Psychological flexibility is not a single dimension: The distinctive flexibility profiles of underweight, overweight, and obese people

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ABSTRACT

Psychological flexibility interventions such as Acceptance and Commitment Therapy have been shown to be beneficial for weight management. Flexibility is often treated as a single, global construct, but it can also be described in terms of interrelated components (e.g., accepting, awareness, defusion, values). Are some components of flexibility of greater relevance to weight-related issues than others? We utilized a planned missing data design to assess weight status and a broad range of psychological flexibility components in a nationally representative sample of Americans ($N = 7884$; 3748 males, 4136 females; age: $M = 47.9$, $SD = 16$). Profile analyses revealed that different weight and gender groups showed different configurations of inflexibility. Underweight men showed a "defensive but active" pattern, expressing high avoidance on multiple dimensions, high levels of fusion, but also showing high hope and willingness to experience distress when pursuing goals. Overweight and obese participants did not show elevated levels of inflexibility, and indeed there was some evidence that overweight men (but not obese and severely obese men) were more flexible than other males. Severely obese participants showed elevated patterns of inflexibility across multiple indices, but this pattern differed for men and women. We conclude that psychological flexibility should not be treated as a unitary construct, and make specific suggestions for future intervention research.

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1. Introduction

Human beings have a complex and deeply symbolic relationship with food. Several decades of research suggests that people eat or avoid eating for reasons that have nothing to do with physical hunger (Dallman, 2010; Keskitalo et al., 2008; McAllister et al., 2009; Vamosi, Heitmann, & Kyvik, 2010; Westenhoefer, Stunkard, & Pudel, 1999). For example, people eat to comfort themselves, to overcome fatigue, to manage stress, and to increase feelings of control (McAllister et al., 2009; Troisi & Gabriel, 2011; Westenhoefer et al., 1999). People also under-eat for emotional reasons. For example, some people avoid distress by reducing intake of healthy foods and total calories (Dallman, 2010; Merwin, Zucker, Lacy, & Elliott, 2010). Others may seek to control feelings of insecurity by striving to be perfect (Hewitt, Flett, & Ediger, 1995). A preoccupation with food and weight-related goals may also serve as a distraction from other life issues.

Eating for reasons other than hunger can be a major cause of weight gain (Ciarrochi, Bailey, & Harris, 2014). In many Western countries, such as the United States and Australia, the majority of the population is overweight or obese (Australian Bureau of Statistics, 2012; Berghofer et al. 2008; Caballero, 2007; Flegal,

Carroll, Kit, & Ogden, 2012). Another small percentage is underweight. This means that the so-called "healthy weight category" makes up only about one third of the population. Additional research is needed to identify the psychological factors that lead to unhealthy weight gain or loss, factors that might then become the target for intervention research.

Recently, researchers have begun to explore the link between excessively low/high weight and psychological flexibility (Masuda & Latzman, 2012; Merwin et al., 2011). Psychological flexibility is a broad construct defined as the ability to connect with the present moment and to experience thoughts and feelings openly as they arise, whilst persisting in action that is consistent with values, or changing action when the situation requires it (Hayes, Strosahl, & Wilson, 2011). Psychologically flexible people might engage in less emotional (or defensive) patterns of eating, be mindful of the causes of their eating, and stay flexibly committed to their health-related goals.

This paper examines the link between psychological flexibility and Body Mass Index (BMI) category (underweight to severely obese). To date research in the area of weight has focused on psychological flexibility as a unitary construct (Madden, Leong, Gray, Ciarrochi, & Horwath, submitted for publication; Masuda & Latzman, 2012; Merwin et al., 2011). However, psychological flexibility can be seen as a broad construct encompassing the following components: acceptance, defusion, self-as-context,

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flexible attention to the present moment, chosen values and committed action (Hayes et al., 2011). Meta-analysis of 66 laboratory based component studies provided support for both the usefulness and theoretical relevance of the varied components specified by the psychological flexibility model among both convenience and at risk and distressed population samples (Levin, Hildebrant, Lillis, & Hayes, 2012). Additionally research has begun to examine the benefits of specific flexibility components with varied conditions such as pain (Branstetter-Rost, Cushing, & Douleh, 2009) and anxiety disorders (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Levitt, Brown, Orsillo, & Barlow, 2004).

Similarly interventions in the weight area would likely benefit from a fine-grained analysis of the components of psychological flexibility and their relevance to BMI status. For example, perhaps the flexibility profile for those who are overweight is quite different from those who are underweight. In other words, are there interactions between BMI category and components of psychological flexibility? A lack of parallelism would suggest that some of the components of psychological flexibility are more strongly linked to a particular BMI status than other components. If this does indeed happen, then it would represent a serious challenge to the notion that psychological flexibility should be treated as a unitary construct. Interventions could be designed to focus on the flexibility components that are relevant to specific subsets of clients. This research will therefore examine not only global psychological flexibility, but also the profile of accepting, present moment awareness, defusion and progress towards important life goals or strivings of individuals within each BMI group.

The present study will focus on components of flexibility that have been tied to mental health, rather than those studied exclusively in the context of health. Many people who seek help for mental health issues struggle with weight issues of some kind as a frequent, if important, side issue. In addition to increasing the risk of physical illness, weight problems may be a source of emotional distress and stigma (Major, Eliezer, & Rieck, 2012; Onyike, Crum, Lee, Lyketsos, & Eaton, 2003; Schvey, Puhl, & Brownell, 2011) and triggers for potentially unhealthy weight control behaviors. The practitioner in promoting aspects of psychological flexibility may also help clients to better deal with their weight related issues (even if this is not the primary target of the intervention).

We will start our review with research looking at psychological flexibility as a unitary, global construct. We will then move to research examining the components of flexibility and their link to BMI.

2. Global psychological flexibility and BMI

There has now been several studies examining the ability of psychological flexibility interventions (i.e., ACT) to promote healthy BMI (Forman et al., 2013; Forman, Butryn, Hoffman, & Herbert, 2009; Juarascio, Forman, & Herbert, 2010; Lillis, Hayes, Bunting, & Masuda, 2009; Pearson, Follette, & Hayes, 2012; Tapper et al., 2009; Weineland, Arvidsson, Kakoulidis, & Dahl, 2012) and exercise behavior (Butryn, Forman, Hoffman, Shaw, & Juarascio, 2011). One study showed that a group ACT-based intervention, when delivered by experts, produced significantly greater weight losses at 6 months than standard behavioural treatment (mean weight loss 11% versus 5%; Forman et al., 2013).

Lillis et al. (2009) randomly assigned overweight participants who had lost weight within the past 2 years to a wait-list or a 1 day ACT workshop targeting obesity-related stigma. At 3-month follow-up, ACT participants had lost an additional 1.6% of their body weight, whereas the control group gained .3%. Weineland

et al. (2012) examined the role of ACT in preventing weight regain amongst bariatric surgery patients. The trial was an RCT with an ACT/internet condition (two face-to-face sessions+internet) and a treatment-as-usual condition. Participants in the ACT condition showed significantly reduced disordered eating behaviours (e.g., emotional eating), and improved body satisfaction and quality of life. In yet another study, Butryn et al. (2011) conducted an RCT comparing 4 hours of education with ACT for promoting physical activity, and found that ACT increased objectively measured exercise.

In addition to ACT intervention research, recent correlational research suggests a link between flexibility and weight status. Madden et al. (submitted for publication) have shown that lower psychological flexibility is associated with higher BMI in a nationwide sample of middle-aged women. That study also indicated that inflexible people are more likely to binge and consume high energy-dense foods. Masuda and Latzman (2012) found similar results amongst university students, with inflexible students being more likely to experience bulimia and food preoccupation. In that study, inflexibility was not associated with BMI. In addition, psychological flexibility has been positively associated with eating in response to physical hunger (Boucher, Leong, Gray, Ciarrochi, & Horwath, 2013), which in turn is strongly linked with lower BMI (Madden, Leong, Gray, & Horwath, 2012).

Thus far we have been focusing on overeating, but global psychological inflexibility may also be associated with problems related to under-eating and anorexia (Merwin et al., 2011; Sandoz, Wilson, Merwin, & Kellum, 2013). For example, Sandoz et al. (2013) found a strong link between inflexibility around body image and the extent to which individuals restrict food intake, obsess about thinness, and experience eating related discomfort.

3. Psychological flexibility components and BMI

Psychological flexibility is argued to consist of six components, including experiential acceptance, contact with the present moment, defusion, self-as-context, and committed action (Hayes et al., 2011). All but self-as-context has been heavily researched (Levin et al., 2012). Flexibility components are often studied in isolation, with, for example, some papers focusing on fusion, and another on values. This makes it difficult to assess configural hypotheses, i.e., whether a particular subpopulation can be high in some aspects of flexibility and average or even low in others. The present paper will remedy this problem by seeking to measure components of flexibility at the same time. We now take a closer look at flexibility components.

3.1. Experiential acceptance versus change

Standard cognitive behavioural interventions often focus on improving the effectiveness of client behaviour by seeking to change the form or frequency of feelings or thoughts. For example, they may seek to boost self-esteem, reduce stress, or challenge dysfunctional beliefs (Ciarrochi & Bailey, 2008). However, such attempts to alter or control private events can sometimes be problematic. Control strategies may make it more difficult to cope with food cravings and lead to consumption of craved foods, whereas acceptance-based strategies may reduce craving-based consumption (Forman et al., 2007; Hooper, Sandoz, Ashton, Clark, & Mchugh, 2012). Similarly, acceptance-based strategies may lead to a greater willingness to allow and enjoy consumption of a wide variety of foods (those perceived as healthy and otherwise), rather than regarding some foods as forbidden which can lead to food preoccupation and greater likelihood of bingeing (Tylka, 2006). Outside the eating behaviour area, the paradoxical effects of control have now been

highlighted in numerous studies (for review see Ciarrochi & Bailey, 2008; Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004).

The construct that may be most relevant to avoidance is emotional eating, a pattern of behaviour that is often an attempt to self-comfort or manage stress (Keskitalo et al., 2008; Koenders & Strien, 2011). A clear link has been established between emotional eating and BMI (Keskitalo et al., 2008; Koenders & Strien, 2011). For example, Keskitalo et al. (2008) found that emotional eating explained about 9% of the variance in BMI, and that it had the lowest heritability estimate of other forms of eating behaviour, which is particularly encouraging for those practitioners who wish to influence emotional eating. In a longitudinal study, Koenders and Strien, (2011) found that emotional eating predicted weight gain, even when controlling for a number of lifestyle factors and baseline BMI. In a rare study examining components of psychological flexibility, Merwin et al. (2010) found that non-acceptance of feelings predicted dietary restraint.

Forman et al. (2007) conducted an experiment that manipulated the extent to which participants engaged in control versus acceptance-based coping strategies. The control group was taught strategies to distract themselves from their food cravings, whereas the acceptance group was taught to accept their cravings as they were, without trying to change them in any way. They were also taught defusion strategies, which involved "stepping back from the cravings" and observing them. Forman et al. found that the benefits of control versus acceptance coping depended on the participant's sensitivity to the food environment. Control strategies worked best amongst those who were low in sensitivity, whereas acceptance-based strategies worked best for the highly sensitive.

3.2. Contact with the present moment

This construct is perhaps as broad and multi-dimensional as psychological flexibility (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), and often overlap with other flexibility components. We chose to focus on emotional awareness and identification in this study because this construct has had a clear link to health and eating disorders (Landstra, Ciarrochi, Deane, & Hillman, 2013; Nowakowski, McFarlane, & Cassin, 2013). People with alexithymia, or low emotional awareness, struggle to manage their feelings in adaptive ways and may turn to maladaptive, unhealthy strategies (Ciarrochi, Heaven, & Supavadeeprasit, 2008; Lindsay & Ciarrochi, 2009). With respect to body weight, Schmidt, Jiwany, and Treasure (1993) found that individuals with anorexia had lower emotional awareness than controls. Elfhag and Lundh (2007) found that low emotional awareness was associated with obesity in both men and women.

3.3. Believing unhelpful thoughts/fusion

Within the psychological flexibility model, beliefs are not viewed as thing-like or static, but rather as a particular type of verbal behaviour, a special kind of relational responding that is amenable to a learning or operant analyses (Tornke, 2010). Thus, low self-esteem can be described as a context that reinforces the relating of the stimuli "I" to "worthless" and the consequent transformation of stimulus functions such that "I am worthless" elicits, for example, "giving up" behaviour. Fusion occurs when verbal stimuli dominate over environment or other forms of behavioural control. In contrast, in a defused context where words are experienced mindfully as sounds that come and go, the same sequence of words, "I am worthless," may not elicit giving up behaviour (Hayes et al., 2011).

We utilize the term fusion broadly here and include measures that seek to assess fusion directly (e.g., "I tend to get entangled in my thoughts") or indirectly by assessing the believability of unhelpful thoughts (e.g., I strongly believe the statement "I am a worthless person."). There has been little research involving health and the direct assessment of fusion, but there has been substantial literature on indirect assessment, and this is what we focus on here. For the sake of this paper, we will use the term "fusing" and "believing" interchangeably.

Fusion with certain ideas is likely to be associated with unhealthy behavior. For example, fusion with the idea, "I am unable to achieve my goals", or "low hope", is likely to lead less health related goal striving. Fusion with low social worth beliefs, or "low self-esteem", may lead a person to give up on health goals, because they believe health and fitness will not improve their social value. The relationship between these constructs might, of course, be bi-directional, with high BMI leads to lower hope and social self-worth.

Consistent with this theorizing, low self-esteem has clear links to disordered eating, drive for thinness, bulimia, and body dissatisfaction (Shea & Pritchard, 2007). Although self-esteem is clearly linked with subjective dissatisfaction with body image, it may have little or no relationship with actual body mass index (Strauss, 2000; Tiggemann, 1991).

Perfectionism is another fusion-related variable that is associated with eating disorders (Mas et al., 2011; Merwin et al., 2010). Perfectionism involves believing that one must strive for flawlessness and set high standards for appearance. Whilst excessively high standards for women are linked with underweight, the case in men is less clear. The ideal male image tends to be more muscular and not underweight (Mccreary & Sasse, 2000; Salusso-Deonier, Markee, & Pedersen, 1993). Nonetheless, there is a relatively small proportion of anorexic and bulimic men, who account for approximately 10% of this condition (Weltzin et al., 2005; Woodside et al., 2001). Men with eating disorders are more likely than others to be homosexual, perfectionistic, and focused on exercise. This is particularly the case for forms of exercise where less weight might be beneficial such as rock climbing and triathletes (Weltzin et al., 2005; Woodside et al., 2001).

In addition to correlational studies on fusion, Hooper et al. (2012) conducted an experimental study into defusion and eating related behaviour. These researchers found that participants trained in defusion strategies consumed significantly less chocolate in a taste test than the participants trained in suppression strategies. They also found that over the course of a week, the defusion group experienced greater cravings, but did not consume more chocolate, suggesting that one's relationship to the craving, rather than the occurrence of the craving itself, improved eating behaviour. The BMI status of these participants was unknown.

3.4. Values and committed action

In the ACT framework, values are chosen qualities of purposive action that can never be obtained as an object but can be instantiated moment by moment (Hayes et al., 2011). Values help increase self-control by focusing people on longer term life directions rather than immediate impulses. For example, Logel and Cohen (2012) conducted an experiment in which women were given a list of values, none of which were related to health. These women then either wrote about why their ninth ranked value was important to someone else (control condition) or wrote about why their most important value was important to them. Approximately 2.5 months after the experiment, the women who had affirmed their values had lower BMIs and smaller waistlines compared to the control condition.

There are a wide variety of ways to examine valued activity (Dahl, Plumb-Vilardaga, Stewart, & Lundgren, 2009), but perhaps the most common can be found in the area of personal striving

assessment and Self-Determination Theory (SDT) (Deci & Ryan, 2000). SDT posits that people strive for long-term, abstract objectives for reasons that vary from controlled (e.g., striving due to guilt or coercion) to autonomous (striving because it gives fun or meaning). There have now been over 180 studies in the area, and the general finding is that people are able to sustain healthy behavior to the extent that the behavior is autonomously motivated (Ng et al., 2012). The present study focused on the extent of autonomous striving as our proxy for valued activity.

4. The current study

The present study explored the extent to which profiles of acceptance, awareness, believing/fusing, and valuing/striving differed between the BMI categories. Because no previous research has assessed all these variables in a single study, we did not have strong hypotheses about how profiles might differ between BMI categories. We expected that the components of psychological flexibility would generally be worse for underweight and overweight groups. We focused on two key question:

Question 1. Will the psychological inflexibility profiles be the same for our different weight and gender categories?

Question 2. Relative to the normal weight group, will the inflexibility components increase in a uniform and linear fashion as groups become increasingly overweight? For example, will overweight groups be more inflexible than normal weight groups, and obese groups be still more inflexible than overweight?

5. Method

5.1. Participants and design

We purchased a nationally representative American sample of 7884 participants (3748 male; 4136 female) from a professional survey company. Participants completed an on-line, anonymous survey in exchange for points they received from the survey company, which they could redeem for merchandize (directly from the company). We utilized a planned missing data design to administer a large number of measures to participants, whilst keeping respondent burden to a minimum (Graham, Taylor, Olchowski, & Cumsille, 2006; Schafer, 1997). The online survey was designed so that participants were required to enter responses to the various questions, hence resulting in a 100% completion rate of the subset of questions the participants were presented. Part one of the questionnaire was administered to all participants, and included assessment of demographics, self-reported height and weight, and personal strivings. The second part included a random sample of 60 items from the remaining measures described below, which kept the total survey administration time to around 20 to 30 minutes. No individual question had fewer than 1655 responses, or 21% of the total sample.

5.2. Statistical procedure

While missing data was high, this was due to a missing by design procedure and thus can be considered as missing completely at random (MCAR; Enders, 2010). In MCAR cases both traditional missing data approaches (e.g., listwise deletion) and more modern methods (e.g., multiple imputations) will produce unbiased estimates. However, a missing by design approach has practical limitations. Since all cases have at least one missing value, listwise deletion is not feasible. Thus we relied on

imputation procedures (see Little & Rubin, 2002). Because each missing value estimate is made with some error, estimates based on a single data set do not take into account such uncertainty while multiple imputations with associated estimation formulas do (Little & Rubin, 2002).

We performed multiple imputation ($m=25$) in the statistical software R (R Core Team, 2013), using the package Amelia II (Honaker, King, & Blackwell, 2010), which implements Expectation-Maximization (EM) algorithm with bootstrapping (Dempster, Laird, & Rubin, 1977; Honaker et al., 2010; King, Honaker, Joseph, & Scheve, 2001). In this procedure, multiple bootstrapped samples of the original incomplete data are used to draw values of the complete data parameters. The EM algorithm draws imputed values from each set of bootstrapped parameters and automatically fills in the missing values with the imputed values. Across the imputed datasets, the observed values remain the same, but the missing values are replaced with draws from EM based predictive distribution of missing data. Amelia II diagnostics on our imputed datasets confirmed that EM convergence was normal and EM chain lengths of all 25 imputed datasets were reasonably short (under 555), indicating a robust imputation model. We then extracted 25 imputed files from R and merged them in SPSS for subsequent analysis.

We examined relative efficiency of our imputed datasets before proceeding with our main analyses. Relative efficiency is a comparison of the estimate (the mean of each scale in our case) to a theoretical estimate computed using an infinite number of imputations. The closer the estimate is to 1, the more it matches the theoretical ideal (IBM, 2010). We examined the efficiency of the mean estimates within gender and BMI categories and found that the 25 imputations produced substantial efficiency, with the efficiency estimate not dropping below .99 for any variable. All parameter estimates were pooled across the 25 imputations, providing estimates that are generally more accurate than if they had been based on only one imputation (IBM, 2010; Schafer, 1997). We also report pooled (average) F and alpha statistics.

5.3. Measures

Demographics: Participants were asked to indicate their age, gender, highest level of education, household income, marital status, and ethnic background. Income categories ranged from 0 to 12, starting at 0–10,000 US dollars and going up in ten thousand dollar increments to 130,000 or more. Thus, a category of 6 indicates an income between 50 and 60 thousand dollars and a category of 7 indicates an income between 60 and 70 thousand dollars. Participants were asked to indicate their highest level of education on the following scale: Some high school or less (1), high school diploma or equivalent (2), some college (3), College diploma (4), some graduate/professional school (5), and graduate/professional degree (6).

Weight classification: People self-reported weight and height. Recent research from the US, Australia, the Netherlands and Thailand show high levels of agreement between self-reported and measured BMI data (Burton, Brown, & Dobson, 2010; Lim, Seubsman, & Sleigh, 2009; Stommel & Schoenborn, 2009; Strunkard & Albaum, 1981), and self-reported and measured BMI categories (Dekkers, van Wier, Hendriksen, Twisk, & van Mechelen, 2008). To allow for examination of non-linear patterns in profiles, participants were classified into BMI categories based on the World Health Organization classification system (WHO, 2004). Underweight was classified as having a BMI of 18.5 or below, normal was greater than 18.5–25, overweight was greater than 25–30, obese was greater than 30–35, and severely obese was over 35 BMI.

Mental health was measured using the *General Health Questionnaire* (*GHQ, $\alpha=.70$ in our sample*) which is a highly used,

reliable, and valid measure of personal mental health (Goldberg, 1978; Mcdowell & Newell, 1996). Participants are provided with the sentence stem, "Have you recently…" and then are provided with 12 response items including, "been feeling unhappy or depressed," "felt you couldn't overcome your difficulties," "been able to face up to your problems." Responses are on a four-point scale, with labels such as "Not at all" to "Much more than usual." Higher scores are indicative of greater psychological distress.

Psychological flexibility was measured using *The Acceptance and Action Questionnaire II* (AAQ-II, $\alpha=.87$. in our study) (Bond et al., 2011). The AAQ-II measures the tendency to control thoughts and feelings and ability to act in the presence of difficult thoughts or feelings. It is the most well-established measure of global psychological flexibility, measuring the totality of the above processes (Gloster, Klotsche, Chaker, Hummel, & Hoyer, 2011). The AAQ-II has been shown to have adequate test–retest reliability, discriminant, convergent and predictive validity (Bond et al., 2011; Gloster et al., 2011). Each item is rated on a 7-point Likert scale (e.g., "I worry about not being able to control my worries and feelings" and "My painful memories prevent me from having a fulfilling life"). Higher scores indicate higher psychological flexibility.

Accepting was measured using the *Multidimensional Experiential Avoidance Questionnaire* (MEAQ) (Gamez, Chmielewski, Kotov, Ruggero, & Watson, 2011). The scale has been shown to be reliable, correlated with measures of psychopathology and quality of life, even when controlling for neuroticism (Gamez et al., 2011). It assesses six dimensions of avoidance, including behavioural avoidance ($\alpha=.81$; "I won't do something if I think it will make me uncomfortable"), distress aversion ($\alpha=.80$; " I would do anything to feel less stressed"), distraction and suppression ($\alpha=.74$; "When something upsetting comes up, I try very hard to stop thinking about it"), repression/denial ($\alpha=.83$; "I am able to turn off my emotions when I don't want to feel"), procrastination ($\alpha=.77$; "I tend to put off unpleasant things that need to get done"), and distress endurance ($\alpha=.78$; " Even when I feel uncomfortable, I don't give up working toward things I value"). All alphas reported above are for subscales in this study. Items are rated on a scale from 1 "strongly disagree" to 6 "strongly agree".

Being aware: We focused on low emotional awareness, as this construct has clear links to eating disorders (Nowakowski et al., 2013). Awareness was measured using two subscales assessing difficulty identifying and describing feelings, from the *Toronto Alexithymia Scale-20 (TAS-20)* (Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994). The scale included items such as: "When I am upset, I don't know if I am sad, frightened, or angry" and "It is difficult for me to find the right words for my feelings". Higher scores indicate less ability to identify emotions ($\alpha=.82$ in our study) and describe emotions ($\alpha=.68$ in our study).

Believing unhelpful thoughts/Fusing: We utilized two measures that were designed to directly assess fusion, including the Cognitive Fusion Questionnaire (CFQ, $\alpha=.80$ in our study) (Gillanders et al., 2014) and The Drexel Defusion Scale (DDS, $\alpha=.76$ in our study) (Forman et al., 2012).

The CFQ consists of 13 items, in which people assess the extent to which their thoughts are distressing, entangling, and interfere with action. Examples include, "I get upset with myself for having certain thoughts," and "I tend to react very strongly to my thoughts." Items are scored on a 1 to 7 point Likert scale ranging from "never true" to "always true". The scale has demonstrated good reliability and validity (Gillanders et al., 2014).

The DDS contains instructions to define defusion to respondents, and then covers items that evaluate the extent to which people defuse from thoughts about ten situations. Participants are asked to rate each item using a scale ranging from 1 "not at all" to 5 "very much". The questions ask about defusing from situations that involve feelings of anger, cravings for food, physical pain,

anxious thoughts, and thoughts about the self. The scale has demonstrated good reliability and validity with research suggesting that the measure is unidimensional (Forman et al., 2012).

In studying fusion, the majority of the field does not use the term "fusion", instead preferring to use terms such as "self-concepts" or "beliefs." We think it important to not ignore these measures despite the difference in names. Specifically, we thought it important to include markers of two of the most researched constructs in psychology, self-efficacy (Bandura, 1977; Ciarrochi, Heaven, & Davies, 2007) and self-esteem (Rosenberg, 1979). We utilized the *Adult Dispositional Hope Scale* (ADHS, $\alpha=.84$ in our study) (Snyder et al., 1991) as our marker of general self-efficacy and the *Rosenberg Self Esteem Scale* (RSE; Rosenberg, 1979).

The 8-item Hope scale assesses the agency aspects of hope (e.g., "I think I am doing pretty well") as well as pathways of hope (e.g., "I can think of ways to get the things in life that are most important to me"). These were rated on a 6-point Likert scale, from "none of the time" (1) to "all of the time" (6). This measure has demonstrated validity (Snyder, 2000).

The 10-item RSE measures global trait self-esteem and has demonstrated good reliability and validity (Marshal, Parker, Ciarrochi, & Heaven, 2013). Participants are asked to indicate their agreement with statements such as, "generally I feel satisfied with myself" and "I think that I am a failure". The scale utilised a 9-point scale, ranging from "very strongly disagree" to "very strongly agree."

Valuing: There are a number of measures that relate to values, and perhaps the most researched one in the health area involves measuring personal strivings (Ng et al., 2012). The personal strivings measure involves an idiographic component, which involves people describing important life goals, or "personal strivings", followed by a series of questions about each life goal (Emmons & McAdams, 1991; Sheldon & Kasser, 2001) which seeks to assess goal importance, progress, and the extent to which goals are completed for autonomous versus controlled reasons. Specifically, people are asked to "…think of personal strivings as the goals that you typically try to obtain in your life. For example, two strivings might be: 'Trying to be physically attractive,' 'Trying to seek new and exciting experiences.' Spend a few minutes thinking about your goals as personal strivings. Then enter them in the space provided. Try not to make them too specific (e.g., I will clean the car today) but a little more general like the examples given above." After writing down a personal striving, the seven Likert scale items are completed that assess the extent to which each striving was *important* ($\alpha=.54$ across four strivings), done for *autonomous* reasons ($\alpha=.84$; three questions per striving; I strive because it makes my life more meaningful, or for fun and enjoyment, or because of personal importance), *controlled* reasons ($\alpha=.85$; two questions per striving: striving because of guilt, shame, or anxiety, striving because someone else wants me to do it). Participants rated the extent that they "disagree strongly" (1) to "agree strongly" (6) with each statement. They used the same scale to rate the extent that they had made *progress* on the striving ($\alpha=.69$).

5.4. Striving coding system

Three trained judges rated each of the personal strivings using the coding system employed by Emmons and McAdams (1991). They rated the extent to which each striving indicated approach versus avoidance (attempting to get away from something aversive), intrapersonal versus interpersonal focus (about the self versus others), and the extent to which the striving indicated motivation for achievement (achieving or accomplishing goal), relationship (establishing, maintaining, repairing relationships; commitment and concern for another), or power (concern about

having impact, control or influence over others). Strivings were also rated for self-development and health (e.g., improving health, well-being, aspects of the self), self-presentation (concern with making a favourable impression, improving one's image to others), self-sufficiency independence (concern about being autonomous), maladaptive/self-defeating strivings (reflecting a lack of growth or adaptiveness), generativity (goals providing for the next generation), and spirituality. The interrater reliabilities for all scales across the three raters were high, generally above alpha of .80. Avoidance and Spirituality achieved alpha reliability across the four strivings of .90 or above, Relationship, Growth/health, Generativity, and Self/other achieved alphas greater than .80, Achievement and Concern with Presentation achieved reliability greater than .77, and Independence achieved a reliability greater than .62 across all strivings. Power and Maladaptive striving were not reliably rated ($\alpha < .50$) and were thus not considered in further analyses.

6. Results

6.1. Preliminary analyses

All analyses were conducted within sex, given the clear evidence for gender differences in response to underweight and overweight (Barry, Pietrzak, & Petry, 2008; Grilo & Masheb, 2005; Tiggemann & Rothblum, 1988). Table 1 presents the basic demographics. Amongst men and women, being underweight was associated with being younger, wealthier and more educated. Amongst females, being a healthy weight was also associated with youth, wealth, and education. The severely obese tended to be both the poorest and least educated in both genders.

ANOVAS revealed significant effects of weight category on mental health within both males and females (Bottom, Table 1). Post-hoc exploration of the significant F test revealed that, relative to the normal group, underweight males and severely obese females reported poorer mental health, all $ts > 2$, $ps < .05$.

Concerning marital status, we found a significant relationship between marital status (single versus married) and weight category amongst both men ($\chi^2(4)=44$) and women ($\chi^2(4)=37.2$), $ps < .001$. Underweight women were less likely to be married (77/99.9 observed/expected), as were the severely obese

(238/252.3). Amongst men, there was no effect of underweight on marital status (68/68.7). Overweight (866/816) and obese men (438/411) were slightly more likely than expected to be married, and severely obese men were slightly less likely than expected to be married (238/252.3).

Ethnicity: Highly significant effect of ethnicity on weight. $F (8, 7762)=14.376$, $p < .001$. Bonferroni post-hoc comparisons revealed that African American's ($N=563$; BMI$=28.98$) were heavier than Hispanic ($N=437$, BMI$=27.11$), European ($N=663$, BMI$=27.32$), European American ($N=3362$, BMI$=27.9$), Asian, ($N=267$, BMI$=24.09$), and Native American ($N=300$, BMI$=26.82$), $ts > 2$, $ps < .05$. Asian's, in contrast, were lighter than the other groups, $ts > 2$, $ps < .05$. There were no detectable differences involving the small group who identified as South Indian/Indian subcontent ($n=31$, BMI$=25.34$). People who identified as Mixed multi-racial ($n=200$, BMI$=27.2$) and "other" ($n=1948$, BMI$=28.03$) were significantly heavier than Asians, $t > 2$, $p < .05$, but were not significantly different from the other categories.

Table 2 presents the intercorrelations between the explanatory variables in the study. All variables are scored so that higher numbers indicate better functioning or higher psychological flexibility. As can be seen in the first column, all measures tended to correlate with global psychological flexibility (AAQ), with the strivings measure having the lowest correlations. The strivings measure generally seemed to be the least correlated with the other measures. The cognitive fusion questionnaire (abbreviated "CogF" in Table 2) was only modestly associated with the defusion questionnaire, suggesting that they are measuring largely different constructs. Many of the correlations in the Table 2 matrix were modest to small.

6.2. Profile analyses

The profile analysis was conducted using GLM repeated measures analysis, with BMI category as the between subject variable and the components of psychological flexibility as the within subject variables. The main tests of interest are the main effect of BMI category on flexibility variables (do BMI groups differ?), and the interaction between BMI category and the flexibility measures (are group profiles parallel?). In order to present profiles on the same unit of measure, all scales were standardized. We conducted a number of ANOVAS and consequently chose to use a

Table 1
Demographics and mental health by weight category. Means (standard errors).

	Male						Female					
	Under weight	Normal	Over weight	Obese	Severely obese	F	Under weight	Normal	Over weight	Obese	Severely obese	F
N	110	1013	1424	724	431	–	195	1673	1055	631	515	–
BMI	16.10	22.66	27.33	32.20	41.09	4913***	16.95	22.14	27.35	32.22	41.30	6513***
	(.20)	(.05)	(.04)	(.05)	(.30)		(.12)	(.04)	(.04)	(.06)	(.27)	
Age	40.22	48.05	51.76	53.13	50.88	25.2***	39.03	45.54	51.04	50.40	48.99	32.5***
	(1.41)	(.56)	(.41)	(.55)	(.69)		(1.33)	(.45)	(.53)	(.66)	(.69)	
Income category	7.54	6.3	7.07	6.68	5.64	18.4***	5.68	5.96	5.41	5.20	4.77	18.7***
	(.36)	(.11)	(.09)	(.12)	(.16)		(.24)	(.08)	(.09)	(.11)	(.13)	
Educate	4.44	3.85	3.94	3.81	3.55	12.6***	3.62	3.63	3.49	3.47	3.43	4.2**
	(.14)	(.04)	(.035)	(.049)	(.06)		(.09)	(.031)	(.04)	(.052)	(.054)	
Poor mental health	2.52	2.18	2.15	2.17	2.22	19.7***	2.20	2.16	2.18	2.20	2.24	3.84*
	(.067)	(.016)	(.014)	(.019)	(.025)		(.036)	(.013)	(.016)	(.020)	(.022)	

Note: Income categories go up in 10 thousand dollar increments, such that a category of 6 indicates an income between 50 and 60 thousand dollars and a category of 7 indicates an income between 60 and 70 thousand dollars. Education varies from some high school or less
(1) to graduate/professional degree
(6). Mental ill-health was measured using the general health questionnaire.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 2
Inter-correlations between quantitative markers of believing and psychological flexibility including accepting, awareness, fusing and striving.

	Experiential acceptance							Awareness		Believing/Fusing				Striving/Valuing			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
1. Aaq	1.00	.61**	.54**	.61**	.22**	.71**	.16**	.78**	.58**	.84**	.08**	.71**	.19**	.46**	.02	.12**	.06**
2. Proc	.54**	1.00	.50**	.38**	.16**	.57**	.22**	.55**	.48**	.57**	.10**	.51**	.27**	.33**	.12**	.20**	.14**
3. BeAv	.42**	.42**	1.00	.65**	.51**	.47**	.01	.49**	.40**	.47**	.00	.32**	.00	.40**	−.11**	.00	−.06**
4. DiAv	.55**	.31**	.57**	1.00	.53**	.48**	−.07*	.52**	.36**	.54**	−.02	.32**	−.08*	.43**	−.21**	−.09**	−.12**
5. Distr	.02	.03	.40**	.39**	1.00	.28**	−.35**	.23**	.15**	.14**	−.23**	−.04	−.31**	.24**	−.30**	−.20**	−.22**
6. Repr	.63**	.49**	.35**	.40**	.16**	1.00	.06**	.78**	.68**	.60**	−.04*	.52**	.04	.45**	.06**	.22**	−.05*
7. Endur	.32**	.33**	.17**	.11**	−.27**	.19**	1.00	.13**	.19**	.25**	.52**	.47**	.72**	.01	.45**	.40**	.38**
8. Identify	.75**	.49**	.37**	.45**	.07**	.73**	.27**	1.00	.64**	.74**	.07**	.60**	.13**	.43**	.03	.15**	.00
9. Describe	.56**	.43**	.34**	.33**	.07**	.68**	.29**	.64**	1.00	.53**	.12**	.52**	.24**	.31**	.07*	.15**	.08**
10. CogF	.84**	.52**	.37**	.50**	−.03	.52**	.37**	.71**	.49**	1.00	.21**	.69**	.28**	.40**	.06*	.12**	.09**
11. Defus	.27**	.23**	.14**	.15**	−.16**	.09**	.47**	.23**	.21**	.37**	1.00	.32**	.50**	.02	.28**	.24**	.28**
12. SE	.75**	.48**	.28**	.35**	−.13**	.50**	.51**	.62**	.52**	.72**	.39**	1.00	.58**	.29**	.28**	.32**	.30**
13. Hpe	.42**	.41**	.17**	.13**	−.23**	.21**	.68**	.33**	.36**	.46**	.46**	.67**	1.00	−.07*	.42**	.30**	.50**
14. Cont	.38**	.28**	.29**	.35**	.10**	.37**	.11**	.34**	.27**	.32**	.12**	.28**	.07*	1.00	−.12**	.06*	−.17**
15. Aut	.06**	.15**	−.05*	−.13**	−.23**	.10**	.32**	.05*	.06*	.08**	.16**	.22**	.30**	−.05*	1.00	.71**	.54**
16. Imp	.09**	.16**	.00	−.07**	−.16**	.20**	.31**	.11**	.11**	.07**	.14**	.22**	.21**	.10**	.63**	1.00	.41**
17. Prog	.18**	.21**	.03	−.01	−.16**	.02	.30**	.09**	.12**	.18**	.19**	.31**	.42**	−.06*	.44**	.33**	1.00

Note: All measures have been scaled so that higher numbers are assumed to indicate better functioning. Males above diagonal, females below. AAQ=general measure of psychological flexibility; Proc=procrastination; BeAv=behavioural Avoidance; DiAv=distress Aversion; Distr=distraction/suppression; Repr=repression/denial; Endur=distress endurance; CogF=cognitive fusion questionanire; Defus=defusion; SE=self-esteem; Hpe=hope; Contr=sense of strivings being controlled; Aut=strivings authentic; Imp=strivings importance; Prog=progress on striving.

* $< p < .05$.
** $p < .01$.

somewhat conservative alpha of.01 for all tests. In addition, n order to reduce issues of Type 1 error, we conducted posts-hoc tests of differences in profiles only if the ANOVA was significant.

Table 3 presents the results of the ANOVA. We focus on the test of mean differences (BMI effect) and parallelism (interaction between BMI and flexibility component). As can be seen in Table 3, BMI had a main effect on all flexibility components except for male striving. There were highly reliable interactions across all tests except awareness of feelings, indicating that most of the profiles were not parallel and different BMI groups had different configurations of flexibility. The effect sizes were generally small, but as we shall see in the subsequent analysis, this was in part due to the significant effects being concentrated in the underweight and severely obese categories. There was relatively little difference between the normal, overweight, and obese groups. It is worth noting that the effect of BMI on avoidance and awareness was about six times larger for males than females. We now consider these effects in detail.

Table 4 illustrates the avoidance effects. Within males, underweight men showed the clearest pattern of avoidance, with one notable exception. They were the highest in the group on distress endurance (an index of low avoidance). Interestingly, the avoidant men appeared to demonstrate above average levels of acceptance compared to the rest of the sample. In contrast, the severely obese men appeared to be somewhat more avoidant than the men in the other weight categories. Amongst underweight females, there was little evidence of high avoidance. In contrast, there was a pattern of avoidance only amongst the severely obese women, who showed particularly high levels of procrastination and low distress endurance.

Table 5 presents the results for the Believing/Defusing variables. Underweight males showed a mixture of endorsing unhelpful beliefs but believing they could defuse from negative states. They also had below average self-esteem but the highest hope across all male and female groups. In contrast, the severely obese men tended to be high on fusion (CFQ) and low levels of self-esteem and hope. Amongst females, there was little evidence of difference from the rest of the sample. The normal weight women

were above average in self-esteem and hope. The severely obese showed particularly low levels of self-esteem and hope.

The right side of Table 5 presents the emotional awareness findings. Underweight males were particularly low on emotional awareness, whilst severely obese males showed moderate deficits in awareness. The significant interaction from Table 3 was difficult to interpret in this instance but examination of the means suggested that identifying emotions rather than describing was more of a problem for underweight men. Women showed little effect of BMI category on awareness, with only average weight women showing slightly higher levels of emotion identification skill than the rest of the sample.

Table 6 presents the results for striving. Underweight males tended, more so than other groups, to endorse strivings for controlled reasons. As with the other analyses, there were few strong negative associations with being overweight amongst men. Underweight females also endorsed strivings for controlled reasons, but were approximately normal on the other striving measures. Only the severely obese female groups showed evidence of diminished progress in strivings.

6.3. Weight and striving content

The quantitative component of the striving measure, as presented in Table 6, focuses on "why" people strive (e.g., controlled versus authentic). The qualitative component of the measure focuses on "what" people strive for. Our final analyses, therefore, focused on the quantitative ratings of the qualitative part of the strivings measure. We did not conduct profile analyses on these ratings because they were not all considered to be components of psychological inflexibility, as was true of the quantitative measures. Correlational analyses revealed that there were only weak relationships between the striving content and the measures not related to striving. For example, correlations between experiential avoidance and the qualitative ratings of avoidant goals were under .08. There were also small relationships between low self-esteem, hope and avoidant strivings, $rs < .11$, $ps < .01$. The most robust correlations were between the self-reported and qualitative

Table 3
Analyses of variance for the effect of the flexibility component, BMI category, and the interaction.

Explanatory variable	df_n, df_d	MS	F	p	η^2
Experiential avoidance					
Males					
BMI	4,3743	55.23	22.91	< .0001	.024
Avoidance	5,10025	7.77	10.87	< .0001	.003
BMI × Avoidance	20,10025	5.40	7.51	< .0001	.008
Females					
BMI main effect	4,4131	3.08	7.24	< .0001	.003
Avoidance	5,11025	.935	1.28	ns	.000
BMI × Avoidance	20,11025	1.59	2.16	.002	.002
Believing/defusing					
Males					
BMI	4,3743	16.43	7.67	< .0001	.008
Believing	3,11229	5850	10884	< .0001	.740
BMI × Believing	12,11229	7.00	12.904	< .0001	.014.
Females					
BMI	4,4131	16.58	7.15	< .0001	.007
Believing	3,12393	5850	10884	< .0001	.801
BMI × Believing	12,12393	2.399	5.192	.0004	.005
Being aware of feelings					
Males					
BMI	4,3743	31.40	19.52	< .0001	.020
Aware	1,3743	1.23	3.07	ns	.001
BMI × Aware	4,3743	1.60	4.11	.0026	.004
Females					
BMI	4,4131	5.15	3.16	.013	.003
Aware	1,4131	.423	1.04	ns	.000
BMI × Aware	4,4131	.751	1.83	ns	.002
Striving/valuing					
Males					
BMI	4,3743	1.83	1.07	ns	.001
Striving	3,11229	6.38	3.11	.025	.003
BMI × Striving.	12,11229	5.00	6.53	< .0001	.007
Females					
BMI	4,4131	5.5	3.51	.007	.003
Striving	3,12393	.76	.98	ns	.000
BMI × Striving	12,12393	2.59	3.34	< .0001	.003

Note: ns=not significant; df_n and df_d=degrees of freedom numerator and denominator of F ratio. η^2 is variance explained across all contrasts involved in the effect (see DF numerator).

Table 4
The association between BMI category and different indices of experiential acceptance.

Gender/category	Procras	Beh av.	D. aver	Suppres	Repress	D end
Male						
Underweight	−.63***	−.72***	−.67***	−.53***	−.72***	.25*
Normal	.04	.00	−.03	−.03	.00	.03
Overweight	.08**	.06*	.06*	.04	.09***	.01
Obese	−.03	.02	.05	.03	.00	−.02
Severely obese	−.15**	−.06	−.02	.01	−.12*	−.14*
Female						
Underweight	−.01	.05	−.06	.10	−.02	.05
Normal	.06*	.01	.00	.00	.03	.05
Overweight	.02	.03	.01	−.02	.02	.01
Obese	−.08	−.02	.03	.01	−.05	−.06
Severely obese	−.13**	−.09	−.03	−.01	−.06	−.13**

Note: Procras=procrastination. Behav av.=behavioral avoidance. D. Aver=distress aversion. Suppres=suppression. Repress=repression/denial. D end=distress endurance. Scales have been scored such that higher numbers=less avoidance.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 5
The association between BMI category and different indices of believing/defusing and emotional awareness.

Gender/category	Fusing/believing				Emotion aware	
	CogF	Defusion	S-Est	Hope	Identify	Describe
Male						
Underweight	−.58***	.27*	−.37***	.29*	−.73***	−.48***
Normal	.01	.00	.02	.03	.00	.02
Overweight	.08**	.02	.09	.03	.09***	.09***
Obese	.00	−.03	.00	−.06	.01	−.04
Severely Obese	−.14**	−.08	−.26***	−.14*	−.11*	−.16**
Female						
Underweight	−.11	−.02	−.04	.09	−.09	−.02
Normal	.02	.02	.08**	.07**	.06*	.03
Overweight	.04	.01	.04	.01	.01	.03
Obese	−.03	−.03	−.09*	−.08	−.07	−.04
Severely obese	−.09	−.04	−.22***	−.19***	−.08	−.09

Note: CFQ=cognitive fusion questionnaire; S-Est=self-esteem. Scales have been scored such that higher numbers=less fusion, fewer unhelpful beliefs, and more emotional awareness.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 6
The association between BMI category and different indices of striving/valuing.

Gender/category	Controlled striving	Authentic striving	Striving importance	Striving progress
Male				
Underweight	−.54***	.17	−.09	.21
Normal	.02	−.03	−.05	.03
Overweight	.03	.01	.02	.02
Obese	.06	−.02	.02	−.07
Severely obese	−.09	.02	.03	−.06
Female				
Underweight	−.18*	−.03	−.06	.04
Normal	−.01	.02	−.03	.06
Overweight	.07*	.03	.04	.04
Obese	−.02	−.05	.00	−.08
Severely obese	−.03	−.06	.02	−.17***

Note: Scales have been scored such that higher numbers=less controlled striving, more authentic striving, and higher importance and success of strivings.
** $p < .01$.
* $p < .05$.
*** $p < .001$.

components of the strivings. Specifically, there were modest correlations between avoidance and low authentic striving ($r_m = .15$; $r_f = .17$, $p < .01$), and avoidance and low striving progress ($r_m = .15$; $r_f = .21$, $p < .01$).

ANOVAs were conducted to examine the link between weight category and mean striving content across the four strivings, and the significant results by striving category are presented in Table 7. Both males and females had higher likelihood of avoidant strivings as they become heavier. Females, but not males, also showed an increasing orientation to self-development and health related goals with increasing weight. Finally, underweight males and females showed the highest level of self-presentation strivings, with self-presentation strivings generally decreasing somewhat with increasing weight.

Table 7
The link between weight category and the mean and standard error (SE) of judge-rated striving content.

	Males			Females		
	Avoidance	Self d. and health	Present.	Avoidance	Self d. and health	Self present
Underweight	1.02[a]	1.45	.122[a]	1.08[a]	1.29[a]	.129[a]
SE	.011	.074	.039	.015	.053	.025
Normal	1.07[a]	1.44	.068[b]	1.10[a]	1.43 [bc]	.096[b]
SE	.006	.023	.008	.005	.015	.006
Overweight	1.10[b]	1.44	.077[ab]	1.14[b]	1.45[bcd]	.079[ab]
SE	.006	.018	.007	.007	.019	.007
Obese	1.14[c]	1.45	.058[b]	1.18[c]	1.45 [bcd]	.072[b]
SE	.009	.024	.007	.010	.024	.008
Severely Obese	1.16[c]	1.51	.050[b]	1.19[c]	1.50 [d]	.081[b]
SE	.013	.033	.009	.011	.027	.011
F	20.3***	.83	2.4*	28.1***	4.48**	2.80*

Note: Within a column variable, means with difference subscripts differ at .05. Self d. and health=goals focused on self-development and improving health. Present=goals focused on making a favourable impression on others.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Finally, we evaluated the robustness of all reported patterns by redoing all analyses controlling for income, age, and education. We found no differences in the pattern of results or the tests that were significant.

7. Discussion

Consistent with psychological flexibility theory (Hayes et al., 2011), all flexibility components correlated with a global measure of flexibility. However, the flexibility profiles of the groups were clearly not parallel: The different groups showed different configurations of flexibility and inflexibility. Underweight men showed a mixed flexibility pattern, with some aspects of flexibility being below average and others being above average. Underweight females showed little evidence of psychological inflexibility. In contrast, severely obese men and women scored high on some markers of inflexibility but not others. For example, severely obese women tended to have average levels of emotional awareness, but reported below average progress in strivings. In contrast, severely obese men reported below average levels of emotional awareness, but no deficits in striving progress.

We also found that, relative to the normal weight group, the inflexibility indices did not increase in a uniform fashion as groups become increasingly overweight. Overweight and obese groups across both genders showed little evidence of inflexibility. Indeed, overweight men showed higher acceptance and lower endorsing of unhelpful beliefs than the rest of the sample. Inflexibility components were above average only for severely obese men and women. We now consider five distinctive flexibility profiles in detail.

7.1. Underweight men

Underweight men show a "defensive but active" pattern. They were highly avoidant, fused, and emotionally unaware, but still demonstrated high distress endurance and belief that they could achieve their goals. However, those goals tended to be engaged in for controlled reasons, e.g., out of a sense of guilt or pressure from others, and also tended to be focused on concern for self-presentation.

Underweight men scored higher than any other group in procrastination, behavioural avoidance, distress aversion, suppression, and repression. The qualitative analyses of their strivings suggested that they were approach oriented (i.e. strivings were phrased positively as moving towards something, as opposed to away from something aversive). Given the small correlations between self-report and qualitative ratings, self-reported avoidance and qualitatively rated avoidance scored by raters appear to reflect independent constructs, despite their similarity in name.

We would speculate that one can have approach goals in a specific domain of life, say work and health, and this might come out in the qualitative ratings. However, one may still be avoidant in most other domains of life, e.g., relationships, and this may come out in the self-report measures of avoidance. The underweight men were the youngest group, but also the wealthiest and most highly educated. Thus they seem to be quite successful in the world of work and money, but, based on their self-reports, might be quite avoidant in other aspects of their life.

Even if strivings were rated as "approach" in our qualitative analyses, they could have had underlying avoidance motivation. Qualitative raters were forced to focus and rate what was exactly said, so, for example, strivings related to "impressing others" would be rated as "approach", even if the underlying motivation was to avoid social rejection. Consistent with this view, the quantitative ratings suggest that underweight men were striving to escape guilt and pressure from others (reflecting controlled motivation).

Taken together, these findings suggest that underweight men are successful at moving towards some goals (as indicated by education and wealth), but the goals appear to be driven by pressure from others or society and excessive societal ideals (e.g., the thin ideal). This pattern of inflexibility is what one might expect from men who rate high in perfectionism, a variable that has been shown to predict disordered eating amongst male cyclists (Ferrand & Brunet, 2004). Future research should examine the link between inflexibility and perfectionism.

7.2. Underweight women

Underweight women have one thing in common with their male counterparts: They too expressed a sense of their goals being controlled by others and they described goals that tended to focus on self-presentation (e.g., "being attractive"). This looks again like the "perfectionism pattern" (Hewitt et al., 1995), with women being driven by excessive thinness ideals. However, unlike underweight men, underweight women did not have below average mental health, and did not show patterns of avoidance or unhelpful beliefs.

The underweight women in our sample had normal levels of mental health and are therefore unlikely to seek psychological help. We also do not know if they met criteria for anorexia, such as disturbance in the way they experience their body or intense fear of gaining weight (American Psychiatric Association, 2013). We do know that these women had strivings that tend to be low in autonomy (e.g., driven by guilt) and contain "extrinsic" content (focused on self-presentation), two factors that have been associated with lower levels of happiness (Sheldon, Ryan, Deci, & Kasser, 2004). Future research is needed to investigate the potential psychological downsides of females being underweight and having long term strivings that are motivated by guilt and focused on self-presentation.

7.3. Severely obese women

The greatest psychological inflexibility amongst women occurred in the severely obese group. These women expressed high levels of procrastination, behavioural avoidance, and low levels of distress endurance. They tended to have high levels of fusion, and low levels of hope and self-esteem. Finally, unlike severely obese males, severely obese females expressed little sense of progress in achieving their strivings. The strivings they did have tended to be classified as avoidant. However, they were not high on every index of inflexibility. They tended to not use a suppression strategy, and they generally were able to identify strivings that were personally important to them.

Given that so many aspects of psychological inflexibility are high in severely obese women, we would expect an intervention like ACT that targets psychological flexibility to be ideal. Indeed, increasing research is suggesting that ACT is of benefit for promoting healthy behaviour and weight loss (Butryn et al., 2011; Forman et al., 2013, 2009; Juarascio et al., 2010; Lillis et al., 2009; Pearson et al., 2012; Tapper et al., 2009; Weineland et al., 2012). Our only intervention suggestion would be this: Given severely obese women experience the lowest level of striving progress in the sample, the ACT protocols might benefit from including behavioural activation very early in the intervention. This activation could be focused on exercise, but might be focused on other valued activities as well, such as hobbies and building relationships.

7.4. Severely obese men

Severely obese men showed elevated levels of avoidance, low awareness, and fusion, but also showed normal levels of mental health and striving progress. The overweight men were perhaps most distinctive from the other groups in their low levels of awareness. Severely obese men reported the second highest level of difficulty in describing emotions (with underweight men clearly first). Also, unlike obese women, men showed no link between weight gain and the tendency to increase self-development and health goals. Increasing weight was associated with increasing avoidance goals amongst men, as was true for women, but these avoidance goals were not about losing weight for men. Men appear to be impervious or indifferent to the health risks of their weight gain.

Past research has found that there is a distinction between the "what" and "why" of goal striving (Sheldon et al., 2004), and our study replicates this. The "why" variables assess the extent that people engage in striving for controlled and autonomous reasons and these variables clearly link to psychological flexibility. The "what" variables are based on goal content indicating avoidance, self-presentation, and growth striving, and these variables only slightly linked to our psychological flexibility indices. Conceptually, there are important differences between experiential avoidance as measured by self-report and avoidance goals as inferred from participant's qualitative responses on the striving measure. The former focuses on internal experiences, whereas the latter focuses on external experiences. The qualitative strivings have been shown to contribute independently to happiness (Sheldon et al., 2004), and therefore should be considered in future research as a complement to psychological flexibility measures, rather than a subset of those measures.

7.5. Overweight men

Overweight men showed the lowest levels of procrastination, behavioural avoidance, distress aversion, and repression. They also reported high self-esteem and low endorsing of unhelpful beliefs.

We would speculate that like underweight women, overweight men do not seem to violate the societal norm. They may interpret their size as indicating they are "bigger and stronger" than other men. However, like underweight women, these men may be at risk for future physical health problems, given their weight and the tendency for weight to increase with age (Bes-Rastrollo et al., 2008; He & Baker, 2004).

7.6. Limitations and future research

The main strengths of this study are its large sample size and broad range of measures. Its weakness is that it is correlational, and does not allow us to assess causality. Also, although we focused on an extremely broad set of flexibility measures, we did not include non-flexibility measures relevant to health behaviour, such as emotional eating, rigid diet control, and inhibitory control (Koenders & Strien, 2011; Tangney, Baumeister, & Boone, 2004; Westenhoefer et al., 1999). Future research should investigate the links between psychological flexibility and these other measures. We observed only small effects for BMI, in part because the psychological flexibility indices failed to distinguish between normal, overweight, and obese groups. This lack of effect may be due in part to our use of domain general flexibility measures. Future research should examine the effect of BMI on body image and weight related flexibility measures (e.g., Sandoz et al., 2013).

BMI was measured by self-report. It may be beneficial to examine both self-report and measured BMI data in future studies. Nonetheless, existing research generally shows extremely good agreement between self-reported and measured BMI data (Burton et al., 2010; Lim et al., 2009; Strunkard & Albaum, 1981). It will be important for future research to gather data through means that do not involve a professional survey company, to ensure the results are representative. Finally, it will be valuable for future experimental research to distinguish the psychological inflexibility components that potentially contribute to weight gain from adverse psychological effects of obesity such as stigmatization and discouragement, loss of hope and low self-esteem. Experimental research should also examine the extent that inflexibility is triggered by situational cues, such as those in the environment indicating anti-fat attitudes.

Our general conclusion is that psychological flexibility is best thought of as a configuration of components, rather than as a one-dimensional construct. Our results were unambiguous in showing that profiles of flexibility where not parallel: Some markers of flexibility were more strongly linked to particular BMI categories than others. Further, for some BMI categories (e.g., underweight men), configurations of components were mixed, with some indicating high flexibility and others indicating low flexibility.

Given that we have found different flexibility profiles, one next step in a contextual behavioural science research agenda will be to evaluate the extent that these measures have treatment utility (Ciarrochi et al., in press). Does providing a counsellor with profile information about flexibility improve outcomes? For example, if measures show that a client has the "defensive, but active" pattern observed here in underweight males, would this cause counsellors to alter or improve their intervention? Another treatment utility question involves the matching of measures to interventions. For example, if we know a particular client has normal levels of emotional awareness but a substantial deficit in goal striving, would a value clarification and behavioural activation intervention work better for that client than, say, an awareness building intervention? Future research is needed to understand how a profile-based understanding of flexibility can contribute to practice.

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