Anorexia, Body Image and Peer Effects: Evidence from a Sample of European Women

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Abstract

Excessive preoccupation with self-image (or identity) is regarded as a factor contributing to the proliferation of food disorders, especially among young women. This paper models how self-image and peer effects influence health-related behaviours, specifically food disorders. We empirically test this claim using data from the European survey. Our findings suggest that the larger the peers' body-mass, the lower the likelihood of being anorexic. Self-image is correlated with body weight. We use several definitions of peers' body mass and we find that all are negatively associated with the likelihood of women being thin or extremely thin.

Key words: self-image, identity, body image, eating disorders, anorexia, European women

JEL: I12, Q18.

1. Introduction

It is becoming increasingly apparent that standards of physical appearance are important and powerful motivators of human behaviour, especially regarding health and food. However, the content and formation of these ideal-body standards have yet to be explored in the economics literature. Case studies of eating disorders constitute a natural example to investigate how changes in social attitudes towards physical appearance explain irregular health behaviour such as eating disorders among women. Anorexia together with other food disorders such as bulimia nervosa can be characterized by a *distorted body image* accompanied by an eating obsession. Eating disorders can have damaging, and even devastating and life-threatening effects (APA, 2000). About 6% of those who suffer from anorexia nervosa die from it (Birmingham *et al*, 2005). Given that the relatively young females are more at risk, it becomes especially important to understand how food disorders are engendered, identifying the motivation underpinning them.

The reasons for the increasing trend towards food disorders are yet to be fully understood. Some critics have argued that the phenomenon of anorexia is a paradigmatic example where economics needs to examine preference formation given that anorexia and food disorders more generally are recognised as "an extreme response to the pressures (for example, to thinness) that are experienced by most if not all women" (Fine, 1995). This paper is the first attempt to model anorexia and test some of these claims empirically. Only one other paper by Goldfarb *et al*. (2009) proposes a model explaining anorexic disorders (low calorie intakes, purging behaviours) that is based on taste variations and on an implicit rational choice to be underweight. However, Goldfarb's model does not attempt to include or explain the formation of self-image, which, as we argue, is essential to understand food disorders. Similarly, Ham (2009) proposes a model of addiction to explain bulimia nervosa, but does not look at preference formation either. In the social science literature the formation of social identity is seen as a key factor, and it is thought that food disorders are probably the result of some 'socially transmitted' standard of 'ideal' body image affecting food intake and exercise. Mainstream literature in social psychology regards social image as being continually under construction and essential in determining physical, psychological and social equilibrium (Schilder, 1958), hence anorexia results from a tension between aesthetic and utilitarian reactions to food ingestion (Orbach, 1993). When applied to food disorders, this could explain some extreme forms of weight aversion. This is the first claim of the paper.

Secondly, in explaining the formation of self-image, we claim that network phenomena appear to be relevant to the biological and behavioural trait of obesity (Christakis and Fowler, 2007) as reflecting the tensions between the imperatives to eat and not to eat (Fine, 1995). Although the correlation between network effects and obesity is contested in Cohen-Cole and Fletcher (2008), Trogdon *et al.* (2008) using a sample of adolescents found that mean peer-weight is correlated with individual weight, suggesting that early health behaviour is significantly determined by social influences. However, the specific mechanisms behind peer-pressure on food disorders are unknown and require careful examination; the fact that members of the peer group have a similar self-identity is a necessary, but not sufficient, condition for the presence of social-multiplier effects (Costa-Font and Gil, 2004). To measure the strength of such socially transmitted influences on individual behaviour it seems appropriate to use the concept of peer or social-multiplier effect, as applied in Glaeser et al. (1996) and in Sacerdote (2000). This concept arises not only when women have similar behaviour or representations (self-identity) due to sharing a common environment, but also when they belong to certain unobservable social groups (see Manski, 1993). Economic explanations of health prevention require a better understanding of the effects of social identity and self-image on health, and the development of empirical strategies to measure these effects.

Recent contributions to the economics literature enable baseline modelling. Akerlof and Kranton (2000) wrote the seminal paper in this area and included an application to gender attitudes. Bodenhorn and Ruebeck (2003) created models for the influence of identity on ethnic preferences. However, there is not much in the literature on the role of social identity as a determinant of health. Blanchflower *et al* 2008 used Eurobarometer data for 29 countries to show that overweight perceptions and dieting were influenced by the individual relative body mass index (BMI). Lakdawalla and Philipson (2002) referred to an 'ideal weight', and Etile (2007) examined the role of social norms on obesity and concluded that social norms have an effect on ideal body-weight (for women). Gardner (1996) discussed the role of body-image in behavioural reactions in cases where individuals perceived a large gap between their desired image and the one they actually had, suggesting that this gap gave rise to permanently distorted self-perceptions of the body. Altogether, the power exerted by media stereotypes of beauty and the social norms that individuals are immersed in – especially the association between thinness, aesthetic ideals and success (Hill, 1993) – is widely accepted. Further, it has been suggested that the consequent fear of rejection based on physical appearance is

behind the increase in the number of persons suffering from eating disorders. Hence, one can hypothesize that eating disorders are 'socially formed' rather than a biological pathology (Bordo, 2003). Hutchinson (1982) points out that 'body image' refers not only to the description of the body but to the place 'where body, mind and culture meet'. Accordingly, different cultural backgrounds are likely to exert idiosyncratic influences on the prevalence of food disorders, and these need to be controlled for.

The aim of this paper is to build an economic model of eating disorders which relates social and environmental factors to 'self-image' and objective weight. Some of the implications of this model are taken to the data and the effect of underlying determinants is estimated. We use a women-only sample from a representative European data-set (Eurobarometer 59.0). We restrict attention to women since according to the APA (2000) women account for 90% of all anorexia nervosa. Extreme thinness is different from thinness in that it is influenced by some deviance form a "fine rule of healthiness". This paper focuses particularly on the effect of 'peer weight' (which is likely to influence self-image or *social identity*) on the likelihood of anorexia, and the influence of self-image on individual weight. In a joint-modelling exercise, the paper then estimates the determinants of the probability of a woman being *extremely thin* and, at the same time, *seeing herself as fine or too fat*. It then takes the two processes apart and estimates a recursive probit model of *being extremely thin* and *perceiving oneself as being fine or too fat*, finding that the unobserved factors explaining both processes are correlated. This paper supports the hypothesis that social pressure through peer-shape is determinant in explaining anorexia nervosa and distorted self-perception of one's own body. To the authors' knowledge, there is no previous study examining anorexia that uses an economic decision-model perspective combining self-image – or self-identity – formation and individual health production. The Oswald and Powdthavee (2007) study on wellbeing an obesity finds that anorexics typically exhibit a convex utility function with respect to weight. A contribution of our study is to introduce identity or self-image to capture the tradeoffs women face between following social pressures to attain a certain body shape and their health.

The structure of the paper is as follows: Section 2 provides some background on the issue of self-image and healthy eating among women. Section 3 proposes an economic model for eating disorders. Section 4 sets out the empirical strategy used, describes the data-set and estimates a reduced-form equation derived from the model. Section 5 presents the estimation results and Section 6 contains a discussion and conclusions.

2. Background

Standard health production models fail to explain irregular behaviours such as those of anorexics. Different factors have been suggested as possible determinants of anorexia, and generally evidence does not suggest a clear consistency with the inclusion of social effects. Some of these are related to 'nature', i.e. gender, genes and predisposition. Other factors are more closely related to 'nurture' i.e. parental values and socio-cultural influences. In the main, these determinants seem to make individuals susceptible to having their food and exercise intake shaped by the strong socio-environmental pressures, which in this paper we define as influencing what an ideal body looks like.

Puberty and anorexia. Girls who achieve sexual maturity ahead of their peers, with the associated development of breasts, hips, and other physical signs of womanhood, are at increased risk of becoming eating-disordered (Bordo, 2003). These girls often wrongly interpret their new curves as signs of fatness and feel uncomfortable because they no longer look like their peers, who still have childish bodies. A young woman in this group may 'tackle' her body, partly because she wants3 to take control and 'fix' her insecurity and importantly because they are under the influence of a culture that equates success and happiness with thinness. For this group of young women, dieting, bingeing, purging, exercising, and other strange forms of behaviour are not random, but the result of a conscious decision process.

Family and anorexia. There is some evidence indicating that eating disorders may run in families. Parents influence their off-springs' values and priorities, including those towards food. Some people with eating disorders report having felt smothered in overprotective families. Others have felt abandoned, misunderstood and alone. Parents who overvalue physical appearance can unwittingly contribute to an eating disorder, as can parents who make critical comments, even in jest, about their children's bodies. Furthermore, families that include a person with an eating disorder tend to be rigid and ineffective at resolving conflicts. In some such cases mothers are emotionally cool while fathers are physically and/or emotionally absent. At the same time, there are high expectations of achievement and success. Children in this type of family learn not to disclose doubts, fears, anxieties, and imperfections. Instead they try to solve their problems by manipulating weight and food, in

an attempt to achieve the appearance of success, even if they do not feel successful (Bordo, 1993). Generally, anorexics reveal great fear of the criticism and rejection that would occur if their perceived flaws and shortcomings should become known (Bachar *et al*, 2001).

Genetic Factors. Some studies suggest that there may be a genetic component in anorexia. According to recent research (Fairburn *et al* 2005) genetic factors account for more than half (56%) of the risk of developing anorexia nervosa and work on the genetics of bulimia and binge-eating is under way. There are suggestions that women who develop anorexia nervosa have excess activity in the brain's dopamine receptors, which regulate pleasure. This may explain why they feel driven to lose weight but receive no pleasure from shedding pounds (Frank, *et al 2005*).

Network effects: the media. Many people believe media stereotyping helps explain why about 90% of people with eating disorders are women and only 10% are men (Thompson and Heinberg, 2002). In westernised countries, characterized by competitive striving for success, women often experience unrealistic cultural demands for thinness. According to *Health* magazine (April 2002), in the United States (US) 32% of female TV-network characters are underweight, while only 5% of the female audience is underweight. Similarly, only 3% of female TV-network characters are obese, while 25% of US women fall into that category. The differences between media images of happy, successful men and women are interesting. While women appear young, beautiful and thin, men are young or old, but strong and powerful in all the areas that matter – physically, in business, and socially. Thin is not desirable in men; power, strength and firmness are.

Despite TV being a dominant media type, some studies have found magazine-reading to be a more consistent predictor than television-viewing (Harrison and Cantor, 2006). Studies of undergraduate women have associated reading fashion magazines with having higher preference for lower weight, having lower confidence on their own body image, feeling frustrated for this reason etc (Turner *et al.*, 1997). The 'ideal' body image portrayed by the media influences social interaction and this may in turn make it more dominant. This circularity only makes the power of social interactions in shaping people's self-identity more extreme.

To sum up, females of similar age, education and background are likely to have been exposed to similar media and social environments and, accordingly, to have similar ideal self-

identities.

3. An economic decision model for eating disorders

Current empirical evidence makes modelling eating disorders complex as one of the assumptions of consumer-choice theory is the principle of non-satiation. According to extant literature, food seems to need to be modelled as an economic 'good' up to a certain caloric intake – which is idiosyncratic due to socially influenced self-perception – and as an economic 'bad' thereafter.

In order to model anorexia, the self-identity model of Akerlof and Kranton (2000) was found to be particularly useful and was adapted to the subject of interest. We assume that individuals choose both food and exercise-related 'actions' - namely their net caloric intake - in order to maximize an implicit utility function that depends not only on their net caloric intake, but also on their self-image (or self-identity) and health. Besides these individual factors, the utility function of individuals is conditioned by their peers' net caloric intake - and also their appearance and their characteristics - and by socio-cultural environmental factors. Thus, the utility function can be modelled as:

$$U_j = U_j(a_j, a_{-j}, c_j, SI_j, H_j; z_j, Z_j) \qquad (1)$$

where a_j is *j'*s net caloric intake; a_{-j} is the appearance of the *j'*s group of reference; c_j reflects *j's* other actions – not related to caloric intake; SI_j is *j'*s self-image; H_j is *j*'s health-production function; z_j are *j'*s characteristics; and Z_j the environmental factors in which *j* is immersed. To simplify our model, we assume that all others' actions, c_j are embedded in the environmental factors, *Zj*. Further, we assume that utility depends on the rather abridged concept of 'net caloric intake' because food and exercise are a source of satisfaction beyond the body weight they achieve.

Similarly to Akerlof and Kranton (2000), self-image SI_j depends not only on *j'*s net caloric intake, a_j, but also on others' body-weight-related actions or appearance, a_{-j}; and is conditioned by *j*'s individual characteristics and environmental factors, z_j and Z_j; and by *j'*s status', s_j - as a person with higher status may have a better self-image than an identical one with lower status. Thus, the equation for self-image is written as:

$$SI_j = I_j(a_j, a_{-j}; s_j, z_j, Z_j) \qquad (2)$$

Finally, a health-production function H_j is added. This depends on *j'*s net caloric intake, a_j; *j'*s status', s_j; and any other individual and environmental factors, z_j and Z_j. The health-production equation is written as follows:

$$H = H(a_j; s_j, z_j, Z_j) \qquad (3)$$

Standard utility maximization subject to a budget constraint under the usual regularity assumptions would lead to an associated first-order condition as follows:

$$\underbrace{\frac{\partial U_j}{\partial a_j}}_{U} + \underbrace{\frac{\partial U_j}{\partial SI_j}\frac{\partial SI_j}{\partial a_j}}_{SI} + \underbrace{\frac{\partial U_j}{\partial H_j}\frac{\partial H_j}{\partial a_j}}_{H} - \lambda P_a = 0 \qquad (4)$$

where λ is the usual income-multiplier and P_a the monetary price of net caloric intake or the combination of food price and exercise monetary cost including the opportunity cost of the time invested in it.

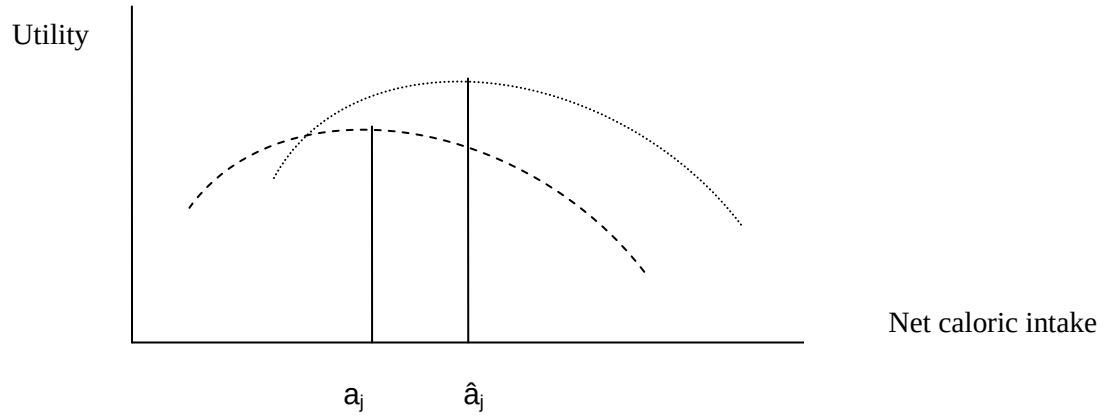
A person without any eating disorder and in a range of net-caloric-intake would be expected to receive a positive marginal utility from net-caloric-intake, from health and also from an improved self-image. Also, it is assumed that a normal net-caloric-intake has a positive marginal impact on health, since nutrition is necessary for survival. Thus, the first two summands in equation (4) are expected to be positive.

In contrast, one can expect a negative marginal impact of net caloric intake on self-image after a certain level of net-caloric-intake, which would make the sign of the second term in equation (4) negative. The net-caloric-intake chosen to optimise overall utility will vary depending on the relative magnitude of the positive and negative signs in equation (4) above, bearing in mind that both anorexic and non-anorexic women will eventually confront the economic principle of non-satiation. The difference lies in satiation among anorexic women taking place at lower levels of consumption. In other words, the 'bliss point' of food consumption for anorexics is lower, because the negative effect of eating on self-image is greater for them. The opposite would apply for extremely overweight individuals.

Given the empirical evidence, a person with anorexia will have an extraordinarily large

negative term associated with the effect of net-caloric-intake on self-image. In this special case the utility of net-caloric-intake would achieve a maximum at a much lower level than for a non-anorexic person (see Figure 1). Note that the sign of the self-image term is idiosyncratic insofar as it depends on the impact on each individual of the societal ideal-body-shape that is in fashion.

Figure 1. Optimal equilibrium with and without anorexia



Thus, an anorexic individual chooses a net-caloric-intake a_j that is under the optimal net-caloric-intake $\hat{a}_j$ associated with his/her characteristics had that individual not been anorexic. This minimum-necessary net-caloric-intake threshold can be thought of as the one that would keep individual *j* on a body mass index (BMI) considered 'healthy'. Hence, whilst obesity refers to the negative slope, the problem in this paper refers to the positive slope instead.

From equation (4), we can infer an implicit reduced form of net-caloric-intake that depends on individual status, individual characteristics and the social environment (peer or network effects), which includes the appearance/net-caloric-intake of others. In particular, under standard normality and linearity assumptions, the likelihood of being anorexic, e.g. the probability that the net-caloric-intake of an individual *j* is below his/her minimal healthy level $\hat{a}_j$ can be expressed as:

$$P(a_j < \hat{a}_j) = \varphi(s_j, z_j, Z_j, a_{-j}, c_{-j}) \qquad (5)$$

The next section describes how equation (5) is taken to the data, where observed variables are included and others can be controlled for as country specific effects.

4. Data and Methods

4.1 Data

We combine two types of variables, namely individual-level variables and socio-environmental variables. The former are taken directly from the answers to the Eurobarometer 59.0 questionnaire, study number 3903. Eurobarometer 59.0 is one of the Eurobarometer Surveys that have been conducted each spring and autumn since autumn 1973, adding countries as the European Union has expanded. The usual sample in standard Eurobarometer Surveys is 1,000 people per country, with the exception of Luxembourg (600) and the United Kingdom (1,000 in Great Britain and 300 in Northern Ireland). Also, since Eurobarometer 34, 2,000 people have been sampled in Germany (1,000 in East Germany and 1,000 in West Germany) in order to monitor the integration of the five new *Länder* into unified Germany and the European Union. In each of the 15 member states, the survey is carried out by national institutes associated with the European Opinion Research Group. A special issue, Eurobarometer 59.0, was carried out in all European Union countries between 15th January and 19th February 2003 on behalf of the European Opinion Research Group. The questions from this Special Eurobarometer centred around attitudes towards life-long learning, health issues, dietary habits and alcohol consumption, safety issues, partnership, household tasks, childcare and family planning. It focussed particularly on the incidence of chronic illness, on long-term treatment, on dental health and, in more depth, on health maintenance (by discussing doctor's visits and various screening tests), on women's health and medical tests relating specifically to women's health, and on general and children's safety.

Given that the mechanisms that give rise to anorexia and bulimia particularly affect women (Hill, 1993) this paper focuses on women's behaviour and thus only evidence on women was selected. This gave a sample of 8,740 valid observations on women above 15 years of age. Furthermore, given that anorexia is especially prevalent among younger women, we use a sample of younger women between 15 and 34, which altogether make a sample of 2871 women. The percentage of extremely thin women of all ages ranges from 11% in France to 2% in Germany. The prevalence of Anorexia reaches a peak of 2% in some countries when all women's sample is examined, but when we restrict the analysis to a sample of younger women the maximum prevalence rises to almost 5%.

We scrutinise a set of individual variables ranging from socio-demographic characteristics to biometric measures and behavioural attitudes. This set of variables includes: (self-reported) weight, height, own-body perception, healthiness of eating habits, age, gender, being married,

educational level, professional category, political attitudes, and residence in an urban or rural area. Furthermore, to reflect the freedom and quality of the answers, in some of the specifications the number of people present during the interview and the level of cooperation is included.

Women are categorised as anorexic if they are *extremely thin* (BMI<17.5) but at the same time perceive themselves as being *'just fine' or 'too fat'*. For that purpose, an indicator variable called 'anorexia' was created, which took a value of 1 if a woman had a BMI of less than 17.5 and at the same time saw herself as being 'fine' or 'too fat'. A second anorexia indicator variable labelled as 'severe anorexia' restricted the previous definition by accounting for the fact that the respondent declared herself to be eating adequately (self reported eating). Finally, self image was classified to identify seeing oneself in the 'right weight range or above it', a variable called 'fine or too fat' was created, which took a value of 1 if the individual declared she saw herself as fine or too fat, and of 0 otherwise.

A variable was also created that measured *health consciousness* through the number of declared gynaecological check-ups received during the previous six months of the interview. This variable was used as a control in the regression. A larger number of check ups is interpreted to proxy women's concerns with their own health, which can be hypothesized to explain some of the unobserved heterogeneity in the model.

Figure 2: Prevalence of extreme thinness and anorexia among different age groups

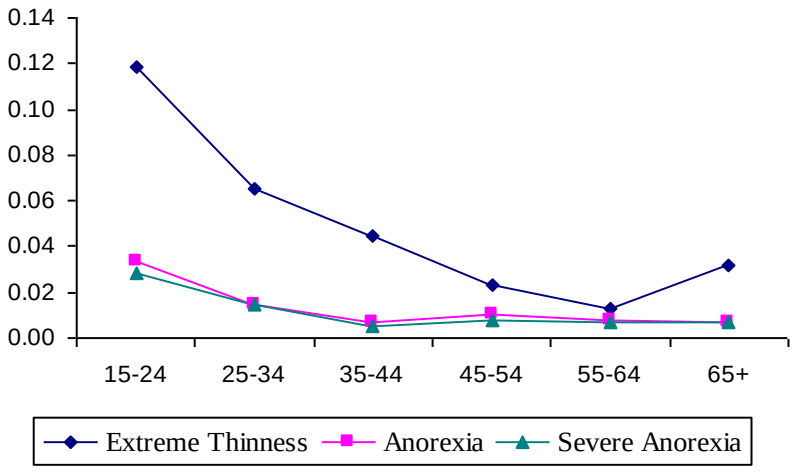


Figure 2 reports the prevalence of the three variables examined in different age groups.

Extreme thinness in terms of very low BMI was highest during early youth (age group 15-24) and progressively decreased until 55-64 years of age, increasing slowly again in the late years of life. This could be due to attrition alongside later life metabolic conditions. Anorexia, as defined here, had a prevalence of 3% for women aged between 15 and 24, just slightly higher than severe anorexia. Both conditions followed a decreasing pattern till the age of 35, after which they remained relatively constant at about 1%. We found that the prevalence of anorexia is just below 4% for younger age groups and just below 2% among women aged 25-34. Therefore, women 34 or below are expected to present a different pattern from women over 34.

The first panel in Table 1 provides some overall statistics for the data (N=8,740). The average age of the women in the sample was 45. Of these, 57% were married, 37.5% were heads of household and 27% lived in a small town or rural area. Roughly 26% had completed primary education, 41% had finished compulsory secondary education, 24% had studied up to 18 years of age, and 9.4% held a university degree. The average value of the variable 'being health conscious' for the full sample was 1.25, indicating the average number of gynaecological screenings received over the previous 6 months.

The second panel in Table 1 shows the descriptive statistics for young women, who had a higher incidence of food disorders. This group included the women between 15 and 34 years of age, with an average age of 25 years. Only 47% were married (in part due to increasing cohabitation), 28% were heads of household and 30% lived in a small town or rural area. Eight per cent had completed primary education, 41% compulsory secondary education, 23% had studied until the age of 18, and 27% held a university degree (indicating some cohort differences with previous generations). For this younger group (N=2,871), the average number of gynaecological check-ups during the last half-year was 1. Other variables such and individual's income were initially included but were never significant, and were finally not included in the reported specifications below. Our analysis includes country fixed effects to explore the variability within countries. Finally, we report a set of robustness checks, which account for the inclusion of different controls.

Table 1. Descriptive statistics

Variable	ALL WOMEN	WOMEN 15-34 years
	Mean (Std. Dev)	Mean (Std. Dev)
Age	45.07 (17.9)	25.40 (5.59)
Married	0.568	0.469
Being head of household	0.375	0.276
Living in rural area	0.268	0.301
Having completed primary education	0.260	0.083
Having completed secondary education	0.407	0.411
Having received education up to 18 years	0.239	0.234
Holding a university degree	0.094	0.273
Being health conscious (using number of gynaecological check-ups)	1.3 (1.5)	1.0 (1.3)
Peer effects: group BMI	25.40 (5.59)	24.7 (1.9)
Observations	8,740	2,871

Source: own elaboration using data from Eurobarometer 59.0 study number 3903

In order to reflect the woman's peer effect (pressure felt in terms of acceptable body-shape in her social environment/setting) different variables were created to represent the appearance of others around her. These measures were: the average BMI of women with the same education level, same reference age group (in ten-year groups), living in a similar environment (rural or urban) and in the same immediate region of residence – all estimated using a recursive system. Since individual BMI and BMI of the group of reference may be affected by common unobserved factors, an instrument for peer BMI was developed using the average BMI of women meeting the above criteria but from a different generation – i.e. five to ten years older. All these effects would be expected to account for contemporaneous geographical influences and, arguably could pick up to some reverse causality form younger generations to older ones. This strategy can be found in other studies such as Grodner and Kniesner (2006) and Etilé (2007) where ideal BMI is used. In an attempt to reflect social norms and image patterns, a variable called '*women's magazines per capita'* was included (measured by subscriptions), referring to the number of magazines categorized as 'for women.' that were made available.

Table 2 provides a breakdown of average BMI by country and age-group, the percentage of women with a BMI below 17.5; the percentage of women 'seeing themselves as fine or too fat', the percentage of women who saw themselves as fine or too fat while having a BMI

below 17.5 (defined here as anorexic); the percentage of women who believed they ate adequately; and finally, the percentage of women with a BMI below 17.5, who saw themselves as fine or too fat and believed they were eating adequately (defined as severe anorexic). The last column reports the circulation of women's magazines per 1,000 persons. At the bottom of the table, we report the aggregate average BMI and the standard deviation for these groups of women as categorized above.

The average BMI by country is about 25 for all ages and 23 for those between 15 and 34 years of age. The country with highest average BMI for all women was Greece (25.85) and the lowest average BMI was that of Austria (23.67); for young women the highest average BMI was that of Belgium (23.41) and the lowest average BMI was that of Italy (21.40). The country with the highest prevalence of female anorexia (column 4) was Austria (1.55%), followed by France and Ireland. The lowest prevalence was in Northern Ireland. For the younger group of women, the highest prevalence of anorexia was in Austria (4.60%) and the lowest in West Germany. Almost all countries contained a population that was generally worried about its body weight, ranging from 56.29 in Northern Ireland to 35.97% in Ireland. In the younger group of women, Luxembourg and Netherland had the highest percentage with 49.42%, while Spain had only 22%. Consistently, the highest percentages of women who declared they ate adequately were found in Denmark (95.53%) and Finland (90.59%) and the lowest were found in Greece (64.07%) and Austria (78.86%). And, consistently with all the above, the highest prevalence of anorexia was found in Austria, Italy and Ireland among both young women and the full sample. Substantial differences were found between the sample of younger women and the sample of women of all ages, suggesting that anorexia is very much a recent phenomenon. Significant differences between younger women and women as a whole were found in Austria, Ireland, Italy and Luxembourg, where a significant high prevalence of anorexia was found among younger women. Interestingly, with hardly any exceptions it was found that self-reported perception of eating adequately was higher among older women that among younger ones. Finally, aggregate circulation of women’s magazines was particularly high in Northern Ireland and Austria, though it was also high in West Germany and Luxembourg.

Table 2: Country-specific BMI* average and other measures of thinness and self-image

Country	obs	BMI		BMI < 17.5		Fine or Too Fat		BMI<17.5 and Fine or Too Fat		Eating fine		BMI<17.5, Fine or Too Fat at and Eating Fine		Magazines
		All	Young	All	Young	All	Young	All	Young	All	Young	All	Young	
Belgium	519	24.67	23.41	1.35%	1.72%	48.31%	46.81%	0.39%	0.57%	85.08%	78.19%	0.39%	0.57%	0.053
Denmark	494	24.19	22.90	1.21%	2.22%	44.44%	40.29%	0.81%	1.48%	92.53%	82.01%	0.61%	0.74%	0.042
Germany East	508	24.03	22.19	0.62%	2.90%	41.56%	34.19%	0.21%	1.45%	82.77%	82.58%	0.00%	1.45%	0.037
Germany West	487	25.45	22.96	0.98%	1.56%	45.78%	37.06%	0.39%	0.00%	82.79%	76.22%	0.39%	0.00%	0.214
Greece	467	25.85	23.37	0.43%	1.20%	51.30%	38.15%	0.21%	0.60%	64.07%	54.91%	0.00%	0.00%	0.022
Spain	500	24.86	21.91	0.62%	0.54%	37.79%	22.40%	0.21%	0.54%	88.95%	90.10%	0.21%	0.54%	0.025
France	484	23.34	21.67	3.66%	5.14%	48.37%	40.22%	1.42%	1.14%	80.42%	75.54%	1.02%	0.00%	0.044
United Kingdom	492	25.98	25.05	1.18%	2.44%	54.73%	49.17%	0.51%	0.98%	82.84%	76.45%	0.34%	0.49%	0.037
Ireland	454	24.06	24.42	1.76%	3.19%	35.97%	30.48%	1.32%	2.66%	87.94%	87.62%	1.32%	2.66%	0.027
Italy	167	23.66	21.40	1.80%	3.90%	41.21%	33.94%	0.80%	2.60%	79.96%	75.15%	0.80%	2.60%	1.32
Luxembourg	309	24.00	22.03	3.56%	4.65%	48.10%	39.77%	1.29%	2.33%	84.49%	75.00%	1.29%	2.33%	1.159
The Netherlands	480	25.63	24.23	0.63%	0.00%	51.94%	49.42%	0.00%	0.00%	90.12%	86.63%	0.00%	0.00%	0.069
Northern Ireland	486	25.26	22.80	0.00%	0.00%	56.29%	49.21%	0.00%	0.00%	82.04%	76.19%	0.00%	0.00%	0.019
Austria	592	23.67	21.94	1.74%	5.17%	38.30%	29.63%	1.55%	4.60%	78.86%	76.72%	1.35%	4.02%	0.037
Portugal	557	25.41	23.01	1.23%	2.84%	42.12%	28.57%	0.62%	1.14%	83.88%	85.71%	0.62%	1.14%	0.097
Finland	499	25.31	23.16	1.08%	1.62%	49.75%	37.93%	0.54%	0.54%	90.59%	85.71%	0.54%	0.54%	0.043
Sweden	517	24.28	22.57	1.60%	2.50%	49.91%	38.07%	0.60%	1.25%	84.77%	82.95%	0.40%	0.63%	0.052
Average BMI (standard dev)		24.69 (4.88)	22.88 (4.28)	16.60 (0.85)	16.64 (0.82)	27.03 (4.84)	26.06 (4.56)	16.66 (1.01)	16.66 (0.95)	24.48 (4.72)	22.68 (4.12)	16.62 (1.08)	16.62 (1.04)	

*Body mass index

Note: Eurobaometer and World Magazine Trends FIPP/ ZenithOptimedia World Magazine Trends

§

Empirical Strategy

Given the dual health production and social dimension of the question examined, we followed a two-step approach. First we estimated the impact of network effects and several covariates on the likelihood of just being anorexic, i.e. equation (5) above. Then, in a second step we used a bivariate recursive (seemingly unrelated) probit specification to separate the two processes involved the definition of anorexia, namely being extremely thinness (an outcome of the health production function in equation 3 above) and 'seeing oneself as fine or too fat' (self-image formation in equation 2 above). The bivariate recursive probit allows a better empirical representation of the theoretical model as it accounts for common unobserved heterogeneity in these two processes. Also, it allowed us to disentangle the effect of different variables on the two separate processes. For instance, variables such as magazine circulation are expected to correlate with self-image but not with health production, unless channelled through self-image. That is, although printed health stories influence extreme thinness, we assume they do so through self-image rather than other routes.

In the light of both the empirical evidence and the model specification in section 2, we model the individual's propensity to be anorexic using a latent variable, A_j^*, which depends on individual and socio-environmental characteristics:

$$A_j^* = \beta w_j + \gamma Z_j + \alpha a_{-j} + \varepsilon_j \quad (6)$$

where w_j are individual-specific controls and determinants of j's status such as gender, age, professional status, political affiliation and education, labelled as in equation (5); Z_j refers to the socio-environmental factors that individual j faces - including prevalence of women's magazines, country's access to the internet, trust in the press, etc. and, for simplicity we assume that Z_{-j} contains c_{-j} all others' actions not related to a_{-j}. which stands for peers' appearance; and, as usual, ε_j represents j's unobserved idiosyncratic characteristics. Based on our own definition of anorexia (see above to address the DSM-IV[1] criteria), we created a dichotomous variable that takes value 1 if the person can be considered anorexic and 0 otherwise:

$$A_j = 1_{(A^*>0)} = \begin{cases} 1 & if \quad A_j^* > 0 \\ 0 & otherwise \end{cases}$$

[1] The DSM-IV stands for the Diagnostic and Statistical Manual of Mental Disorders, which is a coding system developed by the American Psychiatric Association to identify mental health disorders.

Assuming normality of the error term in equation (6), it is possible to estimate the likelihood of being anorexic in the form of the probit model:

$$P(A_j = 1 \mid w_j, Z_j, a_{-j}) = \Phi(\varepsilon_j \leq \beta w_j + \gamma Z_j + \alpha a_{-j}) \quad (7)$$

where is the normal-distribution cumulative-probability function.

b) *Joint estimation of own-body self image and health-production function*
This second empirical exercise investigates how w_j , Z_j and a_{-j} affect the two different processes involved in anorexia according to the paper's own definition: 1. having a self-image of being in the right weight range or simply too fat; and, 2. being extremely thin.

We assumed that seeing oneself on the right weight range or too fat is an outcome reflecting one's latent (body) 'self-identity' as in equation (2). In order to simplify the analysis, we assume that SI^*_j depends linearly on individual characteristics and status (summarized in variable w_j,) and on peers' appearance (a-$_j$.):

$$SI^*_j = \zeta w_j + \vartheta a_{-j} + e_j \qquad (8)$$

Once again, in the survey we do not observe the 'propensity' to see oneself as fine or too fat, so we create a dichotomous variable, SI_j, that takes a value of 1 if the individual declares she sees herself to do so and 0 otherwise. Under the usual linearity and normality assumptions, this dichotomous variable allows us to obtain the probit model below:

$$P(SI_j = 1 \mid w_j, a_{-j}) = \Phi(e_j \leq \zeta w_j + \vartheta a_{-j}) \qquad (8b)$$

We test different specifications of our health production function outcome, we define another measure of the health production function *being extremely thin* (BMI<17.5) may be thought of as a partial representation of the individual's latent health-production function H_j,. As before, what is being observed is the dichotomous variable, associated with this process. The variable H_j, takes value 1 when the individual is extremely thin and 0 otherwise.

We assume that the propensity to *being extremely thin*, labelled UW_j^*, depends linearly on individual characteristics and status, environmental variables, peer appearance, and also – and very importantly – on the individual's own-body perception or self-image, SI^*. *Being extremely thin* may also depend on additional factors and it is not necessary caused by a personal propensity to having a distorted self-image, x_j.

$$UW_j^* = \varsigma SI^*_j + \nu w_j + \lambda Z_j + \rho x_j + \mu_j \quad (9)$$

As before, in the survey we do not observe the 'propensity' to be extremely thin, so we create a dichotomous variable, UW_j, that takes a value of 1 if the individual declares is extremely thin and 0 otherwise.

$$P(UW_j = 1 | SI_j, w_j, Z_j, x_j, a_{-j}) = \Phi(\mu_j \leq \varsigma SI^*_j + \nu w_j + \lambda Z_j + \rho x_j) \quad (9b)$$

The system formed by equations (8b) and (9b) above is estimated on a recursive probit model by assuming that the idiosyncratic terms μ_j and e_j are jointly normally distributed. The identification of parameters in the recursive probit model defined by equations (8b) and (9b) is satisfied by the inclusion of variables x_j in equation (9b) that do not appear in equation (8b) and the triangularity created by the fact that a propensity to being underweight is influenced by a distorted own-body self image but not the other way around.

By estimating the recursive probit model above, it was possible to investigate how individual and environmental factors influence these two processes, while allowing the unobserved factors affecting self-image and extreme thinness to be correlated. Furthermore, cross-country genetic variations in BMI can be controlled for by the inclusion of country dummies and clustering standard errors were always clustered. A country fixed effect allows exploring the individual's variability within each country, which can pick up some of the unobserved cultural influenced on self-image and desired weight.

5. Results and discussion

This section contains the results of estimating the probit model for being anorexic according to the definition outlined above in equation (7). It also displays the results of estimating a recursive probit model formed by equations (8) and (9), which made it possible to correlate not only error terms but also self-image and extreme body-weight (thinness) in line with the theoretical prediction displayed in Figure 1.

Table 3 displays the results of the preliminary strategy, which consisted of estimating a probit model to determine which observable factors could cause a woman to *see herself as fine or too fat* whilst *being extremely thin* (BMI<17.5) - which we call Anorexia. These are displayed in column 1 or, if the woman also thought she was eating adequately (Extreme Anorexia), in column 2. One probit model was estimated for the full sample and one for women between 15 and 34 years of age. There were several explanatory variables or potential determinants of such behaviour: marital status; living in a rural setting; being the head of the

household age (being the excluded group girls aged 18 to 24); education; and a proxy of health-consciousness based on the declared number of gynaecological screenings taken in the last 6 months. Some potential socio-environmental factors were also included: the circulation of women's magazines per capita in the country of residence, and peer BMI – based on the BMI of women in the same age-bracket living in the same region.

For the full sample of women, the estimated marginal effects (see Table 3) showed, as expected, that *the BMI of the group of reference in terms of age, gender and location was very significant and negative* -0.0015 for the full sample, -0.0026 for the sample of younger women. Thus, the higher the BMI of the peer group, the lower the probability of suffering from anorexia. For the younger women, the effect of peer BMI was even more marked, in terms of decreasing the probability of being anorexic. Taking into account that the peers' BMI is 24.11 with a standard deviation of about 2, we can interpret the magnitude of this coefficient in the right context: A change in one standard deviation in the peers' BMI reduces the probability of anorexia by 0.5%, i.e. 0.0026 times 2 is 0.0052. Being married, as opposed to not, was only significant for the full sample. Ceteris paribus, the probability of anorexia is higher for the excluded group (women aged 15 to 24 years of age) followed by women aged 45-55, and in turn followed by women aged 25 to 34 and 35-44. These results suggest the presence of cohort effects. However, in the case of severe anorexia, cohort effects are less marked, suggesting that the younger the women, the more likely it is to suffer anorexia. Results show that having secondary education or having been to university all decreased the likelihood of being anorexic or severely anorexic as defined above. These values reflect cohort effects as explained latter in the results for the recursive probit specification. The signs of the results for being married are influenced by cohort effects which alongside respondent's age and education are the expected ones. Network of peer effects are in line with expectation and the literature on social-multiplier effects (Glaeser *et al*, 1996; Sacerdote, 2000). Nevertheless, this result should be interpreted with caution because only a crude measure of 'peer effect' was used. Yet, we will come back to this point when dealing with robustness checks.

Surprisingly, living in a rural setting, being the head of the family, and the measure of women's magazine circulation were not significant covariates explaining the probability of anorexia for either group. Being in a rural environment was found not to be significant, although urban women were expected to be subject to more social pressure with regards to their appearance than those living in rural settings. However, this might have had to do with other household-related variables such as quality and type of parenthood (Fairburn et al, 1999), which remained unobservable due to lack of data. The non-significance of being the

head of the household was sensitive to the inclusion of education, which may be picking up part of the 'being head of the household' variation effect. However, given that what is being studied is a combination of self-image and thinness, it might well be that the effects cancel each other out, and this calls for a separate estimation strategy. The result of non-significance for the women's magazine circulation per capita was quite puzzling as it was not consistent with some specific studies on the subject (Turner *et al.*, 1997). This may be due to the crudeness of the country measure and the possibility that the categories are not comparable across countries; perhaps better quality data was required to measure the effect of environmental or media-related variables.

The effects of these variables on the probability of being severely anorexic were qualitatively very similar but slightly less marked than the ones commented on above.

Table 3. Probit model of the likelihood of suffering from anorexia

	Anorexia §		Severe Anorexia §§	
VARIABLES*	All women	Younger women 15-34	All women	Younger women 15-34
Peer effects: group BMI	-0.0015***	-0.0026*	-0.0014***	-0.0023**
	(0.00457)	(0.01)	(0.0042)	(0.01)
Being married	-0.0381*	-0.0370	-0.00459*	-0.00681
	(0.002)	(0.006)	-(0.002)	(0.006)
Being health conscious†	0.00076**	0.00265	0.000493	0.00162
	(0.001)	(0.00214)	(0.001)	(0.002)
Between 25 and 34 years old	-0.0327***	-0.0134***	-0.0221**	-0.0752*
	(0.001)	(0.005)	(0.001)	(0.004)
Between 35 and 44 years old	-0.0487***		-0.0368**	
	(0.001)		(0.002)	
More than 45 years of age	-0.0101***		-0.0682***	
	(0.003)		(0.002)	
Having completed secondary education	-0.0256**	-0.0539	-0.0182**	-0.0278
	(0.001)	(0.004)	(0.001)	(0.004)
Having a university degree	-0.0247**	-0.0535	-0.0210*	-0.0404
	(0.001)	(0.006)	(0.001)	(0.005)
Controlled by country of origin	Yes	Yes	Yes	Yes
Number of observations	8012	2654	8012	2654
Psudo R squared	0.0859	0.0484	0.0788	0.0217
LogLikelihood	-275.1	-180.8	-242.5	-145
Number of clusters (countries)	17	17	17	17

Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1
Women's Magazine circulation per capita, living in a rural environment, being the head of the household, and having education up to 18 years of age, were included but were not significant.

§ Anorexia is defined as when the subject is below 17.5 BMI and sees herself as a fine or too fat person.
§§ Severe Anorexia is defined as when the subject is below 17.5 BMI, considers herself fine or too fat and also thinks she is eating appropriately.
† Being health conscious is defined as the sum of all gynaecological screenings received in the last 6 months.

Robustness checks for the probability of being anorexic

To test the robustness of the specifications in Table 3, their impact on the peer marginal-effect coefficient was estimated by adding the controls incrementally (see Table 4 below). The results obtained suggested that the peer marginal-effect was robust to these changes, although the introduction of additional covariates progressively decreased the coefficient from -0.02 to -0.014 for the less restrictive definition of anorexia, and from -0.016 to -0.014 for the strictest definition. This coefficient was barely more stable for the younger sample. Even when additional controls were introduced; the coefficient decreased from -0.014 to -0.010 for both definitions of anorexia. Overall, the peer (network) effects coefficients are fairly stable, and change less than twice a standard deviation.

Table 4: Robustness checks using alternative probit model specifications

Sample	Anorexia §					Severe Anorexia § §				
Anorexia (All women)										
Peer Effects: group BMI	-0.002	-0.0017	-0.0017	-0.0015	-0.0014	-0.0018	-0.0016	-0.0015	-0.0015	-0.0014
	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Personal characteristics		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Age variables			Yes	Yes	Yes			Yes	Yes	Yes
Education				Yes	Yes				Yes	Yes
Health consciousness					Yes					Yes
Controlled by country of origin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Anorexia (Young Women)										
Peer effects: group BMI	-0.0014	-0.0011	-0.0011	-0.0010	-0.0010	-0.0014	-0.0011	-0.0011	-0.0011	-0.0010
	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Personal Characteristics		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Health consciousness			Yes	Yes	Yes			Yes	Yes	Yes
Age variables				Yes	Yes				Yes	Yes
Education					Yes					Yes
Controlled by country of origin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Joint estimation of fat self-image and low weight

Table 5 shows the marginal effects of a bivariate recursive probit model (Greene, 1998) of *being extremely thin* and *seeing oneself as fine or too fat* separately, but allows the

unexplained variation in both processes to be related. Once again, the bivariate model was estimated for the full sample of women first, and then for those in the 15-34 year age range which allows to pick up the presence of cohort effects. Results turn out to suggest that unobservable factors influencing the two processes are only significant for the total sample of all women, but not for the subsample of younger women only. The identification restrictions were that peer BMI and women's magazine circulation were presumably related to body self-perception but not to own-weight, while *seeing oneself as fine or too fat* (self-identity) was likely to influence the probability of *being extremely thin*.

The estimates in the recursive bivariate probit model, where the two processes involved in the paper's simplistic definition of anorexia were disaggregated, gave rise to some interesting findings. Peer BMI had a positive effect on the probability of *seeing oneself as fine or too fat* (0.079 for the full sample) but as expected it revealed a negative effect -0.0377 for the younger sample). Among younger women, being married had a positive effect on the probability of *being extremely thin* (0.12) and on *seeing oneself as fine or too fat* (0.20). Age had a non-linear effect on the probability of *being extremely thin* for the full sample but not on the younger sample, probably because of cohort effects and the limited age-variation in that group. Extreme thinness decreases with age at a decreasing rate, and increases again after the age of 63. Living in a rural area had a positive effect on the likelihood of *seeing oneself as fine or too fat* (0.056) but this was not significant for the younger sample. Having been to university had a significant negative effect on *seeing oneself as fine or too fat* for both samples (-0.345 and -0.214) but only in the full sample did it negatively affect the probability of *being extremely thin* (-0.169). Surprisingly, neither being head of the household nor being health-conscious was statistically significant. Being married did not explain extreme thinness

Seeing oneself as fine or too fat (self-image) had a very negative and significant effect on the probability of *being extremely thin (-0.424* and -0.451 for the full and younger sample, respectively), as one would expect following the model outlined in Figure 1. This result is particularly important as it provides evidence consistent with the idea that self-image and identity do exert an influence on health-production, at least in the case of anorexia. Finally, the coefficient representing the correlation of the error terms of both processes, *Atrho*, is positive and highly significant for both samples, corroborating the fact that there are some unobserved factors influencing both women's body identity and extreme thinness that are positively correlated.

Table 5. Recursive-probit models for being extremely thin and seeing oneself as 'fine' or 'too fat' (marginal effects)

	All women		Younger women 15-34	
VARIABLES*	Extreme thinness ‡	Seeing oneself as fine or too fat	Extreme thinness ‡	Seeing oneself as fine or too fat
Peer effects: group BMI		0.079		-0.0377**
		(0.07)		(0.012)
Being married	-0.0034	0.176***	0.12**	0.20***
	-(0.049)	(0.042)	(0.07)	(0.07)
Between 25 and 34 years old		0.180***		0.13***
		(0.036)		(0.039)
Between 35 and 44 years old		0.309***		
		(0.045)		
More than 45 years of age		0.338***		
		(0.051)		
Age	-0.02*		0.005	
	-(0.01)		(0.03)	
Age squared	0.0001*		-0.0002	
	(0.000)		-(0.001)	
Living in a rural area	0.046	0.056**	0.0320	0.0089
	(0.031)	(0.023)	(0.052)	(0.036)
Having been to university	-0.169*	-0.345***	-0.162	-0.214**
	-(0.095)	-(0.089)	-(0.110)	-(0.098)
Seeing oneself as fine or too fat	-0.424***		-0.451***	
	-(0.134)		-(0.17)	
Constant	0.289*	-3.01***	-0.0381	-1.960***
	(0.146)	-(0.50)	-(0.424)	-(0.569)
Atrho	1.583***		7.564	
	(0.431)		(19.280)	
Controlled by country of origin	Yes		Yes	
Number of observations	8740		2871	
Chi-Square for rho=0	15.1		1.18	
Reject null rho=0	Yes		No	
Degrees of freedom	14		14	
Loglikelihood	-3765.45		-1710.34	
Number of clusters (countries)	17		17	

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1
* Women's Magazine circulation per capita, living in a rural environment, being the head of the household, being health conscious, and having compulsory education and up to 18 years of age, were included but were not significant.
† Being health conscious is defined as the sum of all gynaecological screenings had in the last 6 months.
‡ Thinness is defined as having a BMI of below 17.5

Robustness checks for the joint estimation of fat self-image and low weight

Table 6 shows that the impact of self-image on being extremely thin remained almost constant when additional controls were introduced for both the 'all women' and 'younger women' samples. Results show that show that as expected, the coefficient of fat self image was negative and robust, revealing that women that see themselves as 'fine' or 'too fat' are 44%-46% less likely to be extremely thin. The instruments employed performed well following traditional Hausman test methods and were theoretically relevant. However, additional factors might still be present. For instance, unobservable variables affecting women of different ages may bias upward the relationship between BMI and peer-average BMI (and thus bias downward the peer effect coefficient).

Table 6. Robustness checks using alternative specifications

All women	**Dependent variable: Extreme thinness**			
Seeing oneself as fine or too fat	-0.42	-0.44	-0.44	-0.44
(standard error)	(0.014)	(0.130)	(0.129)	(0.130)
Personal characteristics	Yes	Yes	Yes	Yes
Age variables	No	Yes	Yes	Yes
Education	No	No	Yes	Yes
Health consciousness	No	No	No	Yes
Controlled by country of origin	Yes	Yes	Yes	Yes
Young Women 15-34				
Seeing oneself as fine or too fat	-0.45	-0.44	-0.44	-0.44
(standard error)	(0.200)	(0.210)	(0.210)	(0.210)
Personal characteristics	Yes	Yes	Yes	Yes
Age variables	No	Yes	Yes	Yes
Education	No	No	Yes	Yes
Health consciousness	No	No	No	Yes
Controlled by country of origin	Yes	Yes	Yes	Yes

6. Conclusions

This paper presents a simple theoretical framework to explain the influence of self image and other people's body shapes on female caloric intake, in line with the identity model of Akerlof and Kranton (2000). It then uses an empirical strategy to identify the determinants of food disorders (anorexia) and self-image (seeing oneself as fine or too fat) following first a joint process and secondly a recursive one. We find that the larger the peers' body-mass, the lower the likelihood of being anorexic. Additionally, self-image correlates with body weight even when unobservable factors explaining both processes are controlled for.

Our results were consistent with the assumption that individuals trade off health against self-image. Also, in agreement with the epidemiological literature, we found that weight-related food disorders happen mostly at younger ages and require attention before they extend to older age groups. Note that the findings showed that anorexia primarily affected women aged between 15 and 34, and that it was primarily socially induced. These results have serious policy implications. They call for urgent action on individual identity, probably while it is still being formed, so as to prevent severe damage to women's health and in order to improve their well-being and that of their families and friends.

The influence of a crude measure of peer effects is significant and robust throughout the samples, indicating that socio-environmental factors play an important role. This result should be corroborated using longitudinal data, but these are not available in Europe at the moment. The paper's findings were the best that could be done with the existing cross-sectional data on Europe. They provide some important results that can act as a basis for future literature. In addition the paper contributes to behavioural economics by using a model for eating disorders that allows for net-caloric-intake being a 'bad' instead of a 'good' in the consumer utility function above a certain intake.

Our findings are in line with the Clark and Oswald (1998) model of comparison utility in that deviant behaviour - such as anorexia - may occur when an individual attempts to deviate from some social norm using her own-BMI as an instrument. Hence, it is important to understand how individuals come to value what they do. Consistently, Etile (2007) funds that social norms regarding body shape have significant effects on perceptions of ideal BMI only for those women who want to loose weight. Anorexics, by definition, want to lose weight. In the health policy arena, this implies understanding how preferences for smoking, eating unhealthy food or avoiding physical activity - with their costs in terms of health and well-being - are incorporated in people's utility maximization. Underlying this debate is the question of time-discount rates and the formation of preferences; which has important consequences for health-policy given that preferences for health-related activities are likely both to be influenced by and to influence health outcomes. These results go a step beyond Christakis and Fowler (2007) by exploiting self image as an intermediary source of social pressure.

In the light of this study, government intervention to adjust individual biases in self-image would be justified to curb or at least prevent the spread of a potential epidemic of food disorders. The distorted self-perception of women with food disorders and the importance or

the peer effects may prompt governments to take action to influence role models and compensate for social pressure on women driving the trade-off between ideal weight and health. However, given the nature of the data and the absence of natural experiments we can't prove our results as being causal and should be taken with caution.

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