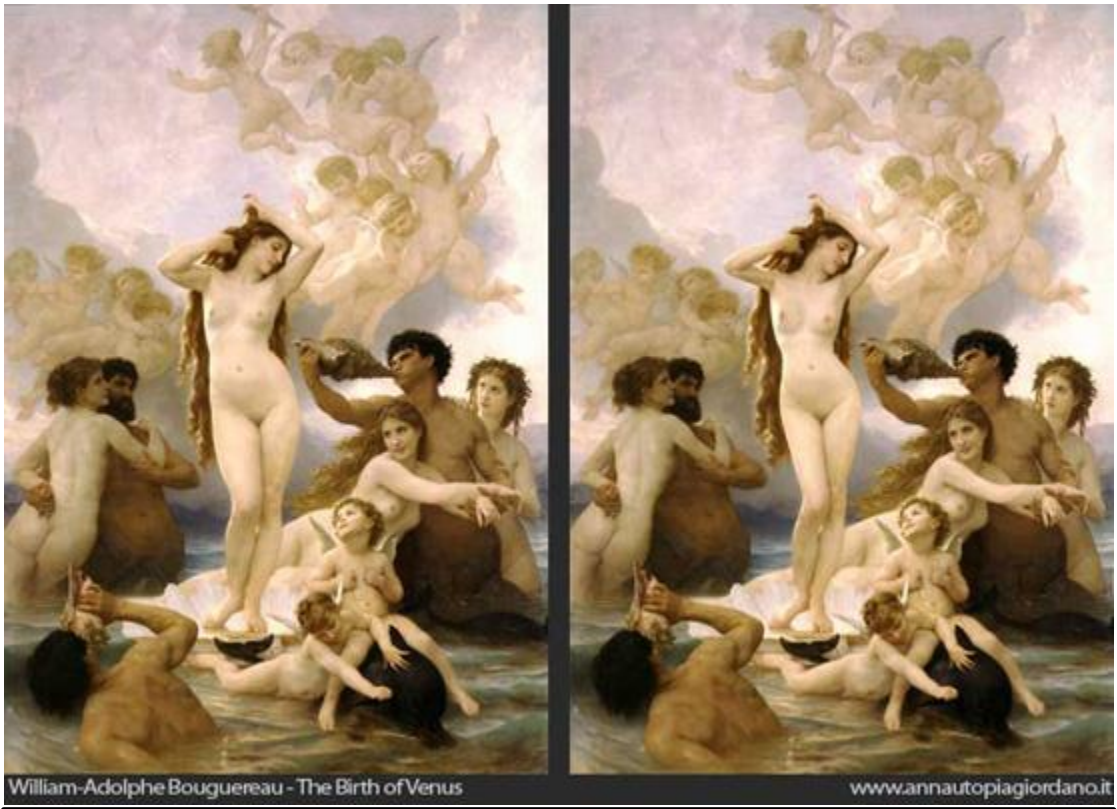
Katlab Body Image Campaign

Research Digest



Current and past standards of the beautiful body by artist Anna Utopia Giordano

Katlab Body Image Research Digest

~The following were compiled by Elena Pangiotopoulou, as part of an NPSA Trust, a UK-registered Charity, fund-raising campaign on Body Image~

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What is this e-book?

UCL in partnership with NPSA, a UK-based Charity, launched a fund-raising campaign on Zequs in January 2015 to support scientific research on a psychological epidemic: body image concerns. To support this cause, the Katlab research team has been uploading one related research digest message every day, for one month, pointing to the potential of using science to combat body image concerns in society. The messages cover a wide range of topics such as eating disorders, childhood obesity, pregnancy and weight gain, cosmetic surgery, media and advertising, and neuroimaging, as well as various psychological interventions. The campaign received a lot of support and raised £1,263.98 in 6 weeks.

We hope that compiling these messages into an e-book provides an up to date account of research in the field of body image that is easily accessible and presented in jargon-free, digestible chunks, which can either be read in its entirety or be dipped into and out of at will.

For more information on KatLab and contacts visit fotopoulou.com

What is the body image problem?

In a society constantly exposed to digital images of idealised bodies and related societal pressures, dissatisfaction with our own body runs deep. Research suggests that the problem is growing:

- 60% of adults report feeling ashamed with the way they look, the numbers being greater among women
- About one third of young girls and boys in the UK fear becoming fat and engage in dieting or binge eating

Such body image concerns have wider consequences, for example leading to depression, eating disorders, increased feelings of shame and low self-esteem1. In young people body image dissatisfaction may also undermine their self-confidence, leading them to diminish participation in health, education and social activities.

Mis-sold 'solutions'

Not surprisingly, a parallel increase in mis-sold 'solutions' for acquiring the idealized body is noted. Cosmetic surgery has become normalized. Between 2008 and 2010, the cosmetic surgery market in the UK grew by approximately 17%, reaching an estimated value of £2.3 billion.

There is also a range of related 'beauty' products and an increase in services that market themselves as helping their customers to achieve a particular, idealized look and allegedly feel better about themselves. In fact, the futile pursuit to acquire the body 'as advertised' may have the reverse effect. Over 28 published empirical studies, with over 4000 women and men from western countries, have found that people report more body image dissatisfaction after viewing media images of thin female models and muscular male models than after viewing images of average-size models.

The role of science

Cleary, in order to tackle the problem effectively we need to do a lot of work to understand and change how images of the human body are portrayed, manipulated and used in advertising and the

media, as well as assess the influence of the cosmetic and plastic surgery sectors on societal perceptions of beauty, health and well-being. Of course, widespread changes in education and media regulation and similar large scale policies affecting such industries are likely to progress slowly and to compete with opposing economic and political interests. Thus, an alternative route to changing how the body is portrayed from the outside, is to understand and be tter control how the body feels from within. What are the psychological and brain processes that can make our body image and self-esteem become more resilient to external and idealized influences? This is where science comes in.

The NPSA Charity aims to funds a number of projects on the neuroscience of inner body perception and resilience. We hope the studies and efforts reviewed in the following pages, give you a taster of the possibilities that lie ahead and that you have generously supported with your t ime and contributions.

Source: Reflections on Body Image Enquiry (2012). The All Party Parliamentary Group on Body Image. http://www.ymca.co.uk/bodyimage/parliament

Why can body dissatisfaction have such a harmful effect on our self-esteem?

Not only does self-esteem impact body image, body image also has an effect on self-esteem. Body dissatisfaction and weight gain can lead to decreased self-esteem (Tiggemann, 2005). In addition, judging oneself to be overweight seems to be more of a self-esteem issue among women than men, and research has shown that women sometimes see losing weight as a strategy for improving their self-esteem (Bale & Archer, 2013; Furnham, Badmin & Sneade, 2002; Gentile et al., 2009).

Why are our body image and our self-esteem linked to this extent, and why does this link seem to be stronger for females than for males? This is obviously a complex question, but the answer has something to do with how we go about forming our self-esteem. One influential conceptualization of self-esteem, known as the sociometer hypothesis, sees an individual's self-esteem as the extent to which they perceive themselves to be included or excluded by others (Leary & Baumeister, 2000). Women in particular may see getting along in relationships with others as highly important to their sense of self-worth. And one important criteria on which individuals make such judgements is how physically attractive they think they are (Bale & Archer, 2013). Perhaps it is worth bearing in mind here that, on average, women believe that men prefer a female figure which is significantly thinner than the female figure that men actually tend to prefer (Grossbard, Neighbors & Larimer, 2011).

On a more serious note, how can we try to protect against body dissatisfaction having such a harmful effect on our self-esteem? In the spirt of changing our minds and not our bodies, one answer could lie in trying to focus our self-esteem on aspects of ourselves other than our physical appearance – and this is in fact one of the strategies used by the "Everybody's Different" school project (see 'School-based interventions for adolescents').

Sources: Bale, C., & Archer, J. (2013). Self-Perceived Attractiveness, Romantic Desirability and Self-Esteem: A mating sociometer perspective. *Evolutionary Psychology*, 11, 68-84.

Furnham, A., Badmin, N., & Sneade, I. (2002). Body image dissatisfaction: Gender differences in eating attitudes, self-esteem, and reasons for exercise. *The Journal of Psychology*, 136, 581-596.

Gentile, B., Grabe, S., Dolan-Pascoe, B., Twenge, J. M., Wells, B. E., & Maitino, A. (2009). Gender differences in domain-specific self-esteem: A meta-analysis. *Review of General Psychology*, 13, 34.

Grossbard, J. R., Neighbors, C., & Larimer, M. E. (2011). Perceived Norms for Thinness and Muscularity among College Students: What Do Men and Women Really Want? *Eating Behaviors*, 12(3), 192–199.

Leary, M. R., & Baumeister, R. F. (2000). The nature and function of self-esteem: Sociometer theory. *Advances in Experimental Social Psychology*, 32, 1-62.

Tiggemann, M. (2005). Body dissatisfaction and adolescent self-esteem: Prospective findings. *Body Image*, 2, 129-135.

Body aesthetics and weight - not the same thing!

A study by Cazzato and colleagues provides interesting new evidence relating to the idea that beauty and weight are not the same thing, and are processed differently in the brains of men and women. Their study used a technique called rTMS (repeated Transcranial Magnetic Stimulation), which uses very short bursts of magnetic pulses to temporarily disrupt brain activity. In this study, the researchers disrupted a small part of the brain known to be involved in the processing of body parts (called the Extrastriatal Body Area – or EBA for short), while showing men and women computer-generated images of male and female models, which varied in terms of how round or thin they were (from extremely round to extremely thin in 4 steps: extremely round, moderately round, moderately thin, and extremely thin). After viewing each image the participants had to rate each model in terms of aesthetics (i.e. "how much do you like the model?") and roundness ("how round is the model?"), which has been show to relate to perceived weight. The researchers found several interesting differences between the ratings of men and women, such as men liking both male and female models less following disruption (of the EBA) on the right and left side of the brain; whereas disruption of the right EBA resulted in women selectively increasing their aesthetic ratings of male, but not female, models. Interestingly, despite brain disruption causing these changes in aesthetic judgments, the perceived weight (roundness) of the male and female models did not change (irrespective of whether men or women were doing the rating, or which side of the brain was disrupted)! As well as suggesting some interesting differences in the way that men and women process the aesthetics of human bodies, the results also suggest that judgments about aesthetics and weight can be disentangled in the brain. These findings might be useful when trying to understand and perhaps even treat body image disorders.

Source: Cazzato, V., Mele, S., & Urgesi, C. (2014). Gender differences in the neural underpinning of perceiving and appreciating the beauty of the body. *Behavioural Brain Research*, 264, 188-196.

Risk factors for body dissatisfaction

The negative consequences of body dissatisfaction are well known and have been the focus of numerous studies. But what do we know about the risk factors that might help us predict increased body dissatisfaction? A study investigated this in a sample of boys and girls of different cultural backgrounds, in two time points: early and middle adolescence, and after five years (i.e. transition from early- to middle adolescence and from middle- to late adolescence). For both sexes, it was found that Body Mass Index (BMI) was a strong predictor of body dissatisfaction in both developmental phases and that peer environment factors (e.g. a friend being on a diet) predicted body dissatisfaction only from early to middle adolescence. Interestingly, self-esteem was found to be a prospective risk factor only for girls, whereas depression during middle adolescence was a risk factor only for boys. Finally, being African American, or from a higher socio-economic status were found to be protective factors in all developmental phases.

These findings highlight the need for interventions that target children before middle adolescence, and that are tailored to meet the needs of the different developmental stages and socio-cultural backgrounds.

Source: Paxton, S. J., Eisenberg, M. E., & Neumark-Sztainer, D. (2006). Prospective predictors of body dissatisfaction in adolescent girls and boys: a five-year longitudinal study. *Developmental Psychology*, 42, 888-899.

Is fat-talking causing body dissatisfaction?

The problem: Body dissatisfaction is increasingly becoming a public health concern because of its potential role in the development of eating disorders. Body dissatisfaction usually arises from sociocultural pressures promoting thinness, such as appearance conversations, or fat talking. Fat talk can be defined as a form of derogatory talk focusing on weight and shape frequently undertaken by girls and women. The five most common fat talking topics are: (a) self-comparison to ideal eating and exercise habits; (b) fears of becoming overweight; (c) how eating and exercise habits compare to others; (d) evaluation of others' appearances, and (e) meal-replacements and muscle building strategies. There is now consistent evidence that fat talking is a correlate of body dissatisfaction (Sharpe, Naumann, Treasure & Schmidt, 2013).

The solution: Body image lessons in UK schools.

The body dissatisfaction of teenage girls could be improved by training teachers to deliver classes in body image. In the pilot study, 261 teenage girls at secondary school level in the UK were given a course of six lessons on positive body image (Sharpe, Naumann, Treasure & Schmidt, 2013). This programme focused on ideals of beauty, unhealthy interactions with peers - such as "fat talking", or making negative comments about weight - and practical measures for boosting mood and self-esteem. This had significant effects on their body image and self-esteem compared with the regular curriculum (187 teenage girls). Remarkably, Interventions delivered by teachers would have wide reach, be easy to implement and be of minimal cost.

Source: Sharpe, H., Naumann, U., Treasure, J., & Schmidt, U. (2013). Is fat talking a causal risk factor for body dissatisfaction? A systematic review and meta-analysis. *International Journal of Eating Disorders*, 643–652.

What can neuroimaging studies tell us about obesity?

Food is readily and abundantly available in the industrialized world. Yet, despite the many cafés, restaurants, supermarkets and corner shops we pass every day, not all of us overeat and become obese. To find out why some people become obese and others don't, it might be useful to evaluate how people's brains respond to food. A recent review of the available brain imaging studies has suggested that over-activity in brain areas associated with reward and emotion, in conjunction with reduced activity in brain areas involved in signalling fullness, may lead to overeating and obesity. A common way to examine activation in these brain areas is to recruit a group of obese individuals (e.g., BMI > 30) and a group of slim individuals (e.g., BMI 20 – 25) and show them pictures of food, typically after they have not eaten for several hours. These kinds of studies indeed show that obesity is linked to increased activity in a network of brain regions involved in reward and emotion when viewing pictures of food. As well as showing pictures of food, brains can also be scanned while participants are actually eating. One such study showed that an area of the brain called the hypothalamus, which is involved in regulating food intake, was slower to respond to food in a group of obese compared to slim men. This "sluggish" response may result in obese individuals not realizing they are full, which could maintain patterns of overeating. Understanding these differing patterns of brain activation in obese vs. slim individuals will hopefully help in identifying who might be at risk of become obese. Early interventions targeted at these at-risk individuals, which include focusing on internal signals of fullness rather than on the many external food cues we are continually surrounded by, may prevent them from becoming obese.

Source: Carnell, S., Gibson, C., Benson, L., Ochner, C. N., & Geliebter, A. (2012). Neuroimaging and obesity: current knowledge and future directions. *Obesity Reviews*, 13, 43-56.

Body image dissatisfaction among males

Most of the past research has focused on body image dissatisfaction among women, but are body image concerns exclusive to women? In a recent review of the scientific literature McCabe and Ricciardelli (2004) clarified the extent to which previous studies have investigated these issues among men. They showed that body dissatisfaction is a significant concern for men as young as 6 years of age and it can sometimes lead to behaviours that require clinical interventions (e.g. poor psychological adjustment, eating disorders, steroid use, exercise dependence, as well as other health behaviours).

The review further discusses the lack of proper measures to investigate body image dissatisfaction in men, since most existing tools are suited to women. Furthermore, social expectations can be different between the genders (e.g. magazines suggest that women should lose weight, while men should increase muscle size), and this needs to be taken into account when carrying out such investigations.

In conclusion, body dissatisfaction cannot simply been seen as a "female problem".

On the bright side, organizations such as "National Eating Disorders Association", a leading non-profit organization in the United States advocating on behalf of and supporting individuals and families affected by eating disorders, seem to have recognized the problem and have begun issuing guidelines specific to body image concerns in men. It seems that research should follow their example and dedicate more resources to understanding and treating body dissatisfaction in men.

Sources: McCabe, M. P., & Ricciardelli, L. A. (2004). Body image dissatisfaction among males across the lifespan. *Journal of Psychosomatic Research*, 56, 675-685.

http://www.nationaleatingdisorders.org/enhancing-male-body-image

Challenging beauty norms

The Problem: It will come as no surprise to discover that idealized media images of thin, attractive models can negatively affect how women evaluate their own bodies. Such images convey the idea that thinness and beauty are linked with success, happiness, popularity, acceptance and an ideal life! This unrealistic and unobtainable beauty standard often produces feelings of incompetence and dissatisfaction.

How to change your mind, not your body: Researchers in the Netherlands have found a way to reduce the amount of attention women pay to images conveying these generic beauty ideas. The answer: challenge beauty norms. The researchers found that women who read norm-challenging information (e.g. statements like "thin women score lowest on life satisfaction") subsequently paid less attention (i.e. looked less) to appearance-related advertisements that depict a thin model in a bikini, compared with norm-confirming statements (e.g. "thin women have more friends and social contacts") or information of no relevance to beauty norms. Moreover, this effect of challenging beauty norms was particularly strong in women with low self-esteem. The authors state that "our results show that the importance women place on being thin can be altered by challenging the idea that women need to live up to the unattainable beauty standards to be valued and successful in life" (see source below, pg. 322). The take home message: challenge beauty norms –to change your mind, not your body!

Source: Mischner, I. H. S., Van Schie, H. T., & Engels, R. C. M. E. (2013). Breaking the circle: Challenging Western sociocultural normal for appearance influences young women's attention to appearance-related media. *Body Image*, 10, 316-325.

Body image in young children

The problem: Body dissatisfaction, i.e. experiencing negative thoughts and esteem about one's body, can lead to negative consequences, such as depressed mood and disordered eating. Research on this topic has mainly focused on children in adolescence, or late pre-adolescence, but rarely on children of younger age. However, body dissatisfaction has been observed even in girls 5-7 years old (Davison & Birch, 2002), while children as young as 4 years display aversion towards "chubby" figures (Cramer & Steinwert, 1998). The thinness ideal for girls is, of course, present in their wider cultural and social environment (e.g. advertisements), but also in their toys: an example is the Barbie doll, with the unattainable and unhealthy weight and body proportions. Such toys, due to their iconic status, become very salient role models for young girls. A study showed that very young girls show increased body dissatisfaction when exposed to images of Barbie dolls, but not when exposed to images of average body shaped dolls (Dittmar, Ive & Halliwell, 2006). It also showed that from 8 years onwards, girls had already internalized the ultrathin beauty model and, when exposed to the normal body shaped doll, their desire to be thinner increased.

The solution: preventing the internalization of the ultrathin ideal. This can be achieved by encouraging dolls with normal proportions to be mass marketed: a promising example is the Lammily doll, which was crowdfunded. It is also important to allow educational programmes to target very young girls.

Sources: Cramer, P., & Steinwert, T. (1998). Thin is good, fat is bad: How early does it begin? *Journal of Applied Developmental Psychology*, 19, 429–451.

Davison, K. K., & Birch, L. L. (2002). Processes linking weight status and self-concept among girls from ages 5 to 7 years. *Developmental Psychology*, 38, 735–748.

Dittmar, H., Ive, S., & Halliwell, E. (2006). Does Barbie make girls want to be thin? The effect of experimental exposure to images of dolls on the body image of 5- to 8-year old girls. *Developmental Psychology*, 42(2), 283-292.

Am I fat or just pregnant?

Problem: Typically, weight gain during pregnancy is not only a natural, but also often a necessary part of being pregnant (Devine, Bove & Olson, 2000). It has been proposed that during pregnancy, matter does seem to take over from the mind (Wiles, 1994). Although each case is different, women often have no choice in physical bodily changes, like the expanding belly (and cup size!), inevitable stretch marks and swollen feet. Despite the maternal body being typically represented as a natural state of femininity, there tends to be a general pressure to stay "healthy" during pregnancy and "get your body back" after birth (Dworkin & Wachs, 2004). Some women even feel disembodied during pregnancy, experiencing a loss of control with the pregnant body "refusing to obey", while other women thoroughly enjoy the physical changes, and most have mixed feelings on the experience (Warren & Brewis, 2004).

Possible solutions: One possibility is to try and focus on your baby, rather than your body. As Dworkin and Wachs (2004) explain, body changes are essential for the development of a growing baby, and after birth, the pregnant body has been through a lot and needs time to recover. Research has also found that it may help to view pregnancy as a way to free women from the common norms associated with body image, and give way to the uncontrollability of the maternal body that reminds us of the most primal aspect of human life (Warren & Brewis, 2004).

Sources: Devine, C. M., Bove, C. F., & Olson, C. M. (2000). Continuity and change in women's weight orientations and lifestyle practices through pregnancy and the postpartum period: the influence of life course trajectories and transitional events. *Social Science & Medicine*, 50, 567-582.

Dworkin, S. L., & Wachs, F. L. (2004). "Getting Your Body Back" Postindustrial Fit Motherhood in Shape Fit Pregnancy Magazine. *Gender & Society*, 18, 610-624.

Warren, S., & Brewis, J. (2004). Matter over mind? Examining the experience of pregnancy. *Sociology*, 38, 219-236.

Wiles, R. (1994). "I'm not fat, I'm pregnant": The impact of pregnancy on fat women's body image. *Women and health: Feminist perspectives*, 33-48.

Does thinness sell products?

We are used to seeing very thin models on the covers of magazines, and a host of research has demonstrated that exposure to pictures of thin models can make us feel more anxious about our bodies. Yet, magazines have been reluctant to use models of average or above average size because they maintain that "thinness sells".

But is it really thinness that sells, or could it be attractiveness, irrespective of body size? And does viewing pictures of attractive average-size models also make us feel anxious about our bodies? If not, a solution might be to use average-size attractive models in advertising. To examine this, researchers created advertisements for deodorants featuring images of thin models (UK size 8) and average-size (UK size 14) models. Importantly, to create the images of the average-size models, they used computer software to "stretch" the bodies (but not the faces) of the thin models, thus changing their size but leaving their facial attractiveness unaltered.

The researchers found that participants' anxiety about parts of their body was higher in the thin models condition than in the average-size condition, despite both being equally attractive. So it is the thinness of models, rather than their attractiveness, which makes us feel worse about our bodies. And here is the good news: Both the thin and average-size models were rated as equally effective in advertising the deodorants! The authors concluded that by using average-size models, "advertising could avoid increasing body-focused anxiety in a large proportion of women while still successfully selling products". Let's hope the media takes this on board...

Source: Halliwell, E., & Dittmar, H. (2004). Does size matter? The impact of model's body size on women's body-focused anxiety and advertising effectiveness. *Journal of Social and Clinical Psychology*, 23, 104-122.

Do diets work?

Do your New Year resolutions include dieting? Have you ever gone on a diet successfully only to find that you returned to your original weight some time later? Have you ever blamed yourself for regaining the weight you worked so hard to lose? Well, blame no more. Diets continue to be highly popular and to support highly lucrative industries. However, in the majority of people they just do not work.

Many systematic and carefully controlled studies have shown that the so called "life-style modification" diets, where you try to change what you eat and how much you eat according to some recommendation, only work in the short-term. People may show significant weight loss in initial months, but most of this weight is regained in the majority of people in the following months or years.

Specifically, one study showed that the proportion of people who successfully and consistently maintained 100% of reduced weight during a 4 to 5 year period after diet completion was only 3% (Kramer, Jeffery, Forster, & Snell, 1989). Another study showed that only 28% of people maintained a loss of at least 10% of initial body weight at 4 years (Christiansen et al., 2007). Finally, a recent meta-analysis in the US (a study that examines, re-analyses and evaluates the results of all similar, previous studies on a given topic) found that 4.5 years post the successful completion of hypocaloric diets, with or without exercise, only an average 3.2% reduction of initial weight was maintained (Anderson, Konz, Frederick, & Wood, 2001).

Of course, pursuing a healthy lifestyle and treating obesity are important goals. However, it is increasingly clear that lifestyle modification diets are not the answer to such goals. The exact physiological and psychological reasons why weight loss is so hard to maintain remain unknown and are likely to be complex (e.g. Blomain, Dirhan, Valentino, Kim, & Waldman, 2013; Sumithran & Proietto, 2013). A current influential hypothesis is that we, as organisms, have developed evolutionary prescribed mechanisms to protect us against weight loss more vigorously than from weight gain, in order to ensure that we survive during periods when food is scarce. The latter periods were more common throughout our history, and still are in many parts of the world. Thus, when we go on a diet our bodies may assume we are starving and ensures we regain the weight as soon as possible. Thus, in countries where an abundance of food is available, and hundreds of companies compete for our appetitive attention, diets do not seem to be the answer to overeating and obesity. Wherever the future answer lies, blaming yourself for lacking the will power to maintain weight loss seems wholly unnecessary.

Sources : Anderson, J. W., Konz, E. C., Frederich, R. C., & Wood, C. L. (2001). Long-term weight-loss maintenance: a meta-analysis of US studies. *The American Journal of Clinical Nutrition*, 74, 579-584.

Blomain, E. S., Dirhan, D. A., Valentino, M. A., Kim, G. W., & Waldman, S. A. (2013). Mechanisms of weight regain following weight loss. *International Scholarly Research Notices*.

Christiansen, T., Bruun, J. M., Madsen, E. L., & Richelsen, B. (2007). Weight loss maintenance in severely obese adults after an intensive lifestyle intervention: 2- to 4-year follow-up. *Obesity*, 15, 413-420.

Kramer, F. M., Jeffery, R. W., Forster, J. L., & Snell, M. K. (1989). Long-term follow-up of behavioral treatment for obesity: patterns of weight regain among men and women. *International Journal of Obesity*, 13, 123-136.

Sumithran, P., & Proietto, J. (2013). The defence of body weight: a physiological basis for weight regain after weight loss. *Clinical Science*, 124, 231-41.

The changing "perfect body" throughout history

By analysing the art of different eras, it is evident that there have been dramatic changes in what is considered a beautiful and desirable female body. The social and historical context of each historical era plays an important role on what constituted the ideal female body weight and appearance (Bonafini & Pozzilli, 2010).

The origins of the representation of an ideal body could possibly lie in the art of Palaeolithic times, where the features of a woman's body that express fertility and fecundity were considered as beautiful (a figure that today is almost considered by medicine as a target for therapy). The ideal of female beauty has shifted from a symbol of fertility to one of mathematically calculated proportions (fifth century BC), based on geometrical precision and proportion, and the unachievable perfection of body forms. However, in the Renaissance and Baroque period, the consideration that beauty belonged, as in the Palaeolithic period, more to the world of the senses, is apparent. The sensual, round beauties only continued to a limited extent into the late 19th and 20th centuries, which saw a revolutionary mutation of the "ideal figure". Deeper into the 20th century, the growing advertising and motion picture industries began showing images of extremely skinny figures (Bonafini & Pozzilli, 2010).

It is of great importance to analyse the perception of an ideal body weight in the light of the research showing that the comparison with "the perfect body" is associated with increased risks of developing an eating disorder (Thompson & Heinberg, 1999). Furthermore, there is evidence that, particularly in adolescence, these tendencies highly correlate with suicidal ideation (Brausch & Muehlenkamp, 2007).

Picking up on this issue, brands like Dove, Debenhams and H&M have launched advertisement campaigns to include diverse body types in their catalogues and ads. Furthermore, organizations like The Representation Project are working to educate women and girls about media literacy and how to handle the images of women we see on television and in advertisements. In addition to the work of brands and organizations, looking back on the "ideal" women throughout the past century tells us just how arbitrary any vision of "the perfect body" is.

Sources: Bonafini, B. A., & Pozzilli, P. (2010). Body weight and beauty: the changing face of the ideal female body weight. *International Association for the Study of Obesity*, 12, 62-65.

Brausch, A. M., & Muehlenkamp, J. J. (2007). Body image and suicidal ideation in adolescents. *Body Image*, 4, 207-212.

Thompson, J. K., & Heinberg, L. J. (1999). The media's influence on body image disturbance and eating disorders: we've reviled them, now can we rehabilitate them? *Journal of Social Issues*, 55, 339-353.

The problem of teasing

Problem: Cultural expectations dictate that girls should be thin and boys should have muscular bodies. This ideal seems to be the source of body image concern in adolescent boys and girls, in a period of their lives when the importance of their appearance is heightened. Such concerns might lead to disordered eating, or to full-blown eating disorders later in their lives. One of the factors for this concern is appearance-related (negative) teasing by family members and friends. A recent study (Schaefer & Salafia, 2014) showed that such teasing by the mother, father, the siblings and peers was significantly associated with body dissatisfaction in adolescent girls, and with higher drive for muscularity in boys; this was found for boys and girls of all shapes and sizes.

Solution: it is important that clinicians become aware of the influence that appearance-related teasing has on young people. Intervention programmes and therapists, for example, when working with adolescents, should include all family members, investigate how they contribute to the adolescent's body image, and educate them about the effect of teasing.

Source: Schaefer, M. K., & Salafia, E. H. B. (2014). The connection of teasing by parents, siblings, and peers with girls' body dissatisfaction and boys' drive for muscularity: The role of social comparison as a mediator. *Eating Behaviors*, 15, 599-608.

What can neuroimaging studies teach us about gender differences in body image concerns?

Concerns about body image are a key feature of eating disorders, which have been the topic of several messages of the day by now. Eating disorders are far more common in women than in men; in fact, women are ten times more likely than men to develop an eating disorder. To understand why women may be more susceptible to developing eating disorders than men, a team of researchers investigated how healthy men and women's brains responded to seeing words related to a negative body image. Participants were shown sets of "unpleasant" body-image related words and "neutral" words, and were asked to pick the word they thought was most unpleasant/ neutral in the set, respectively, while lying in a magnetic resonance imaging (MRI) scanner. The researchers found that women – but not men – showed enhanced activity in the amygdala for unpleasant body image words compared to neutral words. The amygdala has been associated with processing threats; thus, women might find stimuli relating to a negative body image threatening, while men do not. In contrast, men showed a greater activation in the left medial frontal gyrus when viewing the unpleasant compared to the neutral words, while women did not. This region may be involved in cognitive processing of emotional information. Overall, the authors suggest that while women may process words relating to a negative body image in a more emotional way, men may process them in a more cognitive way. A limitation of the study was that the researchers didn't have a category of negative words NOT relating to body image, so it is difficult to know whether these effects were specific to body image. Nevertheless, pursuing this line of thinking further could shed light on why women are more likely to suffer from eating disorders than men.

Source: Shirao, N., Okamoto, Y., Mantani, T., Okamoto, Y., & Yamawaki, S. (2005). Gender differences in brain activity generated by unpleasant word stimuli concerning body image: an fMRI study. *The British Journal of Psychiatry*, 186, 48-53.

Plasticity of self in eating disorders

As previous posts have highlighted, body image concerns affect both men and women and are frequent amongst otherwise healthy individuals. Such concerns and related eating behaviours take more serious forms in psychiatric eating disorders such as anorexia nervosa, one of the greatest challenges for modern health professionals. This is partly due to the multiple factors involved in these pathologies, including neurobiological factors, family dynamics and the surrounding post-modern culture that enforces a cult of objectifying the body.

Joint research undertaken by British and Australian major universities used the Rubber-Hand illusion, in which people can be induced to experience a rubber hand as their own, to investigate body awareness in anorexic patients.

The study found that subjects diagnosed with eating disorders experienced the illusion more strongly than healthy controls. Moreover, the degree to which the subject experienced the illusion was correlated with the severity of their eating disorder pathology. The authors concluded that these patients' body awareness may be more affected by visual information than healthy controls, and thus one could hypothesize that their body image is more susceptible to external influences. While this conclusion is negative at face value, it also suggests positive external influences may be able to help these patients reduce their body image distortions. Future research could thus explore such findings to design appropriate interventions.

Source: Eshkevari, E., Rieger, E., Longo, M. R., Haggard, P., & Treasure, J. (2011). Increased plasticity of the bodily self in eating disorders. *Psychological Medicine*, 4, 819-828.

The brain naturally distorts our own body image

We think that we have perfect knowledge of the size, shape and position of our own body parts but scientific results show that this is far from being the case. According to research at University College London, the brain appears to use a highly distorted model of the hand in which our fingers are perceived to be shorter and wider than they actually are.

In a study led by Dr Matthew Longo, participants put their left hands under a board and were asked to judge the location of different landmarks of their covered hand (such as knuckles and fingertips) by pointing to where they perceived each of them to be. A camera situated above the experiment recorded where the participants pointed. The researchers reconstructed the brain's model of the hand by putting together the locations of all the landmarks, and revealed its striking distortions. Participants estimated their hands to be about two-thirds wider and about one-third shorter than actual measurements.

The researchers suspect that the brain maintains different models of our own body. These models may help in forming either a visual image of our body or in sensing the position of our body parts with eyes closed, as in the above study. For example, participants in this study were very accurate in picking out photos of their own hand from a set of photos with various distortions of hand shape. This suggests that they had an accurate visual image of their own body, but the brain's model of the hand underlying position sense was highly distorted.

Such distortions of our sensory perception occur naturally and are generally shared by most people. They result from the way our brain receives and organizes the multitude of stimulation from different parts of the body and the outside world. Many perceptual distortions reflect the brain's strategies to achieve efficient perception and flexible behaviour.

Importantly, these findings may be relevant to psychiatric conditions involving body image, such as in eating disorders. In some people, a distortion in one of the brain's models of the body could come to dominate, leading them to truly believe that they are grossly fat, even when they are dangerously underweight.

Source: Longo, M. R., & Haggard, P. (2010). An implicit body representation underlying human position sense. *Proceedings of the National Academy of Sciences*, USA, 107, 11727-11732.

Can body image dissatisfaction be reduced by teaching people to be more critical of airbrushed ads?

Fashion advertising extensively uses airbrushing technology to change models' body shape and appearance in general. Hundreds of studies have shown that for the majority of women, being exposed to such unrealistic figures leads to low self-esteem, body image dissatisfaction and negative feelings about the way they look. Adolescent girls are particularly vulnerable to the effects of the "airbrushing culture".

So can we teach people to be critical of unrealistic body ideals? And can this reduce body image dissatisfaction?

The answer to both questions seems to be "Yes".

An experimental study evaluated the impact of an educational intervention concerned with the power of airbrushing at reducing body dissatisfaction among 200 women. The air-brushing intervention informed people about the extent of airbrushing used in the media and illustrated how easy it is to actually change someone's appearance using technology. Women who did not receive the intervention, reported greater body dissatisfaction after being exposed to thin images as compared to women who were informed about airbrushing. Overall, those who received the intervention reported less change in body image dissatisfaction as measured by the Body Shape Questionnaire (BSQ) regardless of which images (thin or fat) they had been exposed to. The results suggest that women can be taught to be more critical of the methods used by the media as a means to reduce body dissatisfaction. Incorporating such interventions into school and university health education campaigns could possibly help in minimizing the detrimental impact of media images on people's satisfaction with their own body.

Source: Ogden, J., & Sherwood, F. (2008). Reducing the impact of media images: an evaluation of the effectiveness of an airbrushing educational intervention on body dissatisfaction. *Health Education*, 108, 489-500.

Childhood obesity: understanding and preventing

Doctors say that obesity is now reaching "epidemic" proportions. According to recent figures from the National Child Measurement Programme, which assesses height and weight of children in England, more than 33% of 11-year-olds and 22% of 4- and 5-year-olds are overweight or obese. Being overweight is linked to numerous health problems, including diabetes, heart disease and high blood pressure, as well as psychological problems, such as stress, anxiety and depression. Unfortunately, parents struggle with many problems when it comes to managing their children's weight (i.e. lack of education about healthy eating, lack of cooking skills, financial problems, marketing campaigns for junk food). It therefore seems that one's environment plays an important role in becoming obese.

However, do only environmental factors lead to obesity?

Researchers at the Wellcome Trust-MRC Institute of Metabolic Science (University of Cambridge, Metabolic Research Laboratories) studied a cohort of children with extreme obesity from an early age and discovered that a number of gene mutations are directly linked with obesity. All of these genes are found in the hypothalamus, which is the region of the brain that is responsible for controlling appetite and food intake. These findings do not only indicate that obesity is biologically driven but also amenable to mechanism-based therapy. In fact, one gene defect is dramatically curable with daily injections of a protein called leptin.

Understanding obesity can hopefully open doors to research on prevention!

For more information:

http://www.neuroscience.cam.ac.uk/research/cameos/ObeseBrain.php

http://www.sanger.ac.uk/about/press/2013/130407.html

Does cosmetic surgery help?

Common cosmetic surgery procedures such as breast augmentation ("boob jobs") and rhinoplasty ("nose jobs") have increased by more than 700% in the past 10 years (American Society of Plastic Surgeons, ASPS, 2003). One reason for this explosion may relate to the increasing willingness of individuals to view these procedures as a way to combat dissatisfaction with their physical appearance. Body image has always been considered a key motivator in people's decisions to undergo cosmetic surgery, but change in body image as a result of cosmetic surgery has only recently begun to be investigated and the results are mixed.

Studies reporting positive effects have been criticized for using biased methods such as assessment by the surgeons themselves (Sarwer & Crerand, 2004) and more rigorous research has been less favourable. For example, a postoperative investigation of 45 women undergoing facial cosmetic procedures did find that the degree of dissatisfaction with the target facial feature of surgery was improved, but not their overall body image (Sarwer & Crerand, 2004).

Sources: Sarwar, D. B., & Crerand, C. E. (2004). Body image and cosmetic medical treatments. *Body Image*, 1, 99-111.

Phillips, K. A., Grant, J., Siniscalchi, J., & Albertini, R. S. (2001). Surgical and nonpsychiatric medical treatment of patients with body dysmorphic disorder. *Psychosomatics*, 42, 504-510.

Remember the positive side of body image

When thinking about body image we often think about its negative aspects, such as how it can generate body dissatisfaction and lead to feelings of incompetence. But there's another side to body image…an often neglected side…a positive side. This neglected side of body image is important, because accentuating a positive body image may actually be important for the prevention and treatment of body dissatisfaction. Fortunately, researchers at The Ohio State University provide some valuable insights into what characterizes and helps generate a positive body image. The researchers used a qualitative research method (called Grounded Theory) to analyse interviews with women who had a positive body image, together with a group of body image experts. They found that a positive body image involves an overarching love and respect for the body, which involves several characteristics such as appreciating the unique beauty and functionality of the body, filtering information in a body-protective manner, defining beauty broadly, and highlighting the body's assets while minimizing perceived imperfections. The importance of unconditional acceptance from significant others, and surrounding yourself with people who also have a positive body image also emerged as factors that help develop and maintain a positive body image. As Angela (a participant in the study) so eloquently says "I don't think just because you're small, you're beautiful or just because you're big, you're not beautiful. I feel like I'm beautiful still even if I'm a little different from [societal] standards" (see source below, pg. 111). So let's surround ourselves with people like Angela, and change our minds, not our bodies.

Source: Wood-Barcalow, N. L., Tylka, T. L., & Augustus-Horvath, C. L. (2010). "But I like my body": Positive body image characteristics and a holistic model for young-adult women. *Body Image*, 7, 106-116.

Could the use of more plus size models change women's obsession with thin bodies?

We live in a society where, through the media, we are surrounded by models and celebrities who are super-slim and as a result there is a general climate of obsession with thin bodies. The question is: Will people's attitudes towards body image change if there is more diversity in the body shapes and sizes portrayed in the media?

Researchers from Durham University, Newcastle University and V U University Amsterdam studied more than 100 women and found that women who habitually preferred thin models were significantly less keen on thin bodies after being presented with plus-size models. On the other hand, when women were shown images of thin models, their preference shifted even more towards thinness. In addition, positive and negative associations with weight were explored. When women were presented with aspirational images of plus-size models, paired with plain images of underweight women, their preferences shifted away from thinness.

The findings suggest that using plus size models can indeed rebalance our attitudes about what is considered to be beautiful and healthy and decrease the obsession with being super-slim. "Normalizing" female models in the media could be a first essential step towards changing our minds instead of our bodies and feel happier and more satisfied with the way we look!

Source: Boothroyd, L.G., Tovée, M.T., & Pollett, T. (2012). Visual Diet versus Associative Learning as Mechanisms of Change in Body Size Preferences. *PLoS ONE*, 7, e48692.

Recent developments in the treatment of Anorexia Nervosa

Anorexia Nervosa (AN) is a psychiatric eating disorder characterized by three core symptoms, (a) the persistent restriction of eating leading to significantly low body weight relative to health norms, (b) an intense fear of gaining weight or of becoming fat, or persistent related behaviours, even though one is underweight and (c) disturbance in the way one's body weight or shape is experienced, undue influence of body shape and weight on self-regard, or persistent lack of recognition of the seriousness of the current low body weight (DSM-V, 2013).

AN is associated with more deaths than any other mental disorder. Unfortunately, its cause is unknown and there is currently no evidence-based treatment. Research on animals has been used to try to study the role of chemical messengers in the brain, such as dopamine and serotonin that may affect how patients experience their need and desire for food, as well as their fears of gaining weight. Unfortunately, the results are currently mixed. In this context, a recent development is the study of a different chemical called ''oxytocin". Oxytocin is known as a ''peptide'' that has a well-recognized role in the body. It acts as a hormone helping lactation, pregnancy and parenting. In recent years it has also been understood that oxytocin also acts like a messenger in the brain, influencing a range of social behaviours, including trust, empathy, and sensitive parenting. Although, recent research shows that the effects of oxytocin are more nuanced than previously thought (Bartz, Zaki, Bolger, & Ochsner, 2011), a group of researchers has recently explored the potential of using 'intranasal' oxytocin, that is oxytocin that can be safely administered by the nose, to treat AN.

The study conducted in South Korea in collaboration with researchers in London, UK, found that intranasal oxytocin as compared to placebo led 31 women with AN to pay less attention to images of food and fatter body shapes. The researchers suggested that oxytocin may thus be able to reduce these patients usual, obsessional focus on eating and body shape. However, it is important to note that oxytocin had no effect on the amount of juice consumed in either the AN or the control group of the study. Moreover, before we can conclude that oxytocin can be used to treat AN, we will need studies of a different kind to be conducted, in which oxytocin is administered for longer periods of time and food intake, weight, body image distortions and other relevant facets of AN are carefully monitored.

Sources: American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders* (Fifth ed.). Arlington, VA: American Psychiatric Publishing.

Bartz, J. A., Zaki, J., Bolger, N., & Ochsner, K. N. (2011). Social effects of oxytocin in humans: context and person matter. *Trends in Cognitive Sciences*, 15, 301–309.

Kim, Y. R., Kim, C. H., Cardi, V., Eom, J. S., Seong, Y., & Treasure, J. (2014). Intranasal oxytocin attenuates attentional bias for eating and fat shape stimuli in patients with anorexia nervosa. *Psychoneuroendocrinology*, 44, 133-142.

School-based interventions for adolescents

The problem: Body image dissatisfaction is becoming a major psychosocial problem in most Western Societies, with about 60% of adults reporting that they feel unhappy with the way they look. In young women the problem is particularly acute. In the US, 80-90% of young women report body image concerns. A UK survey found that 70% of teenage girls don't participate in certain school activities because of body image anxiety, while 42% of girls feel that the most negative part about being a female is the pressure to look attractive and the fear of being or becoming fat.

One solution: At least two systematic studies in Australia have shown that it is possible to reduce the likelihood of adolescent girls developing body dissatisfaction. The trick seems to be simple, but interactive and creative, school-based classes that encourage the girls to think, talk and play around notions of body individuality and enjoyment of appearance differences. Practical exercises and games included role-play to help develop strategies that could counter body comparisons, idealization of the thin body and fat-talk or teasing. Skills of media literacy, self-esteem boosting and dealing with relationships were also practiced.

For details of the "Everybody's Different" school programme see:

O'Dea, J. (1995). *Everybody's different: A self-esteem program for young adolescents*. Sydney: University of Sydney Press.

O'Dea, J. A., & Abraham, S. (2000). Improving the body image, eating attitudes, and behaviours of young male and female adolescents: a new educational approach that focuses on self-esteem. *International Journal of Eating Disorders*, 28, 43-57.

For details of the "Happy Being Me" school programme see here:

Richardson, S. M., & Paxton, S. J. (2010). An evaluation of a body image intervention based on risk factors for body dissatisfaction: a controlled study with adolescent girls. *International Journal of Eating Disorders*, 43, 112-122.

"Pleasant touch" fosters social and physical development

Research supports the vital role of bodily social interaction from the first days of birth. Caregivers who lovingly caress their infants are promoting early physiological and emotional development.

A study at the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig, Germany, showed that slow and gentle touch of the skin helps to build the social links essential to bonding. It was found that infant's heart rate slowed in response to brushstrokes when the strokes were light and of medium velocity (3cm per second). Interestingly, the more sensitive the caregiver was to touch, the stronger was this physiological effect and the more the infants engaged with the touch. This skin-to-skin contact early in life can serve as a protective factor against emotional, behavioural and social problems later in adulthood. Affective touch is known to provide important interoceptive signals, which help the brain to monitor the internal environment of our body and give us a sense of coherent bodily self.

Source: Fairhurst, M. T., Löken, L., & Grossmann, T. (2014). Physiological and Behavioural Responses Reveal 9-Month-Old Infants' Sensitivity to Pleasant Touch. *Psychological Science*, 25, 1124-1131.

How about changing the body… temporarily? Body image in virtual reality

Systems in the brain that are responsible for visual perception have been widely studied. These systems give us the possibility to create a representation of the surrounding world by processing the stimuli to which we are exposed in order to adapt and respond to the environment adequately. Visual cues of our own bodies contribute to our so-called body image. People tend to perceive this body image as a fixed or stable structure. However, scientific work in the field of virtual reality points to a different direction.

When perceiving our bodies in a virtual space, new questions arise regarding the influence that this virtual space has on our experience of ourselves and the "true" reality that surrounds us. Avatars have been used in research to introduce a new way to conceptualize human embodiment. We can track the origin of the term avatar to Hindi mythology. Avatars present the opportunity to simulate and experiment with our body image, its perception and processing and thus the way we live it, allowing us to venture into experiences that would be impossible to have in reality but that, nevertheless, can widen the repertoire of behavioural alternatives.

Recently, a Spanish and British research group recruited twenty subjects, of which ten experienced a virtual character that reflected the movement of the upper body in synchronicity with the subject's movements; then, the avatar displayed prerecorded actions instead. The other ten subjects went through the same processes but in a reversed order. The results showed that it is possible to experience a body ownership illusion from an avatar under the synchronous movement condition. This study presents evidence of the usefulness that avatars have for helping us experience a congruent perception of our bodies. Manipulation of virtual reality is therefore a promising research line in regarding body image, since virtual reality allows us to go beyond the sensorial integration that we are accustomed to and temporarily replace our body physiognomy with a digital one. The avatar experience may have a positive influence in the presence of body-image disorders and perhaps "changing" our bodies temporarily, i.e. using noninvasive, non-chirurgical methods like avatars, might be a key to changing the mind.

Sources: Woźniak, M. (2012). Pictures of me: possibilities of shaping our body image through virtual reality. *Limes: Borderland Studies*, 1, 1-10.

González-Franco, M., Pérez-Marcos, D., Spanlang, B., & Slater, M. (2010). The contribution of real-time mirror reflections of motor actions on virtual body ownership in an immersive virtual environment. In *Virtual Reality Conference (VR), 2010 IEEE* (pp. 111-114).

Improve your self-perception

Most of us know the feeling of being dissatisfied about certain parts of our bodies, be it that we think our thighs are too fat, our bums too big, etc. But as our campaign hopes to demonstrate, we can change our minds to help us feel more positive about our bodies. One way, as we saw here (see 'Challenging beauty norms') is to challenge beauty norms. Today's message focuses on how we can also improve our own perception of ourselves.

We have already heard that boosting self-esteem, by improving our general evaluation of ourselves, can improve body satisfaction (see 'School-based interventions for adolescents'). But what about going a step further to focus specifically on being kind to ourselves? Being understanding and non-judgmental of our shortcomings is captured by a psychological construct termed self-compassion. Higher self-compassion is linked to being more accepting of ourselves. Might higher levels of self-compassion be connected to higher body satisfaction as well?

Researchers in Canada found that self-compassion was indeed related to women's concerns about their bodies. Across two studies, they demonstrated that women scoring higher on a measure of self-compassion – and especially on items relating to how judgmental they were of themselves – had fewer concerns about their bodies. This was found even when controlling for women's levels of self-esteem, indicating that there may be a unique benefit in being kind to ourselves. Although this study assessed the degree of self-compassion women generally had already, rather than boosting their self-compassion in the study, do give it a try: Be kind to yourself, and change your mind, not your body!

Source: Wasylkiw, L., MacKinnon, A. L., & MacLellan, A. M. (2012). Exploring the link between self-compassion and body image in university women. *Body Image*, 9, 236-245.

On the role of exercise

The problem: Research has shown that most adults in the UK fail to get enough exercise, risking their health.

One solution: A study with 127 male and female elementary school, high school and university students found that high exercisers reported greater self-esteem and greater satisfaction with specific aspects of their body as compared to low exercisers. Physical activity is not only good for your physical health, but also for your mental well-being!

Source: Frost, J., & McKelvie, S. J. (2005). The Relationship of Self-Esteem and Body Satisfaction to Exercise Activity for Male and Female Elementary School, High School, and University Students. *The Online Journal of Sport Psychology*, 7, 36-49.

Enhancing resilience from within

As humans, we have a continuing experience of our body, so that when we look ourselves in the mirror, when we walk, or when we have a stomach ache we think of these experiences as belonging to the same body. Decades of research has shown, however, that in fact our brain holds many different models of the body; for example there are wide differences between how the body is represented in the mind "from the outside", as when seen in mirrors and "from the inside", as when we experience pain, or a racing heart.

Importantly, these different representations of the body can be influenced by both external and internal sources. For example images of other bodies in the media may affect how we think about our body as viewed by others (see 'Does thinness sell products?'). Interestingly, the perception of bodily feelings such as the ones accompanying joy or enthusiasm may also influence how we view other bodies. For example, classic studies in psychology have shown that when men were tricked to think that their hearts were beating faster in response to viewing pictures of certain semi-nude women, they subsequently rated these women as objectively more beautiful than other women for which they thought their heart beats had not changed during the initial viewing (Vallins, 1966).

Can such internal bodily feelings also influence how we view our own body? A recent study conducted in the lab of Professor Manos Tsakiris suggests that they can. They used a measure of body ownership (namely the Rubber Hand Illusion; see 'Plasticity of self in eating disorders') to quantify the extent to which 46 healthy women experienced ownership over a plastic but realistic rubber-hand. They also measured the ability of these women to detect and count their own heartbeats. Based on the results on this heartbeat counting task, they divided the women into two groups. Those, whose counts closely matched their actual heartbeat as measured objectively by special equipment, formed the "high" performance group. By contrast, those who were not as good on the task formed the "low" performance group. The researchers then combined all the above results and found that women in the low performance group experienced a stronger illusion of ownership over the rubber hand, while the ones who were in the high performance group were less persuaded by the rubber hand illusion. Tsakiris and colleagues concluded that people who are worse in monitoring signals from within the body may be more susceptible to externalized images of the body and hence more likely to experience body image dissatisfaction in modern society. As people with anorexia have been shown to have poor cardiac awareness (Pollatos et al., 2008), it is likely that their body image distortions may also relate to their poor awareness of internal bodily signals. Indeed, subsequent studies have shown that people with anorexia are more easily swayed by the rubber hand illusion (Eshkevari, Rieger, Longo, Haggard, & Treasure, 2012; see also 'Plasticity of self in eating disorders'). These findings suggest that a possible way to reverse body image dissatisfaction and anorexia is to enhance the perception of internal body signals with either psychological or neuroscientific means. Such enhancement could lead to body image resilience, the central goal of the current campaign and our future studies.

Sources: Eshkevari, E., Rieger, E., Longo, M. R., Haggard, P., & Treasure, J. (2012). Increased plasticity of the bodily self in eating disorders. *Psychological Medicine*, 42, 819–828.

Pollatos, O., Kurz, A. L., Albrecht, J., Schreder, T., Kleemann, A.M., Schöpf, V., Kopietz, R., Wiesmann, M., & Schandry, R. (2008). Reduced perception of bodily signals in anorexia nervosa. *Eating Behaviors*, 9, 381-388.

Tsakiris, M., Jiménez, A. T., & Costantini, M. (2011). Just a heartbeat away from one's body: interoceptive sensitivity predicts malleability of body-representations. *Proceedings of the Royal Society B: Biological Sciences*, 278, 2470-2476.

Vallins, S. (1966). Cognitive effects of false heart-rate feedback. *Journal of Personality and Social Psychology*, 4, 400.

Using mindfulness to combat body dissatisfaction

Eating disorders such as anorexia and bulimia are widespread and have serious physical and psychological impacts on those affected. Their causes are complex and varied, but (unsurprisingly) concerns about body image have been identified as an important factor in these illnesses (Cooley & Toray, 2001). Unhealthy concerns about one's physical appearance can lead to body avoidance, where a person dresses in baggy clothes for example, or avoids looking in the mirror; to excessive body checking, such as constantly and critically looking in mirrors; and/or being acutely aware of not matching the ideal body images constantly being portrayed in the media around us (and which most of us bear no resemblance to!).

The practice of Mindfulness promotes patterns in thinking which directly challenge the unhelpful behaviours described above. Mindfulness is a type of meditation which encourages the individual to direct their attention to whatever they are physically or emotionally experiencing in the present moment, in an accepting and non-judgemental way. Over time, an individual may become less critical of themselves – not constantly comparing themselves to others or ideals – and less preoccupied with scrutinizing or avoiding the sight of their own body.

On this basis, Alberts, Thewissen and Raes (2012) hypothesized that increased levels of mindfulness would be likely to be associated with lower levels of concern over body image. A sample of 26 adult women were assessed for their baseline levels of mindfulness and body image concern, using standardized questionnaires. All women had reported some type of difficulty in their relationship with food or controlling their weight, but none were diagnosed as having a clinical eating disorder. Half of the women were then given an 8 week mindfulness training course, with daily exercises to promote awareness of their physical sensations and thoughts relating to eating, food and their bodies. At the end of the study, the women who underwent the training showed a significant increase in mindfulness, and a significant reduction in body image concern, relative to the control group.

These findings therefore suggest that encouraging the practice of mindfulness could be a valuable step towards combating negative body image, and the more serious eating disorders it can lead to.

Sources: Cooley, E., & Toray, T. (2001). Body image and personality predictors of eating disorder symptoms during the college years. *International Journal of Eating Disorders*, 30, 28–36.

Alberts, H. J. E. M., Thewissen, R., & Raes, L. (2012). Dealing with problematic eating behaviour. The effects of a mindfulness-based intervention on eating behaviour, food cravings, dichotomous thinking and body image concern. *Appetite*, 58, 847-851.

Effects of body image therapy in anorexia nervosa: an fMRI study

Beyond self-starvation, Anorexia Nervosa (AN) is characterized by body image disturbance including a misperception of one's own body size and an extreme dissatisfaction with one's own body (Vocks, Wächter, Wucherer, & Kosfelder, 2008). Previous messages of the day have already highlighted an enhanced plasticity of the sense of self coming from the body in this clinical population (see 'Plasticity of self in eating disorders'). We have also talked about the recent developments in the potential treatments of AN by means of the practice of Mindfulness (see 'Using Mindfulness to combat body dissatisfaction') and nasally inhaled oxytocin (see 'Recent Developments in the treatment of Anorexia Nervosa').

The problem: A functional magnetic resonance imaging (fMRI) study (Uher et al., 2005) showed for the first time that body image disturbance in AN might be associated with dysfunctional body-image-processing brain circuits. In particular, the extrastriate body area, a brain region that is located in the occipito-temporal visual cortex and is specialized in the perception of human bodies, has shown a lower activation in patients with AN compared to healthy controls. Authors suggested that this lower activation could potentially underlie the body image disturbance, including body size overestimation and negative evaluation of one's own body (Uher et al., 2005).

The solution: Due to the central role of body image disturbances in AN, direct interventions aiming at an improvement of body image have been applied as one component in the treatment of eating disorders (Vocks et al., 2008). This intervention consists of full-body mirror exposure plus 10 weekly sessions of cognitive-behavioural body image therapy (BIT). Although it has been demonstrated that this intervention can reduce body size overestimation and body dissatisfaction in AN, it was not clear whether there could be any change in brain activation as a result of it. Vocks et al. (2010) showed an increase in activation in the extrastriate body area following BIT. These preliminary findings provides the first evidence that the dysfunctional body-image-processing brain circuits that seem to be associated with body image distortion, preoccupation with body weight and negative body-related emotions are modifiable by cognitive-behavioural interventions.

Sources: Uher, R., Murphy, T., Friederich, H. C., Dalgleish, T., Brammer, M. J., Giampietro, V., Phillips, M. L., Andrew, C. M., Ng, V. W., Williams, S. C. R., Campell, I. C., & Treasure, J. (2005). Functional Neuroanatomy of Body Shape Perception in Healthy and Eating-Disordered Women. *Biological Psychiatry*, 58, 990-997.

Vocks, S., Wächter, A., Wucherer, M., & Kosfelder, J. (2008). Look at Yourself: Can Body Image Therapy Affect the Cognitive and Emotional Response to Seeing Oneself in the Mirror in Eating Disorders? *European Eating Disorders Review*, 16, 147–154.

Vocks, S., Busch, M., Schulte, D., Grönermeyer, D., Herpertz, S., & Suchan, B. (2010). Effects of body image therapy on the activation of the extrastriate body area in anorexia nervosa: An fMRI study. *Psychiatry Research: Neuroimaging*, 183, 114–118.

Internet-delivered therapy

The problem: Body dissatisfaction is frequently reported by adolescent girls and is associated with negative mental and physical health outcomes (depressive symptoms, low self-esteem and unhealthy weight loss behaviours). Over 75% of women in the UK report body image concerns and the number of people in the UK diagnosed with an eating disorder keeps increasing. According to a study by King's College London and the UCL Institute of Child Health there has been an increase of 15% since 2000.

One solution: The intervention My Body, My Life: Body Image Program for Adolescent Girls is based on cognitive behavioural principles and addresses body image and eating issues. It consists of a self-help manual, supported by six 90-minute weekly small group (4-8 participants) online sessions facilitated by a trained therapist. Girls complete self-help activities in order to prepare for the online sessions, where they are able to discuss their concerns and learn how to improve their eating behaviours and change negative thoughts about their body image. An evaluation of this internet-delivered targeted intervention found that the programme offers a promising approach to combat body dissatisfaction and disordered eating. An important advantage of this intervention is that it also addresses geographic access problems given that it is delivered over the internet.

Source: Heinicke, B. E., Paxton, S. J., McLean, S. A., & Wertheim, E. H. (2007). Internet-delivered targeted group intervention for body dissatisfaction and disordered eating in adolescent girls: a randomized controlled trial. *Journal of Abnormal Child Psychology*, 35, 379-91.