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IMITATIVE OBESITY AND RELATIVE UTILITY

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Abstract

If human beings care about their relative weight, a form of *imitative obesity* can emerge (in which people subconsciously keep up with the weight of the Joneses). Using international micro data, this paper documents evidence that well-being is correlated with a person's BMI, and that weight perceptions and dieting are influenced by comparisons with others. Highly educated people view themselves as fatter, holding weight constant, than do those with low levels of education. Although our results should be viewed cautiously, and fixed-effects estimates are not always well-determined, there are some grounds to take seriously the possibility of socially contagious obesity.

Imitative Obesity and Relative Utility

1. Introduction

The citizens of the industrialized economies are approximately 10 kilos heavier than they were a few decades ago. This phenomenon is much-debated. Because of the shortened longevity and the diseases (such as diabetes) that are associated with being overweight, the phenomenon is also of concern to governments and the medical profession. According to the Social Science Citation Index, nearly 10,000 journals articles on the issue of obesity[1] have appeared since 1990. In economics, by contrast, there has been less research. Since 1990, the American Economic Review, Quarterly Journal of Economics, Economic Journal, and Journal of Political Economy have each published one article on the topic.

Why has obesity risen? The consumption of calories has gone up (Bleich et al 2008), but that does not tell us why people are eating more. Some writers, such as Offer (2006), argue that obesity has been generated by falling food prices. Yet it is not easy to see how this trigger can be large enough to match the data[2], and the puzzle remains of why, if fatness is a response to greater real purchasing power, we routinely observe that rich people are thinner than poor people[3]. Some commentators speak of an obesity 'epidemic'. Such language is evocative of the idea that fatness can spread from one person to another.

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[1] Our electronic search was on the word "obesity" in abstracts, titles, and key words. The SSCI coverage includes a number of medical journals.

[2] Brunello et al (2008) is a valuable overview of the intellectual and policy issues. Chou et al (2004) examines the role of restaurant-food prices. Gruber and Frakes (2006) are doubtful that the secular decline in smoking is what has raised obesity.

[3] See sources such as Burkhauser and Cawley (2004), Banks et al (2006), Bhattacharya and Bundorf (2005), Propper (2005), Finkelstein et al (2005), and Sanz-de-Galdeano (2005). Links between obesity and labour-market outcomes are studied in Sargent and Blanchflower (1994), Cawley (2004) and Morris (2006). However, Kenkel et al (2006) does not find strong links between high-school completion and later obesity.

In interesting work at the border between medicine and quantitative sociology, Christakis and Fowler (2007) have recently produced evidence consistent with just such an idea.[4] They find that gains in weight appear to spread through a population -- with friends and relatives apparently influencing other friends and relatives, for example -- in a way reminiscent of a contagious disease. Burke and Heiland (2007) and Oswald and Powdthavee (2007) present models in this spirit: the former paper assumes that people like to have a weight close to other people's weight, and the latter paper that people have a utility function defined on relative weight and thus rationally choose a weight bearing in mind the weights of peers. Felton and Graham (2005) suggest that changing norms lie at the heart of the obesity phenomenon. In a related way, Maximova et al (2008) have recently shown that young people's perceptions of weight and overweight depend upon the weight of their parents and friends; Ellaway et al (1997) suggest that different places may have different norms of body weight; and Chen and Meltzer (2008) argue that Chinese obesity may be increasing because of changing norms and social contagion.

2. Relative weight and obesity

Our starting point is the idea that human beings care about their status and position in a society. For example, a longstanding idea in psychology and parts of economics is that -- perhaps for Darwinian reasons -- utility may depend on a person's relative income. The work of Duesenberry (1949) and Frank (1985) has particularly helped to mould economists' thinking on these issues.

In this paper, we consider an equivalent possibility. It is that a person's utility may depend on his or her relative weight. This idea is somewhat in the spirit of Clark (2003) and Powdthavee (2006), who provide evidence that, presumably for reasons of reduced stigma, it is psychologically preferable to be unemployed in an area where there are many other jobless people. For a variety of equivalent reasons, it may be easier to be fat in a society that is fat.

[4] A forthcoming critique of Christakis and Fowler (2007) is that of Cohen-Cole and Fletcher (2008).

It is possible to construct a model where concern for relative weight leads to obesity spirals, and where this happens after only small drops in the price of food. In a world of comparisons, such as Luttmer (2005), people will often emulate each other in a kind of keeping-up-with-the-Joneses sense, and, as a theoretical idea, fatness could then in principle spread in a way that would have the appearance of a contagious effect. However, deviant slimness can emerge rationally among some in the population, and we show later that the sign of the second derivative[5] of the utility function (with respect to relative weight) turns out to be crucial.

Assume that relative slimness confers status. If there are gains from such status -- perhaps better mates or faster job promotion -- then if I have diminishing returns I will invest in status less the more status I have. Thus, when my neighbour gets a little fatter, I rationally myself will become a little fatter (since it is now not necessary to be so slim in order to compete). This logic is based on the assumption of a concave utility function: the concavity leads me to copy the increasingly fatter Jones family in the house opposite mine. But, as explained in Oswald and Powdthavee (2007), if I have a convex utility function over the status from being slim, I will tend to act in the opposite way. When my neighbour becomes fatter, my marginal utility from slimness rises, and I invest more in slimness. In that case, I diet in the face of societal gluttony. Two social phenomena, in opposite directions, can therefore appear simultaneously: a spiral in obesity while some people deliberately choose to be thinner and thinner.

These ideas go through in a wide range of models, but for concreteness we provide an elementary example.

Let b be body mass, and f(b) be its density in the population. Imagine that social status comes from being slimmer than the herd. Assume it depends smoothly on the gap between average weight and one's own. Define mean body mass, m, as:

[5] For more general mathematics in imitative settings, see Clark and Oswald (1998). Hopkins and Kornienko (2004, 2006) provide formal models of status games and comparisons, and Oswald

$$m = \int_0^{\bar{b}} bf(b)db. \quad (1)$$

Assume that utility from body mass b comes in two forms: there is a direct (whether gain or loss) effect from the consequences of eating and an indirect status effect. Assume there is also a cost to being fat, which might be primarily financial but perhaps also in terms of health and mobility. Then let the individual's maximand be given by the utility function

$$W = u(b) + \mu(m - b) - cb, \quad (2)$$

so that, ignoring corners, the first-order condition for optimal weight is

$$\frac{\partial W}{\partial b} = u'(b) - \mu'(m - b) - c = 0. \quad (3)$$

In this case, if society becomes heavier, in the sense that the mean of the weight distribution goes up, a rational individual will imitate the rest of the population if he or she has a concave utility function. This is because the sign of the comparative static derivative db/dm is given by the sign[6] of:

$$\frac{\partial^2 W}{\partial b \partial m} = -\mu''(m - b). \quad (4)$$

This expression is positive if $\mu(.)$, the status part of the utility function, is strictly concave. Hence the existence of imitative keeping-up-with-the-Jones' in body weight will occur among those with a utility function that exhibits diminishing marginal utility in relative slimness.

The people who choose to become slimmer in the face of rising body weights around them will be those with convex utility functions. If utility convexity in status is more likely close to the top of the distribution (think of Wimbledon tennis champions, as they move from being ranked third to second to actually winning the tournament), then anorexic dieting will occur particularly among the elite in society, because, by being

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(1983) discusses the appropriate design of nonlinear optimal taxes in a world with concern for relativities.

[6] At the interior maximum of a function $J(x,a)$ with respect to x, locally $J_{xx}(x,a)dx + J_{xa}(x,a)da = 0$ and J is concave in the argument x.

already close to the top, they have the most to gain. The emphasis here on relativities (here in feelings about weight) is redolent of the approach, in a different sphere, of Richard Easterlin and others that says relative concerns in the utility function are why western society does not see its citizens reporting rising happiness scores through the decades.

There is evidence that people feel they eat too much. Economists are generically loathe to believe that this could be irrational (Cutler et al, 2003), and tend to assume that obese people are contentedly fat.[7] A simple step, taken before by Oswald and Powdthavee (2007) and Graham (2008), is then to study if happiness is lower among heavier people. Graham uncovers negative effects in an NLSY panel. When she allows for time lags, she finds some evidence that lagged obesity is correlated with future depression while lagged depression is not correlated with future obesity.

3. Data

We first examine the patterns in modern cross-section *Eurobarometer* data on 29 nations. Then we turn to longitudinal data in a number of sweeps of the *German Socioeconomic Panel* (GSOEP) as well as data from the *National Child Development Study* and the *British Cohort Study* from the UK and the *Health Survey of England*. All our tables[8] use self-reported data to construct BMI figures, and as such can be only a first step. Our central conclusion is that, while much remains to be understood, there is some evidence that comparisons and relative-weight concerns play a role. In other words, it may be that people's preference functions contain as an argument their relative BMI. If so, this is

[7] Interestingly, Stutzer (2006, 2007) demonstrates that obesity is associated with reduced well-being most especially among a sub-sample of people who report that they have limited self-control. The general argument that people make mistakes about what will produce happiness is set out in Gilbert (2006).

[8] Standard controls are included in these equations, though are not discussed in detail here; the literature includes Blanchflower and Oswald (2004), Di Tella et al (2001), Easterlin (2003), Oswald (1997), Van Praag and Ferrer-I-Carbonell (2004), and Winkelmann and Winkelmann (1998). Jorm et al (2003), Stunkard et al (2003) and Simon et al (2006) find a correlation between obesity and depression, and debate whether it is a causal connection. Doll et al (2000) uncover stronger links to physical, rather than emotional, health.

consistent, under conditions we explain, with the idea that there might be emulation of others' weights.

Table 1 calculates self-reported kilos/metres-squared BMI (body mass index) estimates for each of the 29 countries in the Eurobarometer sample. We agree with Burkhauser and Cawley (2008) that this measure has limitations, but for simplicity in this paper we take BMI as the standard. These data are for the year 2005, and are based on information on approximately 1000 randomly selected people in each nation. As can be seen, Europe's nations typically report numbers that imply a BMI of approximately 25.4 for men and 24.5 for women. The highest body mass index values for males are found in Malta at 26.9 and Slovenia and Greece at 26.4; the lowest reported BMI values are found in Turkey at 24.8 and Netherlands and Italy at 25.0. For women, Italy and France are lowest at 23.5 and 23.8; Malta comes in highest at 26.2. There is likely, of course, to be some measurement error -- possibly of a considerable size -- in these numbers.

Individuals in the Eurobarometer surveys are also asked "*Would you say that your current weight is: Too low; About right; Too high?*" Their answers are given in Table 2. In the entire sample, 31% of male Europeans, and 43% of female Europeans, say their own weight is too high. To explore the cross-section pattern across different kinds of people, we use these data to estimate in Table 3 a simple feeling-overweight regression equation. Among other findings, this is concave in BMI, with a notional turning point at approximately a BMI of 50. Feelings of overweight are also increasing in relative BMI (where the comparison group is the person's age-group for each gender in each nation). There is also a strong gender difference: females are much more prone, for any given BMI value, to feel overweight.

In Table 3 there are signs of a decreasing effect in age, particularly for women, and a marked correlation with Age Left School. As previously found in the work of Oswald and Powdthavee (2007) on Britain, for any given level of BMI the most highly educated Europeans here are more likely to view themselves as overweight. For example, the 'Age Left School over 20' coefficient is 0.5303, with a t-statistic above 10, in column 1 of

Table 3. This category is a proxy for college-educated. The finding that greater levels of education are associated with a greater perception of high body weight is true among males and females; it operates monotonically in each of columns 2 and 3 in Table 3.

In Table 3, the coefficient on relative BMI seems of special interest. Here relative BMI is measured as an individual's BMI divided by the average BMI from their country*age band*gender cell. Age bands are defined in twelve five year age groupings from <20; 20-24 and so on in five year bands up to 69 and then 70 and over. The coefficient on the relative BMI variable is approximately -1.7 for males, with a t-statistic of 1.78, so the null of zero is not quite rejected at conventional levels, and the sign is inconsistent with the idea that people might worry about being fatter than others. For females, however, the coefficient is approximately 2.6 with a t-statistic of 4.51. Hence there is evidence -- as a matter of correlation not causation -- that, regardless of absolute BMI, those reporting fatness relative to their peers are more concerned about their own weight. Comparisons apparently matter; the absolute level of BMI itself is not a sufficient statistic.

Equivalent patterns show up in Tables 4 and 5. Table 4 gives, for 1996, the answers to:

Here are some statements. For each of these, please tell me if you agree strongly, agree slightly, disagree slightly or disagree strongly?

- *I am very satisfied with my body weight. Agree strongly=1 … disagree strongly=5*
- *Over the last 12 months, have you been on a diet, or not?*

and finds particularly large numbers of women saying they have recently been on a diet.

The first two columns of Table 5 provide ordered logit equations in which the dependent variable is a measure of dissatisfaction with weight. The third and fourth columns of Table 5 are dprobit equations in which the dependent variable is 'having dieted in the last 12-months'. Greece, Luxembourg and the UK have the largest country dummies. Especially among Europe's females, a high value of relative BMI is a predictor of those who say they have been on a diet in the previous year: the coefficient is 0.6001 with a t-

statistic of 4.07. For women, there is little or no age-gradient in who diets, whereas for men it is mostly older males who diet. Once again, education enters strongly. Highly educated people are more likely, ceteris paribus, to be dissatisfied with their weight and to say they have been dieting.

How are mental well-being and BMI connected? For Europe, this is hard to establish in modern data, because the Eurobarometer surveys of 1996 and 2005 do not provide life-satisfaction or mental health scores (although Blanchflower (2008) estimates happiness and life satisfaction equations for other Eurobarometer data sets). Instead, we turn to the Health Survey for England. This offers, for the year 2004, a random sample of approximately 10,000 individuals. We study psychological health. The logit equations of Table 6 take as the dependent variable a GHQ score, which is a commonly used measure of mental strain[9]. These reveal, for men and women, evidence of a negative correlation, over usual values of BMI, between psychological well-being and weight. The function itself is convex, with a turning point in the full sample at approximately a BMI value of 30. Other variables take the pattern familiar from recent well-being research (for example, Blanchflower and Oswald 2008a, 2008b). Marriage and divorce variables, and an age quadratic, enter in the familiar way.

As a check, Table A1 in the appendix examines different data. It uses birth cohort data from two sources; the 1970 British Cohort Study and the 1958 British National Child Development Study to estimate (i) life satisfaction equations and (ii) weight satisfaction equations. The data used are taken from the 2000 sweeps where both cohorts were asked the same questions. In column 1, paradoxically, males are happier if their BMI is larger. For women, however, the negative association is again found. In the other columns of Table A1, there is evidence of nonlinearity in BMI.

Most of this evidence is consistent with that from cross-sectional work for the United States in Felton and Graham (2005), Switzerland in Stutzer (2006), Britain in Oswald and

9 Goldberg et al (1997) and Gardner and Oswald (2007) discuss the construction of GHQ scores.

Powdthavee (2007), and the Netherlands in Cornelisse-Vermaat et al (2006), and also with some of the longitudinal associations in Roberts et al (2000, 2002).

A negative correlation between happiness and BMI does not establish causality. It is simply a cross-section pattern; ignores the difference between marginal and average preferences in the population; could be driven by the fact that unhappy people feel compelled to eat; or could simply reflect the fact that a rational eater's utility may be increasing in the flow of eating but decreasing in the stock of fatness.[10]

We now turn to evidence from the German Socioeconomic Panel. There are three sweeps of the panel where people are asked for their height and weight. Life satisfaction data (on a ten-point scale) are also collected. This makes it possible to estimate fixed-effects models of well-being in which BMI measures are included as regressors.

In Table 7, the first three columns are pooled OLS equations in which life satisfaction is the dependent variable. For simplicity, life satisfaction, which has a mean of 6.9 out of a possible 10, and a standard deviation of 1.8, is treated cardinally; ordered estimators give the same results. A number of standard controls, including education and income, are included in these cross-section equations. A strong negative association with BMI is found, and is especially clear for German women, where the coefficient is -0.0198 and the t-statistic is 6.50. For males, by contrast, the coefficient is approximately one third of this size, with a t-statistic of 1.78. Hence, even after controlling for many personal characteristics, fatter people are less satisfied with their lives. The standard deviation of BMI is approximately 5 for women. Thus a one-standard-deviation move up in body mass index is associated, in the cross-section of Table 7, with approximately 0.1 fewer life-satisfaction points among German women.

[10] More precisely, eating influences the flow of calories, and a differential equation then explains dBMI/dt.

This negative association is not, however, maintained in the final three Fixed Effects columns of Table 7. In these equations, BMI now enters positively, and in a way that allows the null hypothesis of zero to be rejected.

There have been few attempts to assess the longitudinal patterns in weight and well-being, so these German Socioeconomic Panel results seem interesting and to provide a challenge to some conventional thinking. The presumption in the medical and psychological literatures has been that a high BMI is bad for physical and mental well-being. It is not possible to use Table 7 to say whether BMI is causing or is the cause of well-being (or neither), but experiments with the inclusion of lagged BMI in these equations did not alter the principal patterns.

In Table 8, we see, as in Eurobarometer and NCDS data, that there is evidence of a nonlinear association between BMI and well-being. Interestingly, this holds true even in the fixed effects specification in the final three columns of Table 8, where the turning point in the quadratic occurs at extremely high BMI values around 50.

Finally, is there any evidence for a role for relative BMI in life-satisfaction equations? Table 9 attempts to address this. We allow separately for the logarithm of BMI and the logarithm of others' BMI. The latter -- a kind of comparison level of bodyweight -- is calculated here by averaging the BMI of all the people in the sample in that year and that federal state within Germany.

Table 9 uncovers one notable coefficient, in a fixed effects framework, on the variable for peers' body mass index. This is the coefficient on Log Average BMI of 4.536 for men. The result implies that, after differencing out person-effects, life satisfaction is higher among those men who live in an area populated by fatter individuals[11].

4. Conclusions

[11] This is akin to the relative-income findings of Blanchflower and Oswald (2004) and Luttmer (2005).

This paper documents the international patterns in well-being, weight, dieting, and people's perceptions of being overweight. It draws upon samples from the Eurobarometer Surveys, the German Socioeconomic Panel, and three British data sets. We explore the idea that utility may depend upon an individual's relative weight. Personal appearance is immediately observable to others, and human beings have to compete for job promotions, sexual mates, and much else. This means that choices about physical characteristics such as body weight may be determined -- whether consciously or unconsciously -- in a way that depends on others' choices.

Although much remains to be understood, we find evidence that comparisons and relative-weight matter. It may be that people's utility functions contain as an argument their relative BMI. If so, this is consistent, under conditions we explain, with the idea that there can be a Keeping up with the Joneses effect that manifests itself as a kind of obesity imitation or contagion.

The paper reaches a number of specific conclusions.

First, we find that more than one third of Europe's population view themselves as overweight. This fact might be set alongside Offer's (2006) interesting argument: *In the rational choice approach there is no such thing as 'overweight'. p.143.* Moreover, we find that individuals' perceptions depend on their characteristics. For example, highly educated people are the most likely to see themselves as overweight once BMI is held constant. This suggests that people have different comparison groups -- the highly educated hold themselves to a thinner standard. For European women, there is evidence that weight dissatisfaction and overweight perceptions depend upon not just their own absolute BMI, but also upon BMI relative to other people (measured as BMI divided by the average BMI in their age*gender*country group). The same, we argue, may be true of dieting decisions.

Second, in cross-section German GOESP well-being equations, we uncover a negative effect from own-BMI. There are also signs of nonlinearities in the relationship.

Third, fixed-effects equations paint a rather different picture. Importantly, the effect of own-BMI is now not negative, but rather is typically positive (something we also find for males in one British cross-section, in the appendix, for NCDS and BCS data). This is a puzzle. It differs from the results of Graham (2008), and suggests that much more longitudinal research is needed on the links between BMI and well-being. As a group of researchers, we are a long way from a deep causal understanding of the links between body weight and mental well-being. However, here we continue to uncover some evidence consistent with comparison effects. For German males, in a fixed-effects framework, life satisfaction is greater among those who live in places where other people tend to be fatter.

References

Banks, J., Marmot, M., Oldfield, Z. and Smith, J.P. (2006). 'The SES health gradient on both sides of the Atlantic'. National Bureau of Economic Research Paper #12674.

Bhattacharya, J. and Bundorf, K.M. (2005). 'The incidence of the healthcare costs of obesity'. National Bureau of Economic Research Paper #11303.

Blanchflower, D.G. (2008). 'International evidence on well-being', IZA paper 3354.

Blanchflower, D.G. and Oswald, A.J. (2004). 'Well-being over time in Britain and the USA'. *Journal of Public Economics*, 88, 1359-1386.

Blanchflower, D.G. and Oswald, A.J. (2008a). 'Hypertension and happiness across nations'. *Journal of Health Economics*, 27, 218-233.

Blanchflower, D.G. and Oswald, A.J. (2008b). 'Is well-being U-shaped over the life cycle?'. *Social Science & Medicine*, 66, 1733-1749.

Bleich, S., Cutler, D., Murray, C. and Adams, A. (2008). 'Why is the developed world obese?', *Annual Review of Public Health*, 29, 273-295.

Brunello, G., Michaud, P-C., and Sanz-de-Galdeano, A. (2008). 'The rise in obesity across the Atlantic: An economic perspective'. IZA paper, June 2008.

Burke, M.A. and Heiland, F. (2007). 'Social dynamics of obesity'. *Economic Inquiry*, 45, 571-591.

Burkhauser, R.V. and Cawley, J. (2004). 'Obesity, disability, and movement onto the disability insurance rolls'. Working paper, Cornell University.

Burkhauser, R.V. and Cawley, J. (2008). 'Beyond BMI: The value of more accurate measures of fatness and obesity in social science research', *Journal of Health Economics*, 27, 519-529.

Cawley, J. (2004). 'The impact of obesity on wages'. *Journal of Human Resources*, 39, 451-474.

Chen, Z. and Meltzer, D. (2008). 'Beefing up with the Chans: Evidence for the effects of relative income and income inequality on health from the China Health and Nutrition Survey'. *Social Science & Medicine*, forthcoming.

Chou, S.Y., Grossman, M. and Saffer, H. (2004). 'An economic analysis of adult obesity: results from the Behavioral Risk Factor Surveillance System', *Journal of Health Economics*, 23, 565-587.

Christakis, N.A. and Fowler, J.H. (2007). 'The spread of obesity in a large social network over 32 years'. *New England Journal of Medicine*, 357, 370-379.

Clark, A.E. (2003). 'Unemployment as a social norm: Psychological evidence from panel data'. *Journal of Labor Economics*, 21, 323-351.

Clark, A.E. and Oswald, A.J. (1998). 'Comparison-concave utility and following behaviour in social and economic settings'. *Journal of Public Economics*, 70, 133-150.

Cohen-Cole, E. and Fletcher, J.M. (2008). 'Is obesity contagious? Social networks vs. environmental factors in the obesity epidemic.' *Journal of Health Economics*, forthcoming.

Cornelisse-Vermaat, J.R., Antonides, G., Van Ophem, J.A.C., and Van Den Brink, H.M. (2006). 'Body mass index, perceived health, and happiness: Their determinants and structural relationships'. *Social Indicators Research*, 79, 143-158.

Cutler, D.M., Glaeser, E.L., and Shapiro, J.M. (2003). 'Why have Americans become more obese?' *Journal of Economic Perspectives*, 17, 93-118.

Di Tella, R., MacCulloch, R.J. and Oswald, A.J. (2001). 'Preferences over inflation and unemployment: Evidence from surveys of happiness.' *American Economic Review*, 91, 335-341.

Doll, H.A., Petersen, S.E.K. and Stewart-Brown, S.L. (2000). 'Obesity and physical and emotional well-being: Associations between BMI, chronic illness, and the physical and mental components of the SF-36 questionnaire.' *Obesity Research*, 8, 160-170.

Duesenberry, J.S. (1949). *Income, saving and the theory of consumer behavior*. Cambridge, MA: Harvard University Press.

Easterlin, R.A. (1974). 'Does economic growth improve the human lot? Some empirical evidence.' In P.A. David and M. W. Reder (Eds.), *Nations and households in economic growth: Essays in Honor of Moses Abramowitz*. New York: Academic Press.

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

Ellaway, J. Anderson, A and Macintyre, S. (1997). 'Does area of residence affect body size and shape?' *International Journal of Obesity*, 21, 304-308.

Felton, A. and Graham, C. (2005). 'Variance in obesity across cohorts and countries: A norms-based explanation using happiness surveys.' Working paper, Brookings Institution, Washington.

Finkelstein, E.A., Ruhm, C.J. and Kosa, K.M. (2005). 'Economic causes and consequences of obesity'. *Annual Review of Public Health*, 26, 239-257.

Frank, R.H. (1985). *Choosing the right pond: Human behaviour and the quest for status.* Oxford University Press: London.

Gardner, J. and Oswald A.J. (2007). 'Money and mental wellbeing: A longitudinal study of medium-sized lottery wins'. *Journal of Health Economics*, 26, 49-60.

Gilbert D. (2006). *Stumbling on happiness*. Alfred A Knopf: New York.

Goldberg, D.P., Gater, T., Sartorious, N., Ustun, T.B., Piccinelli, M., Gureje, O. and Rutter, C. (1997). 'The validity of two versions of the GHQ in the WHO study of mental illness in general health care'. *Psychological Medicine*, 27, 191-197.

Graham, C. (2008). 'Happiness and health: Lessons – and questions – for public policy'. *Health Affairs*, 27, 72-87.

Gruber, J. and Frakes, M. (2006). 'Does falling smoking lead to rising obesity?', *Journal of Health Economics*, 25, 183-197.

Hopkins, E. and Kornienko, T. (2004). 'Running to keep in the same place: Consumer choice as a game of status'. *American Economic Review*, 94, 1085-1107.

Hopkins, E. and Kornienko, T. (2006). 'Methods of social comparison in games of status.' Working paper, University of Edinburgh.

Jorm, A.F., Korten, A.E., Christensen, H., Jacomb, P.A., Rodgers, B. and Parslow, R.A. (2003). 'Association of obesity with anxiety, depression and emotional well-being: A community survey'. *Australian and New Zealand Journal of Public Health*, 27, 434-440.

Kenkel, D., Lillard, D. and Mathios, A. (2006). 'The roles of high school completion and GED receipt in smoking and obesity', *Journal of Labor Economics*, 24, 635-660.

Luttmer, E.F.P. (2005). 'Neighbors as negatives: Relative earnings and well-being'. *Quarterly Journal of Economics*, 120, 963-1002.

Maximova, K., McGrath, J.J., Barnett, T., et al. (2008). 'Do you see what I see? Weight status misperception and exposure to obesity among children and adolescents', *International Journal of Obesity*, 32, 1008-1015.

Morris, S. (2006). 'Body mass index and occupational attainment'. *Journal of Health Economics*, 25, 347-364.

Offer, A. (2006). *The Challenge of Affluence: Self-Control and Well-being in the United States and Britain Since 1950*, Oxford University Press, Oxford.

Oswald, A.J. (1983). 'Altruism, jealousy and the theory of optimal non-linear taxation. *Journal of Public Economics*, 20, 77-87.

Oswald, A.J. (1997). 'Happiness and economic performance'. *Economic Journal*, 107, 1815-1831.

Oswald, A.J. and Powdthavee, N. (2007). 'Obesity, unhappiness, and the challenge of affluence: Theory and evidence. *Economic Journal*, vol. 117, F441- 454.

Oswald, A.J. and Powdthavee, N. (2008). 'Does happiness adapt? Longitudinal evidence on disability with implications for economists and judges'. *Journal of Public Economics*, forthcoming.

Powdthavee, N. (2006). 'Are there geographical variations in the psychological costs of unemployment in South Africa?' *Social Indicators Research*, forthcoming.

Propper, C. (2005). 'Why economics is good for your health – 2004 RES Public Lecture'. CMPO paper 05/116, Bristol University.

Roberts, R.E., Kaplan, G.A., Shema, S.J. and Strawbridge, W.J. (2000). 'Are the obese at greater risk of depression?' *American Journal of Epidemiology*, 152, 163-170.

Roberts, R.E., Strawbridge, W.J., Deleger, S. and Kaplan, G.A. (2002). 'Are the fat more jolly?' *Annals of Behavioral Medicine*, 24, 169-180.

Sanz-de-Galdeano, A. (2005). 'The obesity epidemic in Europe'. IZA paper 1814.

Sargent, J.D. and Blanchflower, D.G. (1994). 'Obesity and stature in adolescence and earnings in young adulthood – Analysis of a British birth cohort', *Archives of Pediatrics & Adolescent Medicine*, vol. 148, p.681-687.

Simon, G.E., Von Korff, M., Saunders, K., Miglioretti, D.L., Crane, P.K., van Belle, G., amd Kessler, R.C. (2006). 'Association between obesity and psychiatric disorders in the US adult population', A*rchives of General Psychiatry*, 63, 824-830.

Stunkard, A.J., Faith, M.S. and Allison, K.C. (2003). 'Depression and obesity'. *Biological Psychiatry*, vol. 54, pp. 330-337.

Stutzer, A. (2006). 'When temptation overwhelms will-power: Obesity and happiness'. Working paper, University of Basel.

Stutzer, A. (2007). 'Limited self-control, obesity, and the loss of happiness'. Working paper, IZA paper 2925.

Van Praag, B. and Ferrer-I-Carbonell, A. (2004). *Happiness Quantified: A Satisfaction Calculus Approach*, Oxford University Press, Oxford.

Winkelmann, L. and Winkelmann, R. (1998). 'Why are the unemployed so unhappy?' Evidence from panel data'. *Economica*, 65, 1-15.

Table 1. Body Mass Index (BMI) by country, 2005

	Male	Female	#
Austria	25.3	24.0	887
Belgium	25.4	24.7	984
Bulgaria	25.8	24.7	963
Croatia	26.3	25.1	953
Cyprus	26.1	25.0	473
Czech Republic	25.5	24.7	977
Denmark	26.0	24.3	983
Estonia	25.3	25.0	932
Finland	25.9	25.3	988
France	25.0	23.8	976
Germany	25.7	24.8	1474
Greece	26.4	25.5	986
Hungary	25.9	25.3	998
Ireland	26.1	24.5	980
Italy	25.0	23.5	937
Latvia	24.8	25.3	886
Lithuania	25.6	25.4	936
Luxembourg	26.5	24.5	478
Malta	26.9	26.2	359
Netherlands	25.0	24.7	1009
Poland	25.5	24.1	963
Portugal	25.2	25.1	914
Romania	25.4	24.2	941
Slovakia	25.5	24.5	1002
Slovenia	26.4	24.6	1014
Spain	25.8	24.7	943
Sweden	25.5	24.6	1022
Turkey	24.8	24.3	868
United Kingdom	25.3	25.4	1148
Total	25.4	24.5	27441

Notes: BMI is kilos/metres squared. Weight and height are self-reported
Source: Eurobarometer #64.3: Foreign Languages, Biotechnology, Organized Crime, and Health

Table 2. Individuals' views on their own weight, 2005. %

	Males			Females		
	Too low	About right	Too high	Too low	About right	Too high
Austria	4	64	32	6	53	42
Belgium	9	49	42	3	47	50
Bulgaria	6	73	21	4	60	36
Croatia	6	59	35	4	55	41
Cyprus	6	65	29	3	52	46
Czech Republic	7	69	25	3	55	42
Denmark	9	49	42	5	51	44
Estonia	8	66	27	2	54	44
Finland	4	60	36	3	52	45
France	9	54	37	5	45	50
Germany	5	60	36	5	46	49
Greece	8	49	42	5	39	56
Hungary	7	69	24	6	54	39
Ireland	4	61	35	3	54	43
Italy	4	68	28	4	54	41
Latvia	12	72	16	4	55	41
Lithuania	14	53	33	5	48	47
Luxembourg	3	50	46	1	49	51
Malta	3	63	34	5	44	51
Netherlands	4	59	36	3	55	42
Poland	12	61	28	7	53	41
Portugal	5	73	22	4	57	39
Romania	6	75	19	7	61	33
Slovakia	5	76	19	3	66	31
Slovenia	5	51	43	3	48	49
Spain	5	70	24	6	61	33
Sweden	7	48	45	3	47	50
Turkey	7	70	23	7	57	36
United Kingdom	8	58	34	3	50	47
Total	7	63	31	5	52	43

Source: Eurobarometer #64.3: Foreign Languages, Biotechnology, Organized Crime, and Health Items, November-December 2005. ICPSR – 4590.

Table 3. Equations for individuals' views on whether their weight is too high: Ordered Logits, 2005

	All	Male	Female
BMI	.7734 (13.33)	1.0494 (17.58)	.9869 (4.76)
BMI^2	-.0074 (6.09)	-.0080 (7.53)	-.0111 (2.71)
Relative BMI	3.7325 (6.97)	-1.7354 (1.78)	2.6194 (4.51)
Male	-1.2309 (26.05)		
20-24	-.0977 (0.89)	-.5104 (3.39)	-.1503 (1.07)
25-29	-.1304 (1.16)	-.7761 (4.77)	-.1806 (1.11)
30-34	-.0093 (0.07)	-.4925 (2.56)	-.3586 (1.97)
35-39	.0752 (0.57)	-.4943 (2.42)	-.3427 (1.92)
40-44	.0710 (0.54)	-.5637 (2.72)	-.3345 (1.87)
45-49	.0397 (0.28)	-.6281 (2.85)	-.4606 (2.41)
50-54	.2476 (1.64)	-.4804 (2.13)	-.3154 (1.55)
55-59	.1222 (0.79)	-.6762 (2.92)	-.4440 (2.09)
60-64	.1164 (0.73)	-.6076 (2.59)	-.5084 (2.29)
65-69	-.0926 (0.59)	-.7541 (3.20)	-.7633 (3.55)
≥70	-.3636 (2.46)	-.7441 (3.57)	-1.0702 (5.33)
Muslim	-.4283 (2.96)	-.2272 (1.06)	-.6755 (2.96)
AgeLeftSchool 16-19	.3141 (6.96)	.2426 (3.64)	.3418 (5.94)
AgeLeftSchool ≥20	.5303 (10.19)	.5065 (6.26)	.4997 (7.47)
Still studying	.4693 (5.43)	.3258 (2.47)	.5823 (5.01)
No ft education	-.5000 (1.63)	-.6316 (2.07)	-.3712 (0.86)
Austria	-.3596 (3.17)	-.2997 (0.84)	-.3720 (2.30)
Bulgaria	-.9472 (6.39)	-1.1843 (1.71)	-.7946 (5.33)
Croatia	-.6711 (5.58)	-.8023 (5.09)	-.7443 (5.70)
Cyprus	-.5641 (3.75)	-.9709 (4.27)	-.4257 (2.11)
Czech Republic	-.7690 (6.00)	-1.0750 (4.71)	-.5510 (3.71)
Denmark	-.3536 (2.93)	-.5118 (5.87)	-.3526 (2.57)
Estonia	-.6328 (4.80)	-.7837 (2.65)	-.5139 (3.75)
Finland	-.4483 (3.54)	-.4473 (3.48)	-.5238 (3.12)
France	.1258 (1.00)	.0502 (2.29)	.3181 (2.09)
Germany	-.2926 (2.67)	-.2887 (0.24)	-.3137 (2.50)
Greece	-.0837 (0.68)	-.4687 (1.63)	.0049 (0.03)
Hungary	-1.0682 (9.16)	-1.2169 (2.35)	-1.0147 (7.25)
Ireland	-.3878 (3.19)	-.4831 (6.71)	-.4512 (3.19)
Italy	-.2113 (1.84)	-.0847 (2.40)	-.1424 (0.93)
Latvia	-1.1521 (10.34)	-1.3684 (0.44)	-1.0030 (7.85)
Lithuania	-.6459 (5.74)	-.9107 (6.99)	-.5453 (4.31)
Luxembourg	.2038 (1.79)	.0150 (4.93)	.2580 (1.66)
Malta	-.5001 (2.98)	-.9640 (0.07)	-.4533 (2.13)
Netherlands	-.3262 (2.76)	-.0521 (4.27)	-.5229 (4.28)
Poland	-.8064 (6.33)	-1.1044 (0.28)	-.5934 (4.73)
Portugal	-.7268 (6.59)	-.7034 (5.23)	-.7333 (5.77)
Romania	-1.1328 (7.70)	-1.1757 (3.59)	-1.1127 (5.68)
Slovakia	-1.1417 (8.89)	-1.2609 (6.25)	-1.1322 (7.82)

Slovenia	-.1468 (1.25)	-.3581 (6.08)	-.1092 (0.73)
Spain	-.8764 (5.69)	-.8870 (1.82)	-.9843 (7.60)
Sweden	.1154 (0.86)	.1833 (3.92)	.0136 (0.08)
Turkish Cyprus	-.0125 (0.07)	-.5472 (0.99)	.2043 (0.78)
Turkey	-.2447 (1.36)	-.3779 (1.93)	-.1280 (0.54)
United Kingdom	-.2771 (2.47)	-.1738 (1.34)	-.3527 (2.14)
cut1	13.1645	14.80430.99	14.6552
cut2	18.2455	20.1276	19.7208
N	27,092	12,199	14,893
Pseudo R^2	.3334	.3304	.3388

Source: Eurobarometer #64.3: Foreign Languages, Biotechnology, Organized Crime, and Health Items, November-December 2005. ICPSR - 4590
Note: excluded categories Belgium and Age left school<16. Also includes a dummy for ALS DK. Standard errors clustered by country and 12 age bands. t-statistics in parentheses.

Q. 'Would you say that your current weight is…? 1=Too low; 2= About right; 3= Too high

Relative BMI is the individual's BMI divided by the average BMI in the age cell done separately by gender*country. Age bands are defined in twelve five year age groupings from <20; 20-24 and so on in five year bands up to 69 and then 70 and over.

Table 4. Dissatisfaction with weight and having recently been on a diet, 1996

	Health dissatisfaction score		% dieted	
	Male	Female	Male	Female
Austria	2.1	2.4	.15	.19
Belgium	2.2	2.7	.09	.23
Denmark	2.0	2.5	.11	.28
East Germany	2.2	2.4	.11	.16
Finland	2.5	3.0	.15	.19
France	2.3	2.8	.13	.25
Great Britain	2.6	3.0	.18	.35
Greece	2.3	2.8	.18	.37
Ireland	2.1	2.4	.08	.20
Italy	2.0	2.6	.13	.25
Luxembourg	2.3	2.7	.20	.35
Netherlands	2.0	2.6	.13	.26
NI	2.2	2.2	.13	.32
Portugal	2.3	2.6	.12	.19
Spain	2.2	2.6	.13	.24
Sweden	2.3	2.8	.11	.18
West Germany	2.2	2.4	.09	.19

Notes:Questions are
Q1. Here are some statements. For each of these, please tell me if you agree strongly, agree slightly, disagree slightly or disagree strongly? I am very satisfied with my body weight. Agree strongly=1 … disagree strongly=5.

Q2. Over the last 12 months, have you been on a diet, or not ?

Tabulated above are the mean dissatisfaction scores (1=very satisfied…5=very dissatisfied) by country and gender in columns 1 and 2 and the % who have dieted in columns 3 and 4

Source: Eurobarometer #44.3: Health Care Issues and Public Security, February-April 1996; ICPSR – 6752.

Table 5. Equations for dissatisfaction with weight and having recently been on a diet, 1996

	Male dissfn. Ologit	Female dissfn. Ologit	Diet male Dprobit	Diet female Dprobit
BMI	.2387 (1.61)	.6065 (7.71)	.0176 (1.72)	.0239 (2.75)
BMI^2	.0005 (0.23)	-.0072 (5.32)	-.0001 (1.51)	-.0004 (4.48)
Relative BMI	-.7220 (0.65)	1.2250 (2.03)	.1595 (1.08)	.6001 (4.07)
Age 20-24	-.0672 (0.48)	-.4002 (3.47)	.0714 (2.84)	-.0031 (0.11)
Age 25-29	-.1474 (0.88)	-.4432 (4.46)	.0301 (1.19)	-.0077 (0.25)
Age 30-34	-.0526 (0.26)	-.6080 (4.61)	.0537 (1.92)	-.0041 (0.12)
Age 35-39	-.1745 (0.92)	-.5017 (4.55)	.0207 (0.72)	.0038 (0.11)
Age 40-44	-.0626 (0.29)	-.6410 (5.58)	.0528 (1.50)	-.0175 (0.53)
Age 45-49	.0655 (0.28)	-.4458 (3.48)	.1153 (3.06)	-.0352 (0.94)
Age 50-54	-.0747 (0.32)	-.5202 (3.24)	.1001 (2.57)	.0318 (0.67)
Age 55-59	-.1303 (0.53)	-.6107 (3.99)	.1520 (3.52)	-.0049 (0.12)
Age 50-64	-.2475 (1.01)	-.8593 (5.22)	.1102 (2.66)	.0316 (0.63)
Age 65-69	-.1812 (0.72)	-.9945 (6.60)	.1162 (2.69)	.0131 (0.25)
Age 70+	-.4302 (1.92)	-1.2105 (6.80)	.1008 (2.40)	-.0584 (1.34)
AgeLeftSchool 16-19	.1270 (2.29)	.1104 (1.69)	.0042 (0.39)	.0342 (2.43)
AgeLeftSchool ≥20	.4020 (5.88)	.2729 (3.56)	.0567 (4.56)	.0530 (3.01)
Still studying	.4169 (3.35)	.1444 (1.41)	.0351 (1.91)	.0126 (0.50)
Austria	-.4717 (3.80)	-.7022 (5.64)	.0746 (4.34)	-.0554 (2.08)
Denmark	-.7147 (5.93)	-.3653 (3.44)	.0122 (0.49)	.0298 (0.87)
Finland	.0615 (0.45)	.1182 (0.86)	.0702 (2.82)	-.0523 (1.87)
France	.2748 (2.12)	.1499 (1.26)	.0647 (3.61)	.0050 (0.18)
Germany	-.1830 (1.79)	-.5010 (4.12)	.0072 (0.42)	-.0789 (3.35)
Greece	-.0147 (0.11)	-.1988 (1.83)	.1291 (4.16)	.1242 (3.52)
Ireland	-.2361 (1.79)	-.3755 (2.87)	.0059 (0.27)	-.0140 (0.46)
Italy	-.5257 (4.10)	-.3340 (3.25)	.0606 (2.98)	.0173 (0.64)
Luxembourg	.0344 (0.28)	-.1168 (1.03)	.1203 (3.98)	.1083 (3.59)
Netherlands	-.3505 (2.95)	-.5002 (4.74)	.0664 (3.44)	.0057 (0.19)
Portugal	.2660 (2.38)	-.2584 (2.27)	.0750 (3.36)	-.0238 (0.69)
Spain	-.0908 (0.81)	-.3330 (3.28)	.0690 (2.72)	-.0004 (0.02)
Sweden	.0159 (0.16)	-.0836 (0.78)	.0213 (1.10)	-.0551 (1.78)
United Kingdom	.3763 (3.07)	.1886 (1.69)	.0943 (4.45)	.0809 (2.50)
cut1	4.9084	9.4951		
cut2	6.5522	11.1487		
cut3	6.9526	11.5136		
cut4	8.8019	13.1798		
N	7,245	7,035	7,251	7,045
Pseudo R^2	.0749	.1068	.0628	.0748

Note: excluded categories Belgium and Age left school<16. Standard errors clustered by country and age cell. Relative BMI is BMI/average BMI by gender by country for 12 age groups. T-statistics in parentheses.

Source: Eurobarometer #44.3: Health Care Issues and Public Security, February-April 1996; ICPSR – 6752.

Table 6. GHQ12 Mental strain equations for England: OLS regressions, 2004

	All	Male	Female
Age	.0546 (6.00)	.0442 (3.26)	.0570 (4.61)
Age^2	-.0005 (6.08)	-.0004 (2.94)	-.0006 (5.02)
BMI	-.1346 (3.55)	-.1389 (1.94)	-.1196 (2.53)
BMI^2	.0023 (3.63)	.0025 (1.97)	.0020 (2.66)
Male	-.0803 (1.53)		
Employed	-.1299 (0.19)	-1.2231 (1.12)	.3631 (0.39)
Unemployed	.5676 (0.81)	-.3771 (0.34)	1.0865 (1.15)
Retired	.4566 (0.65)	-.5623 (0.51)	.7875 (0.83)
Other inactive	1.0524 (1.52)	.9067 (0.83)	1.1665 (1.24)
Degree	.7275 (0.69)	.4516 (0.73)	.1944 (0.69)
Higher education	.7245 (0.68)	.3930 (0.63)	.2223 (0.76)
A-level	.7260 (0.68)	.4746 (0.77)	.1455 (0.50)
O-level	.6091 (0.58)	.4515 (0.73)	-.0165 (0.06)
CSE	.6016 (0.57)	.3873 (0.62)	-.0803 (0.24)
Foreign/other	.4899 (0.45)		
No qualification	.9503 (0.90)	.6905 (1.13)	.4231 (1.55)
Ft student	.2729 (0.26)	-.5540 (0.89)	-.0625 (0.21)
North West	.0618 (0.42)	.5390 (2.57)	-.3078 (1.50)
Yorkshire & Humber	.2452 (1.60)	.4796 (2.20)	.0936 (0.44)
East Midlands	-.0718 (0.47)	.1786 (0.83)	-.2323 (1.09)
West Midlands	.0196 (0.13)	.3903 (1.85)	-.2610 (1.26)
East Anglia	-.1039 (0.68)	.2577 (1.21)	-.3313 (1.55)
London	-.0143 (0.10)	.2937 (1.47)	-.2540 (1.29)
South East	-.2428 (1.67)	.0533 (0.26)	-.4225 (2.09)
South West	-.0258 (0.16)	.2858 (1.21)	-.2437 (1.07)
Asian	.1263 (1.68)	.2671 (2.60)	.0241 (0.22)
Black	.2161 (2.43)	.1306 (1.05)	.2638 (2.11)
Chinese	-.1687 (1.45)	-.2004 (1.30)	-.1073 (0.63)
Irish	.1502 (1.77)	.1053 (0.88)	.1454 (1.24)
Other races	.2239 (0.82)	.0426 (0.11)	.4155 (1.12)
_cons	1.1807 (0.95)	2.1322 (1.33)	1.4062 (1.17)
N	10,065	4,505	5,560
Adjusted R^2	.0427	.0823	.0257

Notes: excluded categories - North East; white: education and labour force status not answered. Source: Health Survey of England, 2004. A GHQ score is a standard measure of psychological ill-health. It amalgamates answers to 12 separate mental-distress questions: "Have you lost much sleep over worry?"; "Been able to concentrate on things?"; "Felt you are playing a useful part in things?"; "Felt capable of making decisions about things?"; "Felt constantly under strain?"; "Felt you could not overcome your difficulties?"; "Been able to enjoy your normal day-to-day activities"; "Been able to face up to your problems"; "Been feeling unhappy and depressed?"; "Been losing confidence in yourself?"; "Been thinking of yourself as a worthless person?"; "Been feeling reasonably happy all things considered?".

Table 7. Life satisfaction equations: The linear relationship between subjctive well-being and BMI in German GSOEP Data

	Pooled OLS			**Fixed Effects**		
	All	Male	Female	All	Male	Female
BMI	-0.0146	-0.0063	-0.0198	0.0252	0.0317	0.0214
	(6.47)	(1.78)	(6.50)	(6.50)	(5.34)	(4.17)
Constant	5.6131	5.2913	5.5863	8.7637	8.5863	5.6053
	(36.93)	(23.92)	(35.18)	(8.49)	(6.02)	(11.29)
Observations	59846	28800	31046	59846	28800	31046
R-squared	0.12	0.13	0.11	0.03	0.04	0.03
Number of Individuals				25562	12341	13221

- robust t-statistics are in parentheses; SE clustered at the individual level. BMI =(weight in kilos)/(height in meters squared)

Covariates include age-band and time dummies; federal state dummies; the log of real household income; and an unemployment dummy. Pooled OLS regressions also include education dummies.

	Mean (Std. Dev.)		
	All	*Male*	*Female*
Life sat.	*6.924 (1.790)*	*6.934 (1.769)*	*6.915 (1.810)*
BMI	*25.514 (4.475)*	*26.203 (4.042)*	*24.871 (4.755)*

Table 8. Life satisfaction equations: Exploring nonlinearities between subjective well-being and BMI in German GSOEP Data

	Pooled OLS			**Fixed Effects**		
	All	Male	Female	All	Male	Female
BMI	0.0452	0.0634	0.0475	0.0680	0.0788	0.0626
	(3.51)	(3.17)	(2.71)	(4.31)	(3.25)	(3.00)
BMI Squared	-0.0010	-0.0012	-0.0012	-0.0007	-0.0007	-0.0007
	(4.69)	(3.55)	(3.86)	(2.80)	(2.01)	(2.03)
Turning Point	*21.4374*	*26.3885*	*19.9245*	*50.0147*	*52.9751*	*47.7484*
Constant	4.8006	4.3199	4.6821	8.1120	7.8913	8.3944
	(20.92)	(12.17)	(16.54)	(7.67)	(5.38)	(5.51)
Observations	59846	28800	31046	59846	28800	31046
R-squared	0.12	0.14	0.12	0.03	0.04	0.03

- robust t-statistics are in parentheses; SE clustered at the individual level. BMI =(weight in kilos)/(height in meters squared)

Covariates include age-band and time dummies; federal state dummies; the log of real household income; and an unemployment dummy. Pooled OLS regressions also include education dummies.

Table 9. Life satisfaction equations: With absolute and relative BMI in German GSOEP data

	Pooled OLS			**Fixed Effects**		
	All	Male	Female	All	Male	Female
Log BMI	-0.338	-0.112	-0.463	0.75	0.92	0.657
	(5.56)	(-1.13)	(-5.73)	(6.78)	(5.37)	(4.51)
Log Average BMI	2.417	4.928	-0.073	1.57	4.536	-1.111
	(-1.62)	(2.37)	(-0.03)	(1.09)	(2.22)	(-0.55)
Constant	-1.487	-10.441	6.329	1.85	-11.789	7.659
	(-0.31)	(-1.56)	(-0.91)	(-0.38)	(1.77)	(-1.17)
Observations	59846	28800	31046	59846	28800	31046
R-squared	0.12	0.13	0.11	0.03	0.04	0.03
Number of Individuals				25562	12341	13221

- Robust t-statistics are in parentheses; SE clustered at the individual level.

BMI =(weight in kilos)/(height in meters squared)
Average BMI =BMI averaged over year and federal state
Covariates include age-band and time dummies; federal state dummies; the log of real household income; and an unemployment dummy. Pooled OLS regressions also include education dummies.

Appendix Table A1. Life and weight satisfaction equations NCDS (age 40) and BCS (age 32), 2000

	Life satisfaction		Weight satisfaction	
	Men	Women	Men	Women
NCDS	-.1733 (4.26)	-.1722 (4.56)	.4175 (8.39)	.0287 (0.59)
BMI	.0128 (2.75)	.0454 (2.07)	1.5510 (27.63)	1.8427 (41.61)
BMI^2		-.0008 (2.20)	-.0167 (17.12)	-.0218 (29.29)
Black	-.5856 (2.04)	-.1065 (0.48)	-1.0972 (2.95)	-.4373 (1.44)
Age left school	.0351 (4.45)	.0272 (3.36)	.0764 (7.72)	.0458 (4.35)
Married	.8219 (15.12)	.8806 (15.76)	-.0033 (0.05)	-.0995 (1.38)
Cohabiting	.4034 (6.58)	.4194 (6.59)	-.0322 (0.43)	.1144 (1.39)
Separated	-.2569 (1.82)	-.4706 (3.75)	-.2399 (1.40)	-.1986 (1.20)
Divorced	-.0404 (0.42)	-.1043 (1.27)	-.2354 (2.01)	-.1032 (0.95)
Widowed	-1.0148 (2.33)	-.1767 (0.66)	-.0652 (0.11)	.3433 (0.91)
Part-time employee	-.4478 (2.60)	-.1208 (2.72)	-.0844 (0.41)	.0492 (0.86)
Full-time self	.0908 (1.71)	.1866 (1.96)	-.1867 (2.88)	.0970 (0.78)
Part-time self	-.3532 (1.49)	.1257 (1.09)	-.5017 (1.78)	.0862 (0.58)
Unemployed	-.7805 (7.68)	-.5010 (3.82)	-.0573 (0.47)	.1227 (0.71)
Student	-.2673 (1.04)	-.0589 (0.34)	.1871 (0.63)	.2556 (1.11)
Govt. scheme	-.5945 (1.44)	-.9232 (1.25)	-.3590 (0.74)	-.8727 (0.99)
Temporary sick	-.9438 (3.60)	-.4407 (1.78)	-.5616 (1.72)	-.3474 (1.06)
Permanently disabled	-1.4827 (13.24)	-1.1829 (10.50)	-.1733 (1.30)	-.0305 (0.21)
Home worker	-.0567 (0.24)	.0104 (0.19)	-.0310 (0.12)	-.0104 (0.15)
Retired	1.2843 (1.68)	-.0975 (0.14)	-1.1797 (1.11)	-.6519 (0.73)
Own home outright	.3746 (4.29)	.8178 (9.89)	.1311 (1.25)	-.0074 (0.07)
Own with mortgage	.3832 (7.36)	.5461 (11.38)	.0486 (0.77)	.1280 (2.09)
Shared ownership	.2743 (0.92)	-.4808 (1.92)	.1953 (0.55)	-.4361 (1.38)
Rent free	.1097 (1.07)	.7089 (6.00)	.1684 (1.38)	-.0551 (0.37)
cut1	-3.9049	-3.6026	26.0809	26.9370
cut2	-2.8092	-2.2581	29.9799	31.4368
cut3	-2.2648	-1.8142	34.6906	36.3027

cut4	-1.6299	-1.2216		
cut5	-1.0616	-.6763		
cut6	-.2387	.1911		
cut7	.4121	.7499		
cut8	1.5768	1.6770		
cut9	3.1023	2.9778		
cut10	4.3533	4.1207		
Pseudo R^2	.0286	.0274	.3604	.4381
N	9604	10426	9705	10494

Source: National Child Development Study (1958) and British Cohort Study (1970)

Notes: excluded categories; rented; full-time employee. t-statistics in parentheses.
BMI^2 never significant for men in a life satisfaction equation.

Would you say you were ...READ OUT...

	BCS	NCDS	BCS	NCDS
	Men		Women	
Underweight	11	6	5	4
About right	44	34	39	32
Slightly overweight	40	52	43	45
Very overweight	6	9	13	19

Here is a scale from 0-10 where '0' means that you are completely dissatisfied and '10' means that you are completely satisfied. Please enter the number which corresponds with how satisfied or dissatisfied you are about the way you life has turned out so far.
| | : | [0]] [1]] [2]] [3]] [4]] [5]] [6]] [7]] [8]] [9]] [10]]
| | : | completely satisfied
| | : | completely dissatisfied

NCDS men=7.23; BCS men=7.19
NCDS women=7.34; BCS women=7.39