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Kevin Denny, University College Dublin

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Height and well-being amongst older Europeans

Kevin Denny[•]

School of Economics
University College Dublin
Ireland

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This paper uses a cross-country representative sample of Europeans over the age of 50 to analyse whether individuals' height is associated with higher or lower levels of well-being. Two outcomes are used: a measure of depression symptoms reported by individuals and a categorical measure of life satisfaction. It is shown that there is a concave relationship between height and symptoms of depression. These results are sensitive to the inclusion of several sets of controls reflecting demographics, human capital and health status. While parsimonious models suggest that height is protective against depression, the addition of controls, particularly related to health, suggests the reverse effect: tall people are predicted to have slightly more symptoms of depression. Height has no significant association with life satisfaction in models with controls for health and human capital.

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

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[•] Kevin.denny@ucd.ie Address: School of Economics, University College Dublin, Dublin 4, Ireland (visiting Economics Department, University of Kentucky 2010). The author is also affiliated to the UCD Geary Institute and the Institute for Fiscal Studies, London.

1. Introduction

The relationship between height and labour market outcomes such as earnings has been extensively studied by economists particularly since the publication of Persico *et al* (2004). Understanding the cause of the premium has proved less straightforward. Case and Paxson (2008) attribute it to the association between height and cognitive ability. The idea is that low height is a marker for under-development generally reflecting, perhaps, early deprivation. Cognitive under-development, the argument goes, is one aspect of this under-development. There has been much less analysis of whether height is associated with well-being generally. The two issues are clearly related since one would expect a height earnings premium to translate into higher levels of well-being. Indeed cognitive ability could have a direct positive independent of any effect via earnings. Lundborg *et al* (2009) by contrast present evidence that the premium is primarily due to the association between height and a person's physical capacity. It is worth remembering, as Batty et al (2009) point out, that while early life conditions (particularly *in extremis*) may well influence height, there is also a very strong hereditary component.

Amongst health researchers, a number of studies have analysed whether height predicts mental health. For example Stack & Wasserman (1996) found that shorter people were more likely to attempt suicide while Bjerkeset *et al* (2008) who find no association with either depression or suicidality. However, some of these 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.

A very useful recent overview of the 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-linearities 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 earnings less than those in between. Heineck (2008) finds a similar non-monotonic earnings-height relationship.

There have been several recent contributions to the economics literature on the subject of height and well-being. The paper by Deaton & 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. 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.

This paper adds to these findings and differs from them in several key respects. It uses a large representative sample from 12 European countries which is drawn from the population of over 50 year olds. It considers as outcomes both a measure of life satisfaction and a measure of depression symptoms. It also allows for the relationship with height to be non-linear.

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 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 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.

Euro-D is a 12 item scale developed by the EURODEP Consortium (Prince *et al* 1999, Copeland 1999). It is primarily based on three parent instruments: the Geriatric Mental State-AGECAT (Copeland, Dewey, & Griffith-Jones, 1986), SHORT-CARE (Gurland, Golden, Teresi, & Challop, 1984), and CES-D (Radloff, 1977). The latter instrument is used in the Rees, Sabia and Argys (2009) paper discussed above. The Euro-D scale was created to provide a simple measure of the extent of depressive symptoms that could be used for comparing across European countries. The questions refer to the presence of these symptoms in the last month. Values of the scale equal to three or higher are taken as a "depression case" that is indicating that such an individual is *at risk of depression*. Hence the scale cannot be used to indicate whether an individual is clinically depressed or not but for convenience, it will be sometimes referred to here as "depression". For other analyses of the depression data in SHARE see Castro-Costa *et al* (2007) and Denny (2009). The question on satisfaction 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).

The marginal distributions for these two variables for the sample used in the data analysis are shown in Figures 1 and 2 respectively. The joint distribution of the two outcomes is given in Table 1b (where the Euro-D scale has been simplified for convenience). There is a clear association between the two (the null of independence is comfortably rejected, p=.0000). Nonetheless there are individuals with relatively high depression scores who report being very satisfied with their life. Since the two refer to different periods this is by no means inconsistent but it serves to remind one that one should not assume that findings for one outcome will be repeated for the other. 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 3. There is evidence of bimodality for both sexes which seems to reflect "digital preference" with large numbers reporting values at 160,165,168 and 170 cm 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. Human capital controls consists of income (in €/10000), years of education and a measure of verbal ability. 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, 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?"

Missing values are treated by case-wise deletion. Descriptive statistics for the sample used are in Table 1a. 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. All estimation uses Stata, version 11.

3. Results

The depression variable is modelling by estimating a linear (OLS) model. Since the dependent variable is, in one sense, discrete one could also use limited dependent variable models. As there are a large number of zeros, for example, it could be argued that a Tobit model should be used. However, aside from having to make a strong distributional assumption, it is unclear that the usual latent variable assumption makes sense in this context. An alternative would be to use an ordered choice model or to think of the variable as a "count" variable. In general using these other estimators leads to essentially the same conclusions as OLS. For the life satisfaction variable, ordered probit is used to estimate the models.

For each outcome a general model is presented. 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.

Before considering the estimated models it is worthwhile visually inspecting the data to see what relationship one might expect to find. Figure 4 presents the results of a simple semi-parametric model of depression as a function of height, adjusting linearly for sex and country dummy variables. This uses the scatterplot smoother of Royston & Cox (2005) which adjusts linearly for covariates using a backfitting algorithm that is guaranteed to converge, see Brieman & Freidman(1985). This model does not take account of the survey design but nonetheless it should give some idea of the underlying relationship.

The graph clearly slopes down but at a diminishing rate. The 95% confidence bands are very narrow in general. However they are wider at the tails, as is quite common, reflecting the lower density of observations there. It is noteworthy, that the predicted values are below 3, the cut-off that defines a depression case, except for heights less than about 145cm. This does not take into account that differences between the sexes.

3.1 Regression models of the Euro-D depression scale

The results of estimating the linear models of depression are shown in Table 2a. The results of an F test for the joint significance of the two height variables are included at the end of the table. Estimates of the slope of the function with respect to height evaluated at quartiles of the height distribution are shown in Table 2b. The most general model is shown in column 1. The coefficients on the height variable indicate a concave relationship. For this model, the positive term dominates such that the slope is positive for most of the distribution (i.e. higher depression scores are associated with greater height) a result that is generally not consistent with much of the existing literature. The second model removes the health variables and this is sufficient to generate a negative slope at low heights. There is, of course, no statistical basis for removing these variables and this suggests one possible reason for the common finding of a negative slope is the failure to condition adequately for health. The third model removes the human capital variables (from model 1) and this too has the effect of making the slope smaller though not by as much as removing the health variables do.

Removing both sets (model 4) generates results very close to those of model 2 which suggest that it is the omission of the health variables that is more important. The last model additionally removes the demographic variables (marital status and age). This is the specification closest to the used in Figure 4 and, not surprisingly, provides the strongest evidence of a generally negative relationship between height and depression. If the same five models are estimated, but without the quadratic term in height, the coefficient on height is almost identical to the estimated slope at the median shown in Table 2b.

So the evidence shows a clear concave relationship between depression and height. However the results are sensitive to the inclusion of covariates and at what values of height one evaluates the slope. However once includes sufficient controls, particularly for health conditions, there is evidence that greater height is associated with worse mental health, if anything. This finding is unusual if not unique. To gain an understanding of the magnitude of the effects one can compare the slopes with the coefficients on the other variables. Deaton & Arora (2009) use the coefficient on income in their model to estimate a monetary equivalent of the height premium. In these models, income is not statistically significant. Using the slope at the median for model 1, one can see that the increase in the depression score associated with an additional 3cm in height is less that the reduction that arises from one additional year of education (3 x .009 < .0315) which is, in turn a small fraction of the coefficient on the female variable (.353). A one standard deviation change in height (8.969) would account for a change equal to the depression scale of .0807 using the same slope estimate. A one standard deviation change in the grip strength variable has about three times the effect.

The safest conclusion one can draw from Tables 2a and 2b is that, while in all models the height variables are jointly and individually statistically significant, variations in height of the order of a few centimetres have an almost negligible effect on the depression variable for most individuals and is unlikely to be of any clinical significance. In short, short people appear to have nothing to worry about (conditional on the other variables). Tall people are at a marginally elevated risk of being depressed.

3.2 Ordered probit models of life satisfaction

The previous analysis was concerned with a mental health problem which, fortunately, most people do not experience though clearly it can be debilitating for those who do. It is also useful to look at a more “normal” outcome such as life satisfaction. This is probably closer to the economists’ concept of utility than a measure of depression, see for example Easterlin (2003) who takes “the terms happiness, utility, well-being, life satisfaction, and welfare to be interchangeable”. *A priori* it is far from clear whether one would expect a greater effect of height on life satisfaction than on symptoms of depression. However, once one conditions for income which is known to be related to height and is believed by most economists to influence well-being, it seems possible that there may be little or no additional effects from height.

The ordered probit models of life satisfaction are shown in Table 3. Since higher values correspond to greater levels of satisfaction, one might expect the coefficients to be the opposite sign (if anything) to those of table 2a. For the two height terms this is indeed the case. 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 & Arora (2009) in the sense that they find that the positive effect of height on their well-being measure was largely mediated by income. Note that unlike the results in Table 2a, income is statistically significant. 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. Given that there is no reason for not including these two sets of controls, the appropriate inference is that height has no direct effect on life satisfaction.

Estimates of average marginal effects for the ordered choice models are shown in Table 3b. 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 has a reasonable set of controls, it is clear that the effects are small and not well determined.

Note that these are average marginal effects: one could also evaluate them at different points in the distribution of height (say) as in Table 2b.

4. Conclusions

The results for both outcomes studied here suggest that the effect of height on people's well-being is dependent on whether one controls for their health and, to a lesser extent, their human capital. For both outcomes, the relationship with height is concave with the beneficial effect of additional height diminishing at the margin, becoming detrimental at certain values. A key difference between the two outcomes is that the statistical significance of height in the depression model is robust to the inclusion of health and other controls; this is not the case for the model of life satisfaction.

In the case of depression symptoms, in a fairly general model the detrimental effect of greater height holds for most of the distribution of height although it is small in magnitude such that it would require large differences in height to have any appreciable effect on people's well-being. Where there is a negative effect of height on depression symptoms it is at lower heights. The finding that taller people are actually at greater risk of mental ill-health is rare although some somatic conditions are known to be more common amongst taller people. However these results are analogous to several papers on the earnings/height premium that find significant non-monotonic relationships with the tallest being disadvantaged.

For life satisfaction, which may be regarded as being conceptually close to economists' concept of utility, height appears to be largely unimportant. Effects are small in magnitude and not well determined except in relatively parsimonious models.

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

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Figure 1

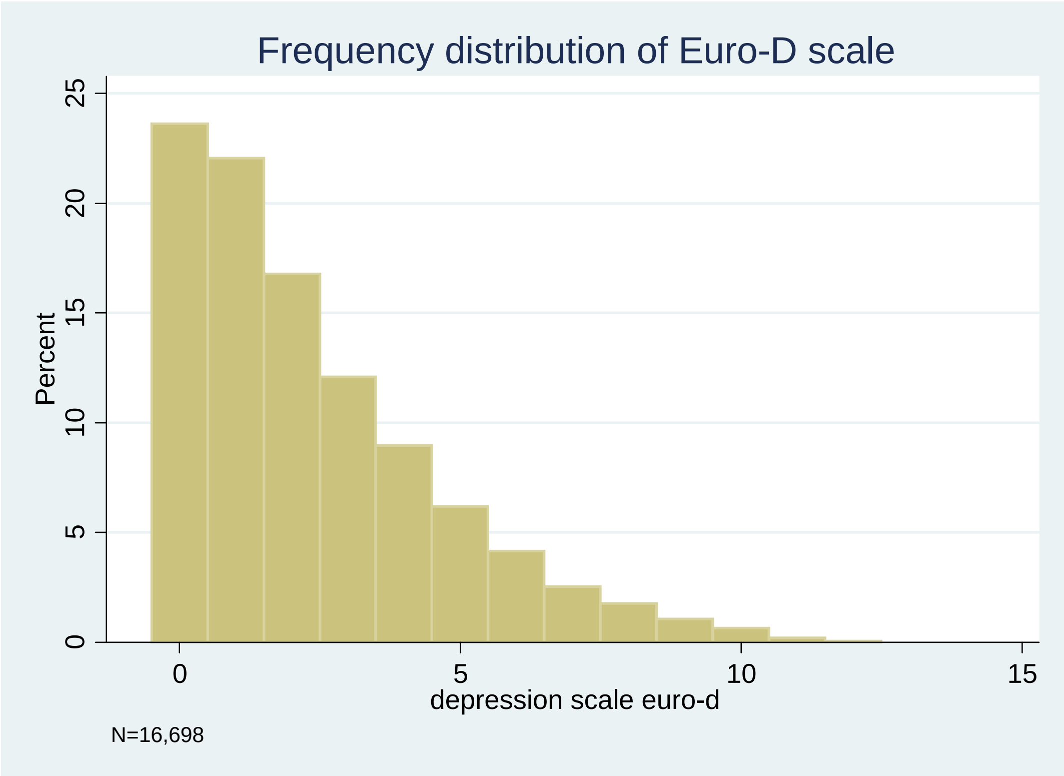


Figure 2

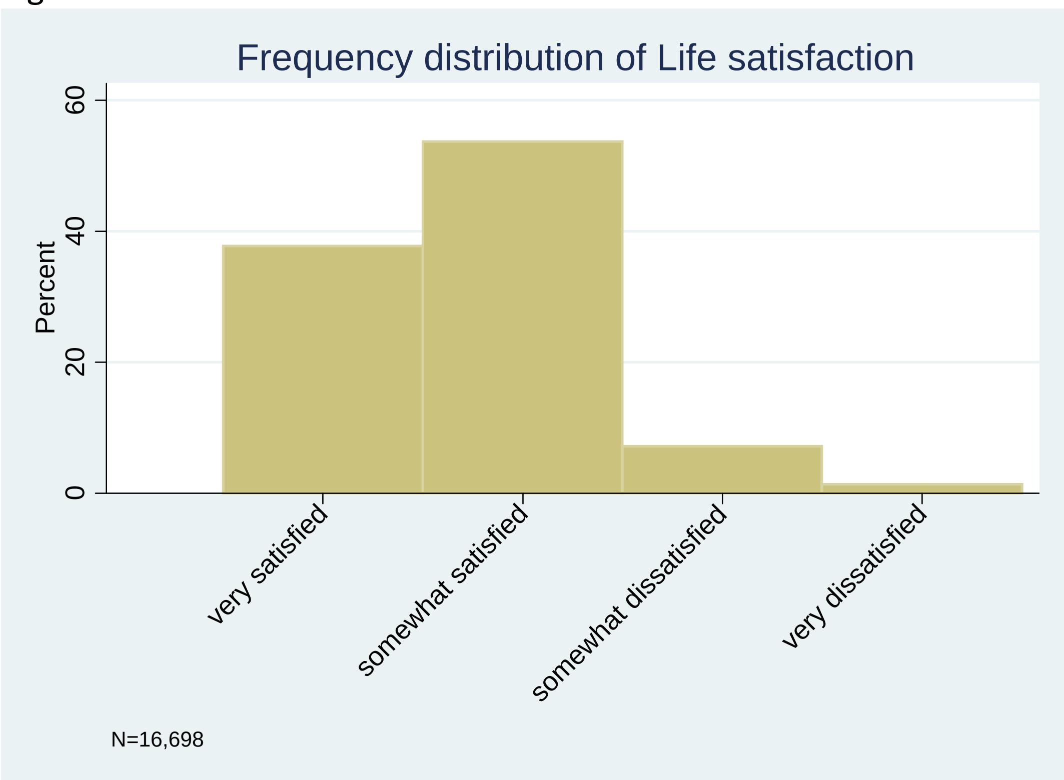


Figure 3

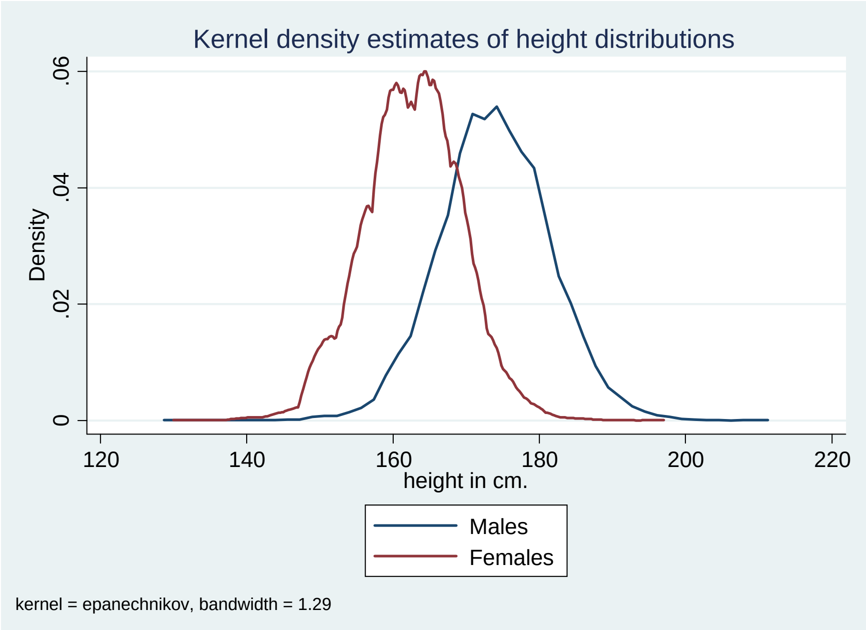
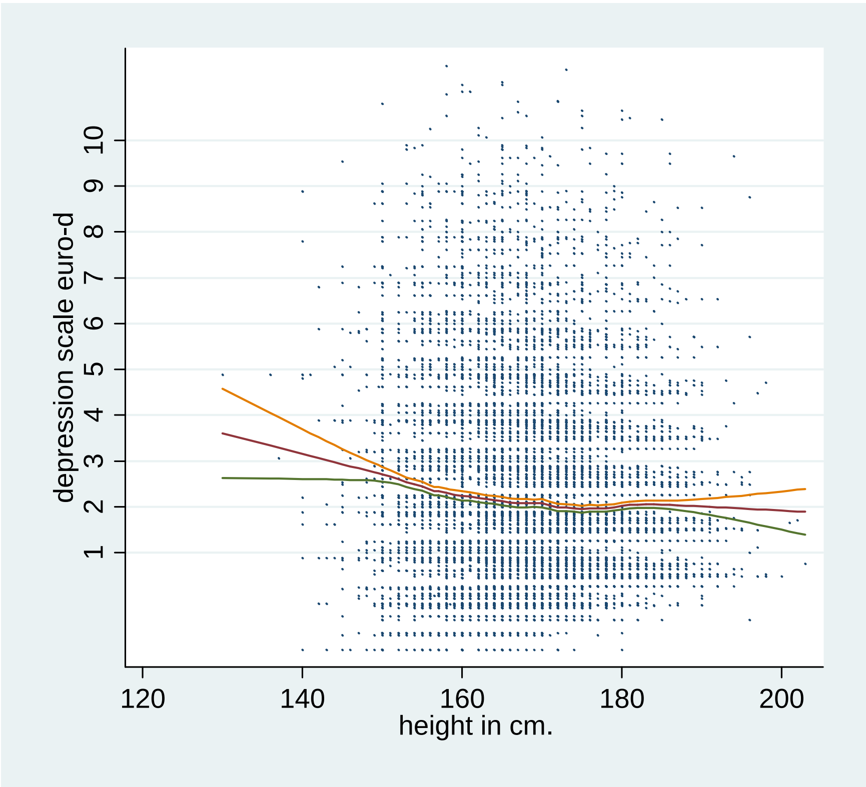


Fig 4:



95% confidence bands shown. Estimate of curve adjusts linearly for sex and country dummies.

Table 1a: Descriptive statistics

	Mean	**Std deviation**
Height	168.200	8.969
Euro-D	2.133	2.115
Satisfaction	2.315	.6335
Woman	.546	.498
Income (€/10000)	2.141	3.136
No income	.133	.3406
Education (years)	10.370	4.326
Verbal ability	19.387	7.211
Chronic illnesses	1.443	1.370
Grip strength	.054	.997
GALI	.385	.487
IADL	.128	.335
Divorced/separated	.072	.259
Never married	.052	.223
Widowed	.130	.336
Age	63.409	10.031

N=16,698

Table 1b: Joint distribution of life satisfaction and Euro-D scale

Euro-D	0	1-2	3-6	7-12	Total
Very dissatisfied	*.0806* *.0046*	*.2155* *.0075*	*.379* *0165*	*.3249* *.076*	*1* *.0136*
Somewhat satisfied	*.0722* *.025*	*.2323* *.0493*	*.4576* *.1219*	*.2379* *.3403*	*1* *.0839*
Somewhat Satisfied	.2066 .4981	.3909 .5776	.3525 .6542	.0500 .4988	1 .5778
Very satisfied	.3476 .4724	.4390 .3656	.1982 .2074	.0151 .0849	1 .3257
Total	.2397 1	.3910 1	.3113 1	.0580 1	

Row proportions above column proportions.

Table 2a: Linear models of Euro-D depression scale

	(1)	(2)	(3)	(4)	(5)
Height	-0.179**	-0.250***	-0.189**	-0.264***	-0.317***
	(2.62)	(3.38)	(2.75)	(3.51)	(4.26)
Height^2/100	0.0560**	0.0743***	0.0581**	0.0765***	0.0900***
	(2.75)	(3.37)	(2.84)	(3.43)	(4.07)
Woman	0.353***	0.750***	0.345***	0.753***	0.761***
	(4.71)	(11.46)	(4.71)	(11.98)	(12.38)
Income	0.0108	0.00320			
	(1.49)	(0.42)			
No income	0.0994	0.0469			
	(1.39)	(0.61)			
Education	-0.0315***	-0.0545***			
	(4.68)	(7.53)			
Verbal ability	-0.0130***	-0.0240***			
	(3.59)	(6.04)			
Chronic diseases	0.248***		0.249***		
	(13.23)		(13.17)		
Grip strength	-0.275***		-0.285***		
	(7.49)		(7.67)		
GALI	0.729***		0.756***		
	(14.32)		(14.72)		
IADL	1.086***		1.133***		
	(12.82)		(13.27)		
Age	-0.0234***	0.00860**	-0.0202***	0.0169***	
	(7.92)	(3.04)	(6.96)	(6.16)	
Divorced/ separated	0.327***	0.402***	0.298***	0.367***	
	(3.78)	(4.27)	(3.43)	(3.85)	

Never married	0.187*	0.233*	0.169	0.228*	
	(1.99)	(2.35)	(1.80)	(2.26)	
Widow	0.453***	0.534***	0.461***	0.571***	
	(5.69)	(6.28)	(5.83)	(6.68)	
Constant	17.08**	22.82***	17.33**	22.78***	29.18***
	(2.96)	(3.64)	(2.99)	(3.59)	(4.66)
R^2	0.245	0.127	0.240	0.112	0.092
p	.0015	.0034	.0049	.0007	.0000

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: Slope of function w.r.t. height (in cm.)

height	(1)	(2)	(3)	(4)	(5)
162	.002	-.010	-.001	-.016	-.0257
	(0.50)	(2.01)	(0.21)	(3.33)	(5.40)
168	.009	-.001	.006	-.007	-.0149
	(2.38)	(0.18)	(1.62)	(1.74)	(3.82)
175	.017	.010	.014	.0038	-.002
	(3.53)	(1.95)	(3.01)	(0.78)	(0.47)

162, 168, 175 are the 1st, 2nd and 3rd quartiles respectively of the height distribution. Absolute *t* statistics in parentheses.

Table 3a: 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 3b: 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	-.0000727	-.0004225	-.0003788	-.0008903	-.0009821
satisfied	(0.28)	(1.59)	(1.45)	(3.35)	(3.66)
Somewhat	.0000512	-.0003792	-.0003754	-.0010211	-.0010966
Satisfied	(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.

References

Batty, G.D., M.J. Shipley, D. Gunnell, R. Huxley, M.Kivimaki, M. Woodward, C. Man Ying Lee & G. Davey Smith. 2009. Height, wealth and health: an overview with new data from three longitudinal studies. Economics and Human Biology, 7(2), 137-152.

Bjerkeset, O., P.Romundest, J.Evans & D. Gunnell . 2008. Association of Adult Body Mass Index and Height with Anxiety, Depression, and Suicide in the General Population: the HUNT Study. American Journal of Epidemiology*, 167 (2): 193-202.*

Boersch-Supan, A., & Juerges, H. (Eds.). 2005. The Survey of Health, Aging, and Retirement in Europe- methodology. Mannheim: Mannheim Research Institute for the Economics of Aging.

Breiman, L. & J. H. Friedman. 1985. Estimating optimal transformations for multiple regression and correlation (with discussion). Journal of the American Statistical Association 80, 580-619.

Cantril, H. 1965. *The Pattern of Human Concern*. Rutgers University Press, New Brunswick, NJ.

Case, A. & C. Paxson. 2008. Stature and status: height, ability and labor market outcome. Journal of Political Economy, 116(3), 499-432.

Copeland, J.R.M. 1999. Depression of older age. British Journal of Psychiatry, 174, 304-306.

Copeland, J. R. M., Dewey, M. E., & Griffith-Jones, H. M. (1986). Computerised psychiatric diagnostic system and case nomenclature for elderly subjects: GMS and AGECAT. Psychological Medicine, 16, 89-99.

Deaton, A. & R. Arora. 2009. Life at the top: the benefits of height. Economics and Human Biology, 7, 133-136.

Denny, K. 2009. Handedness and depression: evidence from a large population survey. Laterality , 14(3), 246 – 255.

Easterlin, R. 2003. Explaining happiness. Proceedings of the National Academy of Sciences, 100(19), 11176-11183.

Gurland, B., Golden R. R., Teresi, J. A., & Challop, J. (1984). The SHORT-CARE: An efficient instrument for the assessment of depression, dementia and disability. Journal of Gerontology, 39, 166-169.

Heineck G. 2008. A note on the height–wage differential in the UK – Cross-sectional evidence from the BHPS. Economics Letters, 98(3), 288–293.

Hübler O. 2009. The nonlinear link between height and wages in Germany 1985-2004. Economics and human Biology, 7(2), 191-199.

Kahneman, D. & A. Deaton. 2010. High income improves evaluation of life but not emotional well-being. Proceedings of the National Academy of Sciences, 107(38), 16489-16493.

Law, C.M. 1987. The disability of short stature. *Archives of Disease in Children*, 62, 855-859.

Lundborg, P., P.Nystedt & D.O. Rooth. 2009. The Height Premium in Earnings: The Role of Physical Capacity and Cognitive and Non-Cognitive Skills. IZA Discussion Paper No. 4266.

Nettle, D. 2002. Height and reproductive success in a cohort of British men. Human Nature, 13(4), 473-491.

Persico, N., A.Postlewaite & D.Silverman. 2004. The Effect of Adolescent Experience on Labor Market Outcomes: The Case of Height. Journal of Political Economy, Vol. 112, No. 5, 1019-1053.

Prince M.J., Reischies F., Beekman A.T.F., Fuhrer R., Jonker, C., Kivela S.L., Lawlor, B.A., Lobo A., Magnusson H., Fichter, M., Van Oyen, H., Roelands, M., Skoog, I., Turrina, C. & J.R.M. Copeland. 1999. Development of the EURO-D scale - a European Union initiative to compare symptoms of depression in 14 European centres. British Journal of Psychiatry. 174, 330-338.

Radloff, L. S. 1977. The CES-D scale: A self report depression scale in the general population.

Applied Psychological Measurement, 1, 385-401.

Rees, D.I., J.J. Sabia & L.M. Argys. 2009. A head above the rest: Height and adolescent psychological well-being. Economics and Human Biology, 7(2) 217-228.

Royston P. & N.J. Cox. 2005. A multivariable scatterplot smoother. Stata Journal, 5(3), 405-412.

Stack, S. & I. Wasserman. 1996. Height and the risk of suicide. Journal of Social Psychology, 136(2), 255-256.