% level, Spain, France and Greece.

In the general model, the height variables are jointly statistically significant only in France, even at the 10% level (p=.0218). Table 5a reports the coefficients for the height variables only in these models while Table 5b reports the marginal effects arising from these two models. The marginal effects are somewhat higher for France than in the pooled model (compare column 1 in Table 5a and 2a respectively for example) although still not large. Why there are cross country differences is unclear but it suggests the importance of cultural over biological influences.

The models so far have not included labour market status since this is potentially endogenous. In Table 6, I report the results from re-estimating the most general and most parsimonious models from Table 2 with the addition of controls for labour market status: the omitted category is being retired. Parameter estimates for most of the controls are not shown but are available on request. While labour market status has a well determined effect on the outcome, it can be seen that it does not fundamentally change the inferences one would draw on the basis of Table 2.

A number of other specifications were estimated and are not reported here: the most general model was estimated separately for men and women. A model with height entering as a cubic function was also tried. Neither of these changed the fundamental result that the height variables were not jointly significant in the general model and are jointly significant in the more parsimonious model. Income of other household members was also included. While it has a direct positive effect on the outcome, as one would expect, it has no effect at all on the results of interest.

4. Conclusions

The results suggest that the estimated effect of height on people's well-being is heavily dependent on whether one controls for their health and, to a lesser extent, their human capital. Other studies, discussed above, show how the relationship between well-being and height is via the relationship with education and earnings. In parsimonious models, the relationship with height is concave with the beneficial effect of additional height diminishing at the margin. Not all datasets that might be used to investigate this topic may have as detailed information as in the present study so the results here provide a useful check for any other studies based on more limited data i.e. with poorer controls for health and human capital.

The dataset is drawn from ten European countries. Estimating models for each country separately, there is evidence of heterogeneity across countries. In particular, the effects of height remain even in a quite general model only in France. One difference between this paper and several others discussed above is that it samples a relatively old population. Part of the effect of height may, as Carrieri and De Paola (2012) note, be due to it generating higher self-esteem or social dominance. It seems plausible that this is less important for older people who have probably got accustomed to their height, whatever it is.

Although the data is a random sample, it is conceivable that there is a sample selection bias introduced by differential mortality associated with height. That is, if shorter people are more likely to die (for example because of the possible suicide effects discussed in the introduction) then those remaining in the sample may have different unobservables (on average) and those may be correlated with height - hence biasing the estimates associated with height. While this is possible, the magnitude of the reported mortality effects are generally small and, arguably, unlikely to be important.

There are several issues which future research should consider. One is the use of alternative measures of subjective-being. The rapidly developing literature on happiness and positive psychology has refined and developed these measures. The four category measure of life satisfaction used here (and in which almost everyone falls into two categories, see Figure 1), while useful, may not be as discriminating as one would like. It would also be interesting to distinguish between immediate "happiness" and more long term "satisfaction". A second avenue of research is the investigation of peer effects i.e. whether it is relative height that matters. The challenge here is being able to identify in the data a suitable reference group i.e. one that is sufficiently proximate to the individual (in whatever dimensions). Inevitably one will have to make some arbitrary assumption (e.g. that people of a particular age in the same community are one's peer group). A third line of research that could be very fruitful is the use of longitudinal data. This would allow one to see how the effect of height varies over the life course. One can conjecture that height effects diminish over time. With birth cohort data, one might also have good measures of early life conditions. Since height is also affected by early life conditions one could tease out in more detail what height is picking up, if anything. A fourth line of research is the question of people's weight, touched on briefly in this paper. The research literature on the effects of height and weight at times appear to proceed independently yet they are clearly related and should ultimately be integrated. Doubtless there are other possibilities as we are still at an early stage in understanding why tall people are, on average, happier with their lives.

Height is an easily measured variable, one that is of popular interest, and that has been shown to have important associations with many biological outcomes. But it is important not to over-state its significance.

Acknowledgement:

The countries in SHARE for the wave used here are Austria, Belgium, Denmark, France, Germany, Greece, Italy, Netherlands, Spain, Sweden and Switzerland. This paper uses data from wave 1 release 2.3.0.

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Figure 1: Frequency distribution of life satisfaction

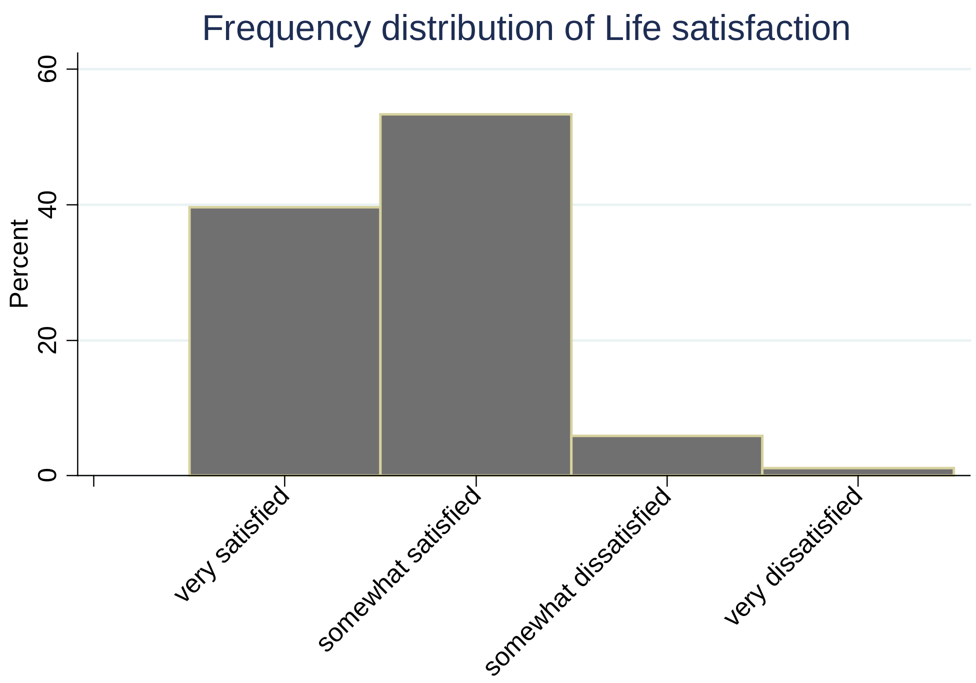


Figure 2: Density of height variable for males and females

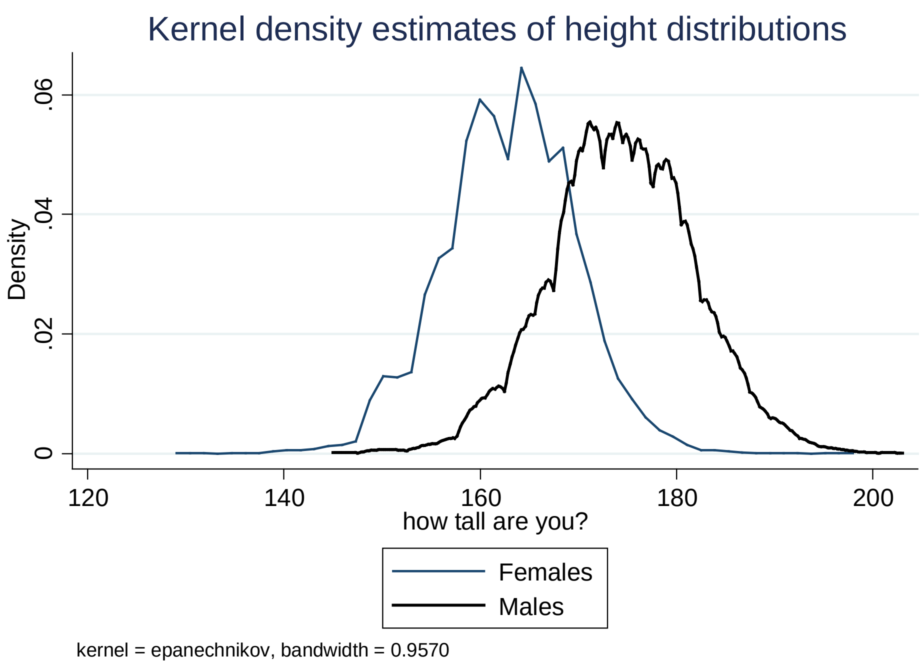


Table 1: Descriptive statistics

	Mean	Std deviation	Correlation with height
Height	168.200	8.969	
Satisfaction *	2.315	.6335	0.0993
Woman *	.546	.498	-0.6349
Income (€/10000)	2.141	3.136	0.2190
No income *	.133	.3406	-0.1900
Education (years)	10.370	4.326	0.2919
Verbal ability	19.387	7.211	0.2021
Chronic illnesses	1.443	1.370	-0.1399
Grip strength	.054	.997	0.6325
GALI	.385	.487	-0.0908
IADL	.128	.335	-0.1430
Divorced/separated *	.072	.259	-0.0082
Never married *	.052	.223	-0.0019
Widowed *	.130	.336	-0.1959
Age	63.409	10.031	-0.1380

N=16,698

Variables marked with a * are not continuous

Table 2a: Ordered probit models of life satisfaction

	(1)	(2)	(3)	(4)	(5)
Height	0.0571	0.0768	0.0583	0.0791*	0.0952*
	(1.42)	(1.90)	(1.45)	(1.98)	(2.39)
$Height^2/100$	-0.0170	-0.0221	-0.0166	-0.0217	-0.0263*
	(1.41)	(1.84)	(1.39)	(1.82)	(2.21)
Woman	0.136**	0.0336	0.132**	0.0176	-0.0264
	(3.13)	(0.96)	(3.16)	(0.53)	(0.82)
Income	0.0125*	0.0146**			
	(2.55)	(2.96)			
No income	-0.0244	-0.00714			
	(0.56)	(0.17)			
Education	0.0216***	0.0284***			
	(5.80)	(7.75)			
Verbal ability	0.0109***	0.0139***			
	(4.82)	(6.29)			
Chronic diseases	-0.0777***		-0.0786***		
	(7.27)		(7.38)		
Grip strength	0.0662**		0.0762***		
	(3.00)		(3.47)		
GALI	-0.285***		-0.308***		
	(9.52)		(10.25)		
IADL	-0.288***		-0.319***		
	(6.68)		(7.42)		
Age	0.0160***	0.00613***	0.0131***	0.00116	
	(9.15)	(3.80)	(7.69)	(0.76)	
Divorced/ Separated	-0.399***	-0.409***	-0.378***	-0.385***	
	(6.94)	(7.20)	(6.57)	(6.76)	

Never married	-0.328***	-0.326***	-0.325***	-0.327***	
	(5.66)	(5.75)	(5.53)	(5.64)	
Widowed	-0.262***	-0.277***	-0.265***	-0.289***	
	(6.11)	(6.49)	(6.32)	(6.92)	
p	.3664	.0688	.1620	.0011	.0002

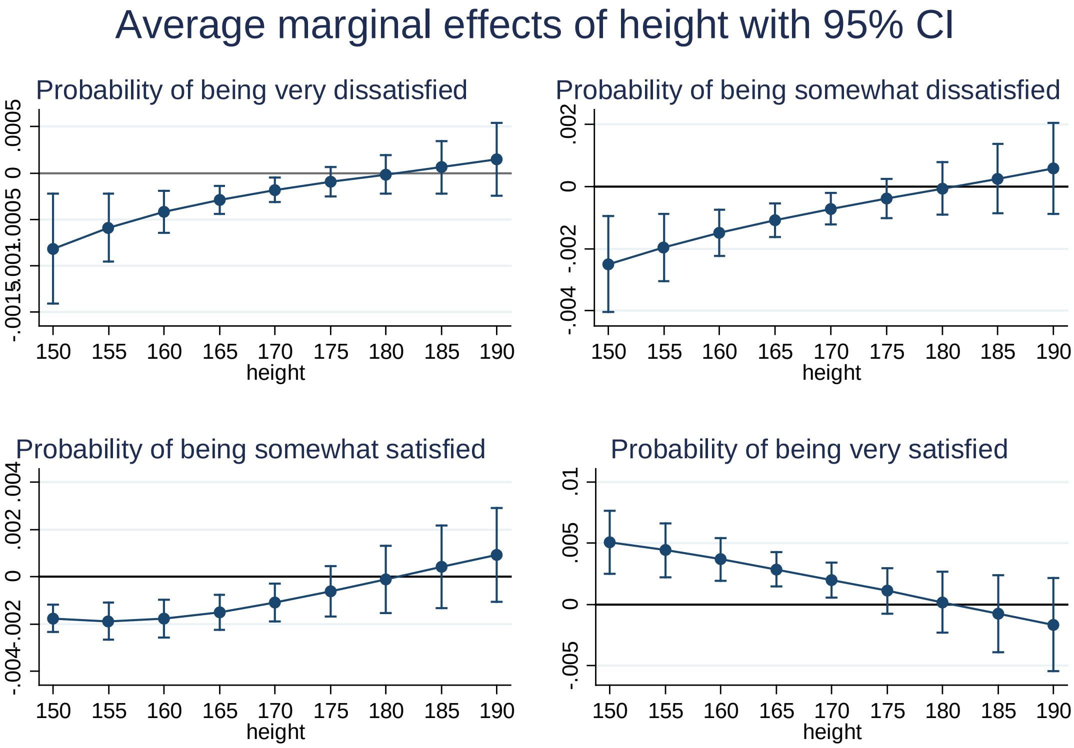
N=16,698. Absolute *t* statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The p value reported in the last row is for an F test for the joint significance of the two height variables. A full set of country dummies are also included in each model.

Table 2b: Average marginal effect of 1cm increase in height

outcome	(1)	(2)	(3)	(4)	(5)
Very dissatisfied	-.0000312	-.000128	-.0001131	-.0002557	-.0002835
	(0.43)	(1.69)	(1.53)	(3.23)	(3.54)
Somewhat dissatisfied	-.0000727	-.0004225	-.0003788	-.0008903	-.0009821
	(0.28)	(1.59)	(1.45)	(3.35)	(3.66)
Somewhat Satisfied	.0000512	-.0003792	-.0003754	-.0010211	-.0010966
	(0.14)	(1.08)	(1.06)	(2.92)	(3.15)
Very satisfied	.0000512	.0009297	.0008673	.0021672	.0023622
	(0.08)	(1.37)	(1.28)	(3.20)	(3.48)

Absolute t ratios in parentheses. Coefficients show the effect of an increase in height of 1 cm on the probability of each of the four outcomes occurring. Note that .002 corresponds to 0.2 of one percentage point.

Figure 3: Average marginal effects from parsimonious model



From results in column5. Height in cm

Table 3: including BMI in general model: selected parameters

	(1) Quadratic in BMI	(2) BMI categories
Height	0.0557	0.0562
	(1.37)	(1.39)
$Height^2/100$	-0.0166	-0.0167
	(1.37)	(1.39)
Under-weight		-0.0731
		(0.56)
Over-weight		0.0706*
		(2.35)
Obese		-0.0251
		(0.66)
BMI	0.0361	
	(1.60)	
$BMI^2/100$	-0.0673	
	(1.75)	
Woman	0.1434***	0.1461***
	(3.28)	(3.35)
Height variables p value	.3903	.3826
BMI variables p value	.1486	.0248

N=16,596. Absolute *t* statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Each model contains the full set of covariates in column 1 of Tables 2: results available on request.

Table 4: Country specific models

	General model	Parsimonious model
Austria	0.4162	0.1361
Germany	0.9692	0.4976
Sweden	0.1914	0.0658
Netherlands	0.8876	0.4740
Spain	0.3920	0.0308
Italy	0.6403	0.1372
France	0.0218	0.0154
Denmark	0.8732	0.1105
Greece	0.1496	0.0001
Switzerland	0.6131	0.7975
Belgium	0.7861	0.3101

The table reports the p-values from an F test for the joint significance of the two height variables for the most and least general specifications (i.e. columns 1 and 5 respectively in Table 2) for each country separately.

Table 5a: Coefficients on height variables in models for France

	(1) General model	(2) Parsimonious model
height	0.3786	0.3936
	(2.70)	(2.89)
$Height^2/100$	-0.1155	-0.1185
	(2.72)	(2.88)

Absolute t ratios in parentheses.

Table 5b: Average marginal effect of 1cm increase in height for France

outcome	(1) General model	(2) Parsimonious model
Very dissatisfied	0.00007	-0.00010
	(0.28)	(0.35)
Somewhat dissatisfied	0.00056 (0.58)	-0.00020 (0.20
Somewhat Satisfied	0.00074 (2.26)	0.00044 (1.54)
Very satisfied	-0.00137	-0.00013
	(0.97)	(0.09)

Absolute t ratios in parentheses. Coefficients show the effect of an increase in height of 1 cm on the probability of each of the four outcomes occurring for the most general and most parsimonious models. Note that .002 corresponds to 0.2 of one percentage point.

Table 6: Including labour market status: selected parameters

	(1) General model	(2) Parsimonious model
Height	0.0563	0.0983*
	(1.39)	(2.45)
$Height^2/100$	-0.0168	-0.0275*
	(1.39)	(2.30)
Employed	0.0353	0.1169***
	(0.83)	(3.60)
Unemployed	-0.5441***	-0.5934***
	(6.44)	(7.19)
Sick/disabled	-0.2485**	-0.6348***
	(2.89)	(7.63)
Home-maker	-0.0087	-0.0134
	(0.17)	(0.33)
Other	-0.3322	-0.3365
	(1.23)	(1.17)
Woman	0.1096*	-0.0344
	(2.51)	(0.98)
Height variables p value	.3829	.0008
Labour market status p value	.0000	.0000

N=16,697. Absolute *t* statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
The omitted labour market category is Retired. The other controls in columns 1 and 2 are as in table 2, columns 1 and 5 respectively.

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