

The Perceived Severity of Obesity and Eating Disorders: Effects of an Information  
Manipulation

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### **Abstract**

The increasing public health burden and comorbid occurrence of obesity and eating disorders has resulted in calls for integrated health promotion efforts. Understanding community attitudes, particularly around the perceived severity of these conditions, is critical in informing such efforts. This thesis aimed to elucidate the relative perceived severity of obesity and eating disorders. Furthermore, this thesis aimed to determine the effect of an information manipulation on the perceived severity of obesity and eating disorders, while also taking into account the potential influence of several covariates deemed to be of interest, namely: gender, age, BMI, body dissatisfaction, familiarity, perceived prevalence, causal beliefs, and physical and mental health status. Participants ( $N = 288$ ) were undergraduate psychology students that were randomly allocated to complete one of four versions of an online survey in which the content of information concerning eating disorders and obesity was manipulated, namely: No Information, Neutral Information, Eating Disorders Information, or Obesity Information. Participants then completed measures assessing the perceived severity of obesity and eating disorders and the aforementioned covariates. Results suggest that eating disorders are considered to be a more severe health condition than obesity. Manipulating information about eating disorders and obesity had little effect on the relative perceived severity of these conditions. Findings from the current study suggest that in this population at least, there may not be a need to raise awareness of the significance of eating disorders. Future research in more diverse study populations and exploring the effects of different information content and methods of delivery is needed. This will be important in ensuring both problems receive the public health attention they deserve moving forward.

**Declaration of Originality**

The works found within this thesis are original and have not been submitted for publication, written by another person, nor submitted for a higher degree to any other university or institution. The empirical research contained within this thesis was approved by the Human Research Ethics Committee at Macquarie University (reference number: HREC 5201600195).

A handwritten signature in dark ink, appearing to read 'Bullivant' with a stylized flourish at the end.

Bianca Bullivant

07/11/2016

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## The Perceived Severity of Obesity and Eating Disorders: Effects of an Information Manipulation

In the past three decades, there has been a substantial increase in the prevalence of both obesity and eating disordered behaviours (Darby et al., 2009; Ng et al., 2014). These conditions are associated with a range of adverse mental and physical outcomes, marked resistance to treatment, and substantial social and economic costs to the Australian community (Kouris-Blazos & Wahlqvist, 2007; Mond, Hay, Rodgers, & Owen, 2007; Mond, Hay, Rodgers, & Owen, 2009). It is predicted that eating and weight-related issues will present public health challenges for the foreseeable future (Hay, Mond, Buttner, & Darby, 2008; Walls et al., 2012). Given the serious health consequences of these conditions, efforts aimed at their prevention are crucial (Sanchez-Carracedo, Neumark-Sztainer, & Lopez-Guimera, 2012).

To date, the respective fields of obesity prevention and eating disorder prevention efforts have remained largely disparate (Stice, Becker, & Yokum, 2013). However, an emerging body of research suggests that there are a number of links between the two conditions (Fairburn & Brownell, 2002; Neumark-Sztainer, 2005a). First, there are a number of shared risk factors that are relevant to a range of eating and weight-related problems, such as body dissatisfaction, media consumption, dieting, and low self-esteem (Haines & Neumark-Sztainer, 2006; Neumark-Sztainer, 2009). Secondly, there is increasing empirical evidence which demonstrates that obesity and eating disordered behaviour can co-occur in the same individual and individuals can move from one problem to another over time (Field et al., 2012; Neumark-Sztainer et al., 2006). In fact, population-based research has uncovered that comorbid obesity and eating disorder behaviours (e.g., extreme caloric restriction, purging, binge eating) are increasing at a faster rate than either problem alone (Darby et al., 2009).

This evidence has prompted a number of researchers to call for integrated prevention efforts between the obesity and eating disorders (Ferrari, 2011; Macpherson-Sanchez, 2015; Sanchez-Carracedo et al., 2012), particularly around health promotion and public health messaging (Austin, 2016; Mond, 2016; Neumark-Sztainer, 2012). Health promotion involves working at a population-level to prevent disease and improve health (Detels, McEwen, Beaglehole, & Tanaka, 2002). It aims to shape the knowledge and behaviours of the public through a range of activities, such as health education, public policies, community-based work, and public health campaigns (Evans, Renaud, Finkelstein, Kamerow, & Brown, 2006). It has previously been a successful strategy for improving community awareness of other mental health problems (Henderson, Evans-Lacko, & Thornicroft, 2013; Thornicroft, Wyllie, Thornicroft, & Mehta, 2014; Yap, Reavley, & Jorm, 2012).

However, efforts towards this kind of prevention first require a better understanding concerning community awareness of eating disorders and obesity as public health problems (Jorm, 2012; Mond, 2014). Public perceptions of the severity (or perceived seriousness) associated with a condition are an important measure of the significance of an issue (Figuerias & Alves, 2007). They provide an insight into which conditions the public believe to be important and therefore in need of prevention efforts. They can also identify any subsections of the community in which efforts to improve the awareness and understanding of a condition need to be made (Skre et al., 2013; Wei, Hayden, Kutcher, Zygmunt, & McGrath, 2013). Perceptions of this kind also need to be identified as they can be conducive to stigmatising views of sufferers and hamper efforts to raise awareness of the need for early, appropriate treatment seeking among both patients and those with whom they interact (Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000; Hart, Jorm, Paxton, Kelly, & Kitchener, 2009; Roerig & McLean, 2010).

Regarding public perceptions of obesity, attempts to promote the seriousness of obesity have been widespread (Bonfiglioli, 2007). Obesity is considered a major public health concern in the Australian community by both public health professionals and the government (National Preventative Health Taskforce, 2009). As such, a number of public health education and promotion campaigns for obesity have been implemented at the population level (e.g. LiveLighter, Measure Up, Swap It, Don't Stop It). These campaigns attempt to raise awareness of the increasing prevalence of obesity, the health consequences associated with obesity and the need to adopt healthier thoughts and behaviours related to eating and weight (King, Grunseit, O'Hara, & Bauman, 2013; Lupton, 2014).

In contrast, eating disorder prevention efforts have been largely confined to selective and targeted prevention programs aimed at adolescent and young adult women (Stice et al., 2013). In regards to public perceptions of these disorders, there has been the concern that eating disorders may be considered either serious but uncommon or common but unimportant (Mond, Hay, Rodgers, Owen, & Beumont, 2004b; Mond et al., 2009; Palmer, 2003). Furthermore, increasing awareness of the adverse impact of body dissatisfaction and disordered eating has raised concerns that obesity prevention messages could be unintentionally harmful for individuals at risk of an eating disorder (O'Dea, 2000; 2005; Schwartz & Henderson, 2009) by making certain eating disordered behaviours (e.g. extreme dieting, laxative use) more normative or even desirable (Mond, Hay, Rodgers, Owen, & Beumont, 2004a).

Currently, little is known about community perceptions of the relative perceived severity of obesity and eating disorders. Furthermore, it is unclear whether efforts to change such perceptions are needed and, if so, how to go about this. In the paragraphs that follow, a narrative review of the literature surrounding public perceptions of severity associated with obesity and eating disorders and attempts to change this perception will be conducted. First,

the public health impact of obesity and eating disorders will be examined. Secondly, current public perceptions of severity associated with obesity and eating disorders will be explored. Thirdly, research on attempts to change perceptions of severity will be discussed. Finally, the review will consider a number of factors which can potentially influence perceptions of severity.

### **Public Health Impact of Obesity and Eating Disorders**

To further understand the relative significance of obesity and eating disorders, it is important to have a comprehensive understanding of the individual and community health burden that these conditions present. Whilst initially examined as separate issues, obesity and eating disorders can be seen as part of a broad range of eating and weight-related problems that exist on the same spectrum (Academy of Eating Disorders, 2011; Neumark-Sztainer, 2005a). On one end of the spectrum are healthy beliefs, attitudes, and behaviours towards weight and diet, while on the other end is a range of problematic beliefs and behaviours which can result in clinical health problems, such as eating disorders and obesity (Neumark-Sztainer, 2005b). It is important to note, however, that obesity is not currently considered an eating disorder. Although some researchers have advocated for certain disordered eating behaviours (e.g. overeating, dieting) which can lead to obesity to be considered eating disorders (Devlin, 2007; Hassler et al., 2004).

Obesity is currently recognised as one of Australia's most significant public health issues (Asia Pacific Cohort Studies Collaboration, 2008; National Preventative Health Taskforce, 2009). Overweight and obesity is defined by the World Health Organisation (WHO) as an excessive fat accumulation that presents a risk to an individuals' health (WHO, 2016). Obesity is typically measured using the Body Mass Index (BMI), a population-level measurement of weight (kg) relative to height (m) (WHO, 2000). It defines overweight in

adults as a BMI between 25 kg/m<sup>2</sup> and 30 kg/m<sup>2</sup>, and obesity as a BMI greater than or equal to 30 kg/m<sup>2</sup> (National Health and Medical Research Council, 2013; WHO, 2016). It is important to note, however, that while a BMI outside the normal range – both underweight and overweight – may confer increased risk for certain illnesses, a simplistic association between BMI and health does not exist (Flegal, Kit, Orpana, & Graubard, 2013).

According to the most recent Australian Health Survey (2011-2012), just under a third of the adult population is overweight (63%) and over a quarter is obese (28%) (Australian Bureau of Statistics, 2013). Prevalence rates are expected to increase, with projection research estimating that by 2025, approximately one-third (34%) of the Australian adult population will be classified as obese (Haby, Markwick, Peeters, Shaw, & Vos; 2012; Walls et al., 2012). Childhood obesity is also prevalent with one in four Australian children currently classified as overweight or obese (26%) (National Preventative Health Taskforce, 2009).

While being overweight can carry a somewhat minimal health burden (Mond & Baune, 2009), obesity is associated with short and long-term physical health symptoms, psychosocial consequences, and premature mortality (Kim & Popkin, 2006; Luo et al., 2007; Puhl & Latner, 2007). Obesity is strongly related to several adverse health outcomes, such as type II diabetes, heart disease, hypertension, stroke, and certain cancers (Kopelman, 2000; Popkin, Kim, Russev, Du, & Zizza, 2006; World Cancer Research Fund International, 2014). It can also heighten the risk of depression, anxiety and poor quality of life (Ball, Burton, & Brown, 2008; Brown, Mishra, Kenardy, Dobson, 2000; McLaren, Beck, Patten, Fick, & Adair, 2008; Puhl & Latner, 2007).

The substantial economic and social burden associated with excess body weight further demonstrates the public health impact of obesity. Among Australian society, the total financial cost of obesity was estimated to be AUD \$8.3 billion (Access Economics, 2008).

Indirect costs (e.g. absenteeism, presentism, production lost to premature death) associated with obesity were estimated to be an additional AUD \$49.9 billion, bringing the total combined cost of obesity in Australia to AUD \$58.2 billion.

While obesity often overshadows eating disorders in terms of public health attention, eating disorders also entail a significant public health burden (Hay et al., 2008). Eating disorders are a disparate group of mental disorders that are characterised by body image disturbance in the form of extreme concerns about weight or shape and the regular occurrence of extreme weight-control and eating behaviours (American Psychiatric Association, 2013). There are several types of eating disorders, including anorexia nervosa, bulimia nervosa, binge eating disorder and other specified feeding or eating disorder (e.g. purging disorder, night eating syndrome) (American Psychiatric Association, 2013; Levine & Smolak, 2006). Disordered eating behaviours associated with these disorders include binge eating, purging (e.g. self-induced vomiting, misuse of laxatives or diet pills), dietary restriction, and excessive exercise (Stice, 2002). Key cognitive features include the overvaluation of weight or shape (undue influence of body shape and weight on self-evaluation), preoccupation with weight or shape and dissatisfaction with weight/shape (Levine & Smolak, 2006; Stice, 2002).

The absence of large, population-based studies of eating disorders in Australia makes accurate estimates of prevalence difficult. It is estimated that approximately 9% of Australian women will be affected by an eating disorder which causes clinically significant impairment during their lifetime (Wade, Bergin, Tiggeman, Bulik, & Fairburn, 2006). Furthermore, studies suggest that approximately 25% of people with anorexia or bulimia and 40% of individuals with binge eating disorder – the most common eating disorder – are males (Hudson, Hiripi, Pope Jr, & Kessler, 2007; Weltzin et al., 2005). While eating disorders meeting formal diagnostic criteria according to accepted classification schemes may be relatively uncommon, subthreshold forms of these disorders are very common (Mond & Hay,

2007; National Eating Disorder Collaboration, 2010) and disordered eating behaviours are known to affect approximately 10% of women and 5% of men (Hay et al., 2008; Mitchison, Hay, Slewa-Younan, & Mond, 2014). Physical health impairments, physiological complications, psychological distress and psychiatric disorders are often present in individuals with these subthreshold conditions and behaviours (Grange & Loeb, 2007).

Eating disorders carry a high level of comorbidity with other mental health problems, including depression, anxiety disorders and substance abuse disorders, as well as high levels of body dissatisfaction (Bergstrom & Neighbors, 2006; Hudson et al., 2007; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Moreover, the mortality rate for people with eating disorder is the highest of all psychiatric illnesses (Arcelus, Mitchell, Wales, & Nielsen, 2011). Physical health complications may include cardiovascular problems, kidney dysfunction, digestive disorders, osteoporosis, muscle loss, hypertension, and fertility problems (Fairburn & Brownell, 2002; Katzman, 2005; Mehler & Krantz, 2004). Such complications are most likely to occur when body weight is very low and when purging behaviours, such as self-induced vomiting and laxative misuse, are present (Hill, 2007). On the other hand, recent studies have found that the high levels of body dissatisfaction observed among individuals with eating disorders symptoms are associated with physical health impairment even after controlling for the occurrence of body weight and eating disorder behaviours (Mond et al., 2013).

Eating disorders are also associated with a substantial socioeconomic burden (Lynch et al., 2010; Samnaliev, Noh, Sonnevile, & Austin, 2015; Wang, Peterson, McCormick, & Austin, 2014). For instance, a recent economic analysis estimated that the total annual cost of eating disorders in Australia was AUD \$52.5 billion, compared with costs of AUD \$52.9 billion for obesity and AUD \$41.2 billion for anxiety and depression combined (Deloitte Access Economics, 2012). Thus, while the individual and community health burden of

obesity is better researched, and better known, it is apparent that both eating disorders and obesity are associated with very substantial social and economic costs.

### **Perceived Severity of Obesity**

Perceived severity (also referred to as perceived seriousness) refers to the degree people deem a particular health problem or disease to be serious (Witte, 1992). This can include perceptions of the mortality and disability (in terms of health and functional impairment) associated with certain conditions. Perceived severity has also been examined in relation to the non-health consequences of a health problem, such as the impact of the health issue on social, career, financial and psychological outcomes (Weinman, Petrie, Moss-Morris, & Horne, 1996). It has been measured for various health conditions among different populations, such as patients, family members and the general public (Broadbent, Petrie, Main, & Weinman, 2006; Figueiras & Alves, 2007; Moss-Morris et al., 2002). For the purposes of the current study, perceived severity will be discussed in reference to the general public's views on obesity and eating disorders, as this has the clearest implications for health promotion programs designed to change such perceptions.

Research into public perceptions of obesity began as the prevalence of obesity began to increase rapidly across the globe over the past two to three decades (Evans, Finkelstein, Kamerow & Renaud, 2005; WHO, 2000). As the public health threat of obesity began emerged, the attention given to media coverage, policy and legislative initiatives, and school and community programs, increased proportionately (Barry, Gollust, McGinty, & Niederdeppe, 2014; Bonfiglioli, 2007). Insight into how this increased media coverage of obesity was affecting public perceptions was critical. Initially, this research explored public opinions about obesity including its causes, consequences and solutions (Barry, Brescoll, Brownell, & Schlesinger, 2009; Oliver & Lee, 2005). Thus in 2001, research indicated that

most people were not seriously concerned about obesity and viewed it as the result of personal failure, rather than biological or environmental sources (Oliver & Lee, 2005).

However, a shift in public attitudes occurred over time such that by the turn of the century obesity was considered a major public health issue, comparable to smoking (Harvard School of Public Health, 2003). This was the case with both health professionals and the public, one study at this time finding that 74% of participants were concerned about obesity, and 83% considered it to be a serious problem (American Public Health Association, 2003). More recent investigations confirm that the public remains concerned about obesity, with Thompson et al. (2012) conducting a household survey with 1,011 American adults aged 18 years and older. The majority of participants (75%) reported that being overweight or obese is an extremely or very serious health problem for people in America. In this study, however, gender differences, indicated that women (81%) were more likely than men (69%) to indicate that obesity is a serious health problem. A limitation of the research is that the majority of the studies have been conducted in North American populations. However, the rise in obesity seen in Australia is comparable to the trends observed in America, and thus the findings from these studies likely have implications for the Australian context (WHO, 2000; 2016).

Evidence suggests that the perceived seriousness of obesity among the public is comparable to that of other important public health issues. For instance, research indicates that most people perceive that the public health impact of obesity is comparable to the public health impact of heart disease and diabetes (Taylor, Forhan, Vigod, McIntyre, & Morrison, 2013; Thompson et al., 2012). Indeed, in the aforementioned Thompson et al. (2012) study in which attitudes of Americans were surveyed, overweight and obesity (75%) was ranked higher in terms of public perceptions of seriousness than heart disease (70%), diabetes (70%), alcohol and drug abuse (62%), HIV/AIDS(48%), smoking and tobacco use (48%) and mental illness (43%). The public considered obesity second only to cancer (81%) as the country's

most serious health issue. Similarly, when ranked against other conditions, childhood obesity (47%) is considered to be as serious as tobacco use (43%), but not as serious as drug abuse (59%) and youth violence (53%) (Evans et al., 2006).

Evidence suggests that individuals' beliefs about the severity of obesity may also be related to their beliefs about related issues, such as the causes, prevalence and treatment of, and responsibility for treatment of, obesity. Thus, in a mixed methods study conducted with 159 Australian parents and 184 of their children (Olds, Thomas, Lewis, & Petkov, 2013), there was a wide range of views on the severity of obesity. To help understand these differences, participants' attitudinal responses were analysed and three types of attitudinal clusters emerged. The first cluster was identified as 'Concerned Internalisers' (27% of the sample) and saw obesity as a serious health problem that was increasing rapidly in Australia. These participants had a tendency to see the causes and remedies of obesity as being the responsibility of the individual. The second cluster was identified as 'Concerned Externalisers' (38%), participants in which held similar views about the severity of the obesity crisis but argued that it was a societal issue rather than positing responsibility with the individual. The final cluster, the 'Moderators' (35%), in which the child participants (aged 9-18 years old) and males were over-represented, believed that obesity was not such an important health issue.

### **Perceived Severity of Eating Disorders**

Concerns have been expressed that eating disorders are not seen by the public as serious disorders (Mond, Robertson-Smith, & Vetere, 2006; 2014; Palmer, 2003), although evidence in this regard is currently lacking. Among women, at least, eating disorders are seen to be severe conditions (Holliday, Wall, Treasure, & Weinman, 2005; Wilson et al., 2009). Thus, in a large general population survey in which women were presented with a vignette of

a fictional person suffering from bulimia nervosa, most participants viewed the condition as severe and disabling, which is difficult to treat and whose sufferers are deserving of sympathy (Mond, 2004b). Similar findings were observed in a different sample of women, presented with a vignette of anorexia nervosa (Mond, Robertson-Smith, & Vetere, 2006).

The research concerning the perceived of eating disorders among men is more limited. Initial research indicates that knowledge of both anorexia and bulimia nervosa was poorer in young men than in young women (Murray, Touyz, & Beumont, 1990; Smith, Pruitt, Mann, & Thelen, 1986). There is also some evidence that men perceived bulimic behaviours to be more common and 'acceptable' than women (Vander & Thelen, 1997). More recent research in a large general population sample (Mond & Arrighi, 2011) found that most participants, both men and women, considered anorexia nervosa and bulimia nervosa to be a serious condition. However, a significant proportion of males reported that they would be only a little or not at all sympathetic to someone with anorexia nervosa (24.8%), that bulimia nervosa would not be difficult to treat (22.1%), and it would only be moderately distressing to experience anorexia (25.7%) or bulimia nervosa (31.9%). Similarly, Anderson, Gratwick-Sarll, Bentley, Harrison, and Mond (2016) found that a substantial proportion of males (48%) did not consider binge eating disorder to be a serious problem. This research suggests a need to target attitudes and beliefs of young men in early intervention and prevention initiatives for eating disorders. Particularly given that they too experience the eating disorders and symptoms of (Mitchison et al., 2014)

Perceptions of severity also seem to differ according to the eating disorder under investigation. Mond and Arrighi (2011) found that bulimia nervosa was seen to be the less severe condition, compared to anorexia nervosa. This is consistent with previous research which has found that young women perceived anorexia nervosa to be a serious condition and were sympathetic to its sufferers (Mond et al., 2006). This is probably not unsurprising given

the media and news portrayal of this condition (Polivy & Herman, 2002) and the perception that anorexia has a stronger genetic/biological basis than bulimia nervosa (Hunt & Rothman, 2007). Nevertheless, this attitude is concerning, as bulimia nervosa can be more serious than anorexia nervosa in terms of its impact on quality of life and is associated with increased mortality (Hay, 2003; Mond & Hay, 2007; Patton et al., 1997; Shisslak, Crago, & Estes, 1995). Further, there is some evidence that binge eating disorder is seen to be a less severe condition than bulimia nervosa (Anderson et al., 2016). This is most likely because binge eating disorder has only recently been considered a mental health illness, and because it involves the relatively “normative” behaviour of binge eating in the absence of extreme weight control behaviours and/or very low body weight. This is still concerning, however, given that individuals with binge eating disorder typically have very poor quality of life, comorbid obesity and have to deal with both mental and physical comorbidities (Field et al., 2012; Sonnevile et al., 2013).

Overall, the research suggests that vast majority of the general public are concerned about obesity and eating disorders (Mond et al., 2004b; Olds et al., 2013; Thompson et al., 2012). To date, to the best of the author’s knowledge, no study has examined the relative perceived severity of eating disorders and obesity as public health problems, although the importance of research examining perceptions of severity across common diseases more generally is recognised (Wang et al., 2009). This is necessary because existing perceptions for one condition may also influence how individuals perceive the other, as well as how they respond to and process new health information related to these conditions. Efforts to compare perceptions of different conditions can raise awareness about the conditions people perceive aren’t severe, thus highlighting the areas in need of greater public education (Erblich, Boybjerg, Norman, Valdimarsdottir, & Montgomery, 2000). Given the number of common links between obesity and eating disorders, this research is necessary. Further, this knowledge

could contribute to the evidence-based design of integrated initiatives, which have been suggested by others (Ferrari, 2011; Irving & Neumark-Sztainer, 2002; Neumark-Sztainer, 2012).

### **Manipulating Perceptions of Severity**

Given that the perception that obesity and eating disorders aren't serious conditions exists, at least in some sections of the community, it is important to investigate whether and how these perceptions might be modified. Efforts to change perceptions of the severity of health problems may be important for a number of reasons. First, perceptions of severity provide an indication as to which health issues people believe to be important and therefore need to be addressed in interventions designed to reduce health burden, such as prevention and health promotion efforts. This has implications for public health policy, for example, the extent to which specific policy initiatives, such as school-based health promotion programs for obesity and/or eating disorders, may be supported (Skre et al., 2013; Wei et al., 2013).

Secondly, the perception that a health problem is of little or no consequence in terms of its adverse impact can be viewed as a form of stigma that may exacerbate the negative experience of individuals with the problem concerned (Crisp et al., 2000; Ebner, Latner, & O'Brien, 2011). It is well known that stigma associated with mental health problems in particular, but also obesity, detracts from the quality of life of individuals affected, while also reducing the likelihood that treatment is sought where this is needed, thereby increasing the individual and community burden of these problems (Andrews, Sanderson, Slade, & Issakidis, 2000). It can also hamper efforts to raise awareness of the need for early, appropriate treatment-seeking among sufferers and their family and friends (Hart et al., 2009; Mond et al., 2006; Roerig & McLean, 2010). Modifying the public perception of severity associated with a condition will have obvious benefits for sufferers as it can help educate

friends and family members on the condition and reduce stigma (Kelly, Jorm, & Wright, 2007; Mond, 2014; Rosenvinge & Westjordet, 2004). Evidence suggests that these types of efforts are of particular importance among young men (Mond & Arrighi, 2011; Wilson et al., 2009).

Finally, the perception that a health problem is less severe than it is may increase the likelihood that at-risk individuals will develop this or a related problem. For example, it has been suggested – and there is some evidence to suggest – that the perception that certain disordered eating behaviours (e.g. binge eating, dieting, laxative use) are “normative” may increase individuals’ likelihood of engaging in these behaviours (Crandall, 1998; Mond et al., 2010; Vander & Thelen, 1997). Changes in beliefs of this kind at the population level may help to explain why an increasing proportion of the population is developing comorbid obesity and eating disorder behaviours and may help to inform the development of public health campaigns (Sylvestksy et al., 2013). For all these reasons, modifying perceptions of severity may have important implications for reducing the adverse impact of health problems and, in turn, improving individual and community well-being.

Given these implications of beliefs about the perceived severity of health problems, the issue of whether and how such beliefs might be modified assumes greater significance. To the author’s knowledge, no study has examined whether and how beliefs about the perceived severity of eating disorders might be modified. However, there is some, albeit limited, evidence bearing on efforts to modify individuals’ perceptions of the severity of obesity and certain other health problems. Typically in this research, efforts to change perceptions are made through the manipulation of information presented to participants. Thus, Hall, Jones and Iverson (2011) randomly assigned 241 Australian women aged 48-85 years to view mock advertisements for two health conditions, namely, osteopenia and osteoporosis. The information presented was manipulated such that participants received either limited

information (brief descriptions of the associated symptoms) or more detailed information (detailed descriptions of the symptoms, causation, diagnosis, and management). In this study, however, there was no effect of the information manipulation on perceptions of severity of the conditions concerned, perhaps because baseline levels of perceived severity were high (Hall et al., 2011), presenting a possible ceiling effect. Furthermore, when considering that the sample was comprised of older adults, it is possible that participants confused the advertised condition osteopaenia with the better known condition osteoporosis, which may have led to greater perceived severity.

Previous research has also examined the effect of different information characteristics on perceptions of severity. Thus, Chen, Bell, and Taylor (2016) used a faux magazine article about caffeine overdoses to explore perceptions of severity. The study manipulated the narrative point of view (first person versus third person point of view) and how similar the protagonist in the article was to the participant (young versus old age). The narrator's point had no effect on perceptions of severity, but if the protagonist was of similar age to the participant than perceptions of severity were higher (Chen et al., 2016). The format of the information presented has been examined in multiple ways, including video games, audiovisual clips and newspaper articles (Benneer et al., 2013; Khalil Beale, Chen, & Prokhorov, 2016; Nourian, Kelishadi, & Najimi, 2016). In particular, Khalil et al. (2016) found that the use of a web-based, game-based intervention which communicated the challenges associated with cancer to be effective in increasing the perceived severity of cancer among university students.

Previous research addressing perceptions of the severity of obesity has focused on the effect that different health promotion messages have on participants' attitudes and beliefs in this regard. In one recent study, some 1700 American adults were randomised to view one of three messages that highlighted the physical health consequences of obesity (i.e., diabetes),

psycho-social consequences of obesity (i.e., bullying message) or parental contribution to childhood obesity, or a control group (Barry et al., 2014). As in the research of Hall et al. (2011) referred to above, there was no effect of the information manipulation on participants' perceptions concerning childhood obesity, and this likely reflected, at least in part, high baseline ratings of perceived severity, again presenting a ceiling effect. Indeed, 86% of participants in Barry et al.'s (2014) study viewed childhood obesity as a serious problem with significant negative consequences.

It appears that manipulating the information presented to participants is a potentially useful means by which to modify perceptions of the severity of certain health problems, although evidence in this regard is limited, particularly evidence bearing on perceptions of the severity of eating disorders. Furthermore, it appears that high baseline levels of perceived severity for certain conditions is problematic (e.g. Barry et al., 2014; Chen et al., 2016; Hall et al., 2011). To date, there has been limited exploration of the subjective impact of the provision of information about eating disorders among individuals (Rosenvinge & Westjordet, 2004). Previous campaigns for other mental illnesses such as depression (Yap et al., 2012) and mental health problems generally (Henderson et al., 2013; Thornicroft et al., 2014) have found education to be helpful in improving community knowledge of these conditions. Recent research has emphasised the importance of communicating information about the seriousness of eating disorders to the general public (McLean et al., 2016). Similarly, obesity researchers have argued for the provision to the public of better information concerning the nature, prevalence and causes of obesity (Hilbert, Rief, & Braehler, 2007). Given the conspicuous links between eating disorders and obesity, it would not be surprising to find that interventions designed to improve awareness of the severity of one of these conditions also impacted perceptions of the severity of the other condition.

### **Other Factors Potentially Influencing Perceptions of Severity**

Previous research has indicated that individuals' demographic characteristics and beliefs concerning other aspects of health problems may also affect perceptions of severity and hence would need to be considered in research of this kind. Particularly considering that differences in perceptions of severity are important to identify specific targets for health promotion efforts (e.g. age, gender, and BMI category). As previously outlined above, one factor potentially influencing perceived severity of eating disorders and obesity is gender. Men are less likely than women to consider eating disorders as severe conditions, regardless of the eating disorder presented (Anderson et al., 2016; Mond et al., 2004a; Mond & Arrighi, 2011). Similarly, the perceived severity of obesity is lower among men than among women (Olds et al., 2013; Thompson et al., 2012). These gender differences are consistent with previous research which found that women have less negative attitudes towards mental illness than men (Crisp et al., 2000; Kelly et al., 2007; Sheffield, Fiorenza, & Sofronoff, 2004).

Individuals' age also likely influences their knowledge and beliefs held about the severity and other aspects of health problems. Previous research on attitudes towards mental health problems found that young, well-educated people have more informed beliefs concerning mental disorders than older adults (Fisher & Goldney, 2003; Hasin & Link, 1988; Yoder, Shute, & Tryban, 1990). We know little about the impact of age on the perception of eating disorder severity specifically, as this area has typically used adolescent and young adult samples (Mond & Hay, 2008; Mond et al., 2007). These studies suggest that are similar perceptions in severity amongst young people. Regarding obesity specifically, one recent study among Australian parents and children found that the children (aged 9-18 years old) were more likely to view the consequences of obesity as less severe than older people (Olds et al., 2013). A better understanding of how age and gender might influence perceptions of the severity of both eating disorders and obesity would be welcome.

The perceived severity of both eating disorders and obesity might also be influenced by individuals' weight status. A recent, qualitative study among South African men and women (aged 35-70 years old) found that the perceived severity of obesity differed according to participants' weight status (Okop, Mukumbang, Mathole, Levitt, & Puoane, 2016). Specifically, women that were in the obese and normal weight range perceived obesity to be a serious health issue, while women in the overweight group did not consider obesity to be a severe health condition. Similarly, for eating disorders, individuals who reported that they might currently have a problem with bulimia or disordered eating were more likely to think that it might not be too bad to have an eating disorder (Mond et al., 2004a). Although relatively large sample sizes, or the use of targeted sampling, would be required to examine the potential influence of eating disorder pathology on perceptions of the severity, it would be of interest to consider the influence of body dissatisfaction in this regard. Body dissatisfaction, though relatively more common, is strongly associated with eating disordered behaviour (Stice & Shaw, 2002; Mond et al., 2013; Wertheim, Koerner, & Paxton, 2001). Hence, it would be of interest to consider the potential influence of both weight status and body dissatisfaction in research addressing the perceived severity of eating disorders and obesity.

Individuals' experience of and/or familiarity with health problems might also be expected to influence their beliefs about the severity of those problems. For example, individuals with higher levels of contact with someone who has an eating disorder report lower levels of negative attitudes towards individuals with eating disorders (Stewart, Schiavo, Herzog, & Franko, 2008; Wingfield, Kelly, Serdar, Shivv, & Mazzeo, 2011). However, previous research has found no association between familiarity and the perceived severity of bulimia nervosa (Mond et al., 2007). This finding may reflect the already high levels of sympathy observed in this study, which may have precluded an effect of familiarity on

responses. Generally, greater familiarity with and/or experience of mental health problems is associated with less negative attitudes towards individuals with those problems (Angermeyer, Matschinger, & Corrigan, 2004; Harre, 2001), although associations of this kind have not always been observed. It is also of interest to consider the potential influence of familiarity with and/or experience of obesity in research addressing the perceived severity of obesity and eating disorders.

The potential influence of beliefs about the causes of health problems on perceptions of the severity of those problems is also of interest. Evidence indicates that believing biogenetic causes are the main cause of eating disorders is associated with less blame attributed to the sufferers and, in turn, greater sympathy (Crisafulli, Von Holle, & Bulik, 2008, Crisafulli, Thompson-Brenner, Franko, Eddy, & Herzog, 2010). Hence it has been suggested that promoting the role of biogenetic factors in the aetiology of eating disorders might be conducive to increased recognition of the severity and public health significance of these conditions (Angermeyer, Holzinger, Carta, & Schomerus, 2011; Klump, Bulik, Kaye, Treasure, & Tyson, 2009). Causal beliefs about obesity may similarly influence perceptions of severity, as one recent study found endorsing individual responsibility as the main cause of obesity was associated with greater perceived severity (Olds et al., 2013).

Finally, individuals' beliefs about the prevalence of health problems may influence their perceptions of the severity of those problems. Thus, findings from some early studies suggested that the more prevalent a health condition is, the less severe it is deemed (Harris et al., 2002; Jemmott, Ditto, & Croyle, 1986). Contrary to this, however, Olds et al. (2013) found that the more prevalent an individual believed obesity to be, the more serious they considered it. Others have found little evidence of an association between perceptions of prevalence and perceptions of severity for both anorexia nervosa and bulimia nervosa (Mond & Arrighi, 2011). Further research elucidating the potential associations between beliefs

about the prevalence of eating disorders and obesity and beliefs about the severity of these conditions would also be of interest.

### **Present Study**

With these considerations in mind, the aims of the current study were twofold. The first aim was to elucidate the relative perceived severity of obesity and eating disorders. The second aim was to determine the effect of an information manipulation on the perceived severity of obesity and eating disorders, while also considering the potential contribution to variance in perceptions of severity of several covariates deemed to be of interest, namely: gender; age; BMI; physical health status; mental health status; body dissatisfaction; perceived prevalence of eating disorders and obesity; causal beliefs regarding eating disorders and obesity; and familiarity with/experience of eating disorders and obesity.

To address these aims, the present study developed written information about eating disorders and obesity. Participants were then recruited to complete an online survey and were randomly assigned to one of four information conditions. The first condition provided no information about either obesity or eating disorders and thus acted as the control group (No Information condition). The second condition received neutral information about both obesity and eating disorders (Neutral Information condition). The third condition received additional information which emphasised the public health impact of eating disorders (Eating Disorders Information condition). The final condition received additional information which emphasised the public health impact of obesity (Obesity Information condition).

Employing this approach, and given adequate subgroup sample size, it would be possible to address the first study aim by examining perceptions of severity among participants assigned to the No Information condition, whereas the second aim could be addressed by comparing perceptions of severity across the study conditions, that is, by

examining whether and how the information presented in the differed conditions influenced perceptions of the severity – and relative severity – of the respective health problems.

In view of the paucity of existing evidence bearing on both study aims, the only a priori hypotheses were, first, that both eating disorders and obesity would be seen to be serious health problems in terms of their adverse effects on individuals with these problems; second, that there would be an effect of the information manipulation on perceptions of severity, such that the perceived severity of eating disorders and obesity would be relatively greater among participants assigned to the Eating Disorders Information and Obesity Information conditions, respectively, when compared with participants assigned to the No Information and/or Neutral Information conditions; and third, that perceptions of severity would also be found to vary as a function of one or more of the covariates assessed. The potential influence of gender was deemed to be of particular interest in this regard, given evidence from previous studies for gender differences in perceptions of severity of both eating disorders and obesity and given the implications of such differences for targeted health promotion programs.

## **Method**

### **Participants**

Participants were recruited from an introductory psychology course at Macquarie University, Sydney, Australia. Participants were recruited via a research participation scheme in which students enrolled in a first-year psychology course were offered course credit in return for participating in psychological research. Students were invited to participate in the study via an advertisement posted on the Macquarie University Psychology Participant Pool ([www.mq-psy.sona-systems.com](http://www.mq-psy.sona-systems.com); see Appendix A for the study's advertisement).

The survey was initially accessed 322 times. However, 20 individuals viewed the information and consent form and exited the survey without providing a response, 11 participants declined to give consent, and 3 participants provided consent but did not complete the survey in its entirety. This left a final sample size of 288 participants (89%) with complete data. The study design and methods were approved by the Macquarie University Human Research Ethics Committee (Reference number: HREC 5201600195 (see Appendix B for approval letter)).

### **Study Design and Procedure**

A between-subjects design was utilised. The independent variable was information about obesity and eating disorders and was manipulated between four different conditions including a No Information condition, a Neutral Information condition, an Eating Disorders Information condition and an Obesity Information condition, as detailed below. There were two dependent variables, the perceived severity of obesity and eating disorders considered separately, and the relative perceived severity of these conditions. Potential covariates included BMI, age, gender, body dissatisfaction, physical health status, mental health status, causal beliefs, perceived prevalence, and familiarity/experience.

The data were collected using Qualtrics (online survey) software (Qualtrics, 2016). Participants accessed the survey from a computer of their choice. At the commencement of the survey, participants were given information about the scope and aims of the study, confidentiality, and data protection (see Appendix C). The study was described to potential participants as an investigation of opinions about health problems. All participants provided their consent before completing a small number of items addressing demographic characteristics and weight status (see below). Participants were then randomly assigned to one of the four information conditions via a computer-generated randomisation procedure. They

were instructed to carefully read the information provided and then rate the quality of the information. Participants then completed measures of body dissatisfaction, physical health status, mental health status, causal beliefs, perceived prevalence and familiarity/experience (see Appendix D for the full questionnaire). Upon completion of the survey, participants were provided with a debriefing statement and asked to re-confirm consent to having their data collected for the purposes of the study (see Appendix F for the debriefing statement). Completion of the questionnaire took, on average, approximately 20 minutes.

**Information conditions.** Written information about obesity and eating disorders was developed for the present study (see Appendix E). Participants in the No Information condition were not provided with any information about either obesity or eating disorders. Participants in the Neutral Information, Eating Disorders Information and Obesity Information conditions all received identical basic information about both obesity and eating disorders. However, participants assigned to the Eating Disorders Information condition received extra information about the public health impact of eating disorders and the relative significance of these disorders compared to obesity, while participants assigned to the Obesity Information condition received extra information about the public health impact of obesity and the relative significance of this condition compared to eating disorders.

In brief, the Neutral Information condition contained factual information about both obesity and eating disorders. This included information about the classification of weight status according to BMI, prevalence rates and the physical and mental health problems associated with obesity and eating disorders. This information was compiled from the scientific literature (Hudson et al., 2007; Ng et al., 2014; Puhl & Latner, 2007; Taylor et al., 2013), and relevant, recent professional manuals and reports (American Psychiatric Association, 2013; Deloitte Access Economics, 2012; WHO, 2000).

The Eating Disorders Information condition provided additional information about the broad spectrum of body image issues, as well as the social and economic cost of eating disorders. The information presented was designed to emphasise the public health significance of eating disorders, compared with that of obesity. Similarly, the Obesity Information condition provided information on the classification of overweight and obesity, as well as the social and economic cost of obesity. The additional information provided was designed to emphasise the public health significance of obesity, compared with that of eating disorders. Care was taken to ensure that the information presented in these two conditions was of equal length (327 words).

## Measures

**Perceived severity.** A scale designed to assess perceptions of severity that could be applied to both obesity and eating disorders was developed for the present study. The measure drew upon similar multidimensional perceived severity scales (e.g. Champion, 1984; Figueiras & Alves, 2007) which have examined public understanding of the health, social, financial and psychological outcomes associated with health problems. The current measure included nine items that assessed the extent to which functioning in a broad range of life domains (e.g. mental health, academic/job functioning, social relationships, leisure activities) (see Appendix D) were adversely affected by being obese or having an eating disorder. Responses were scored on a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*). A total perceived severity score was calculated as the simple sum of the item scores for the respective conditions. Total scores, therefore, ranged from 9 to 45, with higher scores indicating greater perceived severity of the condition concerned. Internal reliability was excellent for both obesity ( $\alpha = .90$ ) and eating disorders ( $\alpha = .92$ ) in the current study.

**Demographic characteristics and weight status.** Participants were asked to report their gender, age (in years), height (in cms), weight (in kgs), country of birth (Australia, not

Australia), first language spoken (English, not English) and residential postcode. Body mass index (BMI; kg/m<sup>2</sup>) was calculated from self-reported height and weight. Weight categories, namely, underweight, normal weight, overweight, and obese, were then assigned using the US Center for Disease Control and Prevention (2010) guidelines for the classification of body weight in adults.

**Information quality.** Participants were asked to rate the quality of the information provided in the (three) information conditions. The five response options were ‘poor’, ‘fair’, ‘good’, ‘very good’, and ‘excellent’.

**Perceived prevalence.** The perceived prevalence of obesity and eating disorders was assessed with two questions, as follows: “What proportion of the Australian population do you think currently experiences obesity?” and “What proportion of the Australian population do you think currently experiences an eating disorder?”. Consistent with previous research in which participants have been asked to estimate the prevalence of eating disorders (cf. Anderson et al., 2016; Mond et al., 2004b), response options were ‘less than 10%’, ‘10-30%’, ‘30-50%’, ‘50-70%’, ‘70-90%’ and ‘90% or more’.

**Familiarity.** Familiarity with obesity and eating disorders were assessed using a modified version of the Level of Familiarity Questionnaire (Benov et al., 2013; Holmes, Corrigan et al., 2005; Mond, Hay, Rodgers, & Owen, 2006). The modified version of this questionnaire has previously been used to examine the effects of familiarity/experience on attitudes towards individuals with various mental health problems and has demonstrated excellent internal reliability ( $\alpha = 0.87$ ) (Benov et al., 2013). The modified measure includes 8 dichotomous (yes/no) items describing increasing familiarity with the condition described ranging from “I have watched a movie or television show in which a person with this condition was featured” to “I currently have this condition” (see Appendix D). In line with

previous coding schemes employed in assessing familiarity and social distance (Benov et al., 2013; Holmes et al., 1999), participants were attributed the score corresponding to the highest level of familiarity that they endorsed. For example, participants endorsing “I currently have this condition” were assigned a score of 8. The current study demonstrated acceptable internal reliability for both obesity ( $\alpha = .80$ ) and for eating disorders ( $\alpha = .78$ ) in the current study.

**Causal beliefs.** Participants’ beliefs about the causes of obesity and eating disorders were assessed with nine items. Five of these items (stressful life events, biological causes, heredity, family problems, lack of will power) were taken from the Causal Attributions scale developed by Dietrich et al. (2004) to assess beliefs about the causes of mental illness. Another four items (poor eating habits, negative emotional state, personality and low socio-economic status) were added to the scale for the purposes of this study, informed by previously research examining causal beliefs relating to obesity (e.g. Tompson et al., 2012). The 9 items were clustered into three theoretically derived subscales based on item content, namely: dispositional causes (4 items: lack of willpower, personality, poor eating habits, negative emotional states); biological causes (2 items: biological cause, heredity), and environmental causes (3 items: stressful life event, family problems, low socioeconomic status). Participants were asked to indicate on a 5-point Likert-type scale ranging from 1 (*not at all likely*) to 5 (*extremely likely*) the extent to which each factor was likely to be a cause of the condition described (eating disorder or obesity). Scores for each subscale was calculated as the simple sum of items comprising each subscale. Higher subscale scores were taken to indicate greater endorsement of the domain in question as a factor in the development of the condition concerned. The current study demonstrated acceptable internal reliability on the dispositional, biological and environmental subscales for both obesity, ( $\alpha = .75, .72, .76$ , respectively) and eating disorders ( $\alpha = .70, .72, .79$ , respectively).

**Health status.** The brief (12-item) Medical Outcomes Study Short-Form (SF-12; Ware, Kosinski, & Keller, 1996) was used to measure the participants' current physical and mental health status. The SF-12 has been found to have very good psychometric properties in a broad range of study populations, including the Australian general population (Sanderson & Andrews, 2002). It comprises 12 items that contribute to two weighted scales, a Mental Component Summary Scale (MCS) that indicates impairment in role functioning associated with mental health problems, and a Physical Component Summary Scale (PCS) that indicates impairment in role function associated with physical health problems. An example of a PCS item is: "During the past 4 weeks have you been limited in the kind of work that you have been able to do as a result of your physical health?", while an example of an MCS item is: "During the past 4 weeks, have you accomplished less than you would like as a result of any emotional problems, such as feeling depressed or anxious?" Item response format is variable, some items being dichotomous, others using a 3, 5, or 6-point Likert-type scale. Scores on the MCS and PCS are scaled to have a mean of 50 and a standard deviation of 10, with lower scores indicating higher levels of health impairment. A score of 40 or less on each scale is taken to indicate moderate impairment, whereas a score of 30 or less is taken to indicate severe impairment (Sanderson & Andrews, 2002). Internal consistency was good for both the MCS ( $\alpha = .89$ ) and PCS ( $\alpha = .84$ ) in the current study.

**Body dissatisfaction.** Body dissatisfaction was assessed using the Weight (5 items) and Shape (7 items) Concerns subscales of the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994; Fairburn & Beglin, 2008). The EDE-Q has been validated in both clinical and community samples and the items comprising the Weight and Shape Concerns subscales have very good psychometric properties (Berg, Peterson, Frazier, & Crow, 2012; Mond et al., 2006). Items assess the extent to which participants were dissatisfied with their weight or shape during the past 18 days, along with related constructs

such as the “overvaluation” of weight or shape. Responses to these items are given on a 7-point Likert-type scale ranging from 0 (*not at all*) to 6 (*markedly*), with higher scores indicating greater body dissatisfaction.

Since the EDE-Q was developed and validated in the female population, it may lack the sensitivity in indexing body dissatisfaction in males, particularly as applied to muscularity- rather than thinness-oriented concerns (Murray, Griffiths, & Mond, 2016). This limitation was addressed in the current study by reversing the polarity of certain gender specific items of the EDE-Q, as has been outlined in previous research with males (Murray et al., 2012). For example, the item “Have you had a definite fear that you might gain weight or become fat” was amended to read “Have you had a definite fear that you might lose weight or become ‘out of shape’”.

As in previous studies (Berg et al., 2012; Mond et al., 2007), scores on the two subscales were highly correlated ( $r = .88$ ). Hence, and also consistent with previous research in community samples (Berg et al., 2012; Mond et al., 2007a), items of these subscales were combined to form a single, 12-item weight/shape concerns scale, with higher scores representing greater body dissatisfaction. Cronbach’s alpha in the current study was .82.

### **Statistical Analysis**

All statistical analyses were carried out using IBM SPSS statistics version 22.0 (IBM, 2013). Demographic characteristics (gender, age, country of birth, first language spoken), weight status (BMI) and other potential covariates as outlined above were described using frequencies, percentages, means, and standard deviations. To confirm adequate sample randomisation, demographic and covariate variables were compared between the four information conditions. Comparisons were made using analysis of variance (ANOVA) for continuous variables and chi-square tests for categorical variables.

To examine the relative perceived severity of eating disorders and obesity, analyses were initially conducted amongst participants' responses from the No Information condition. A power analysis using G\*Power (version 3.1.9.2; Faul, Bychner, Erdfelder, & Lang, 2014) indicated that to detect significant mean differences in a paired-samples *t*-test, a total sample size of 52 participants would be required to detect a moderate effect size with power of .80 and Type I error rate of  $\alpha = .05$ . Thus the sample size of  $n = 72$  would provide adequate power to detect a small to moderate effect size.

Gender differences in the perceived severity of eating disorders, obesity, and the relative perceived severity of these conditions were examined using independent samples *t*-tests. To assess the relative perceived severity of these conditions, a perceived severity difference score was calculated by deducting total perceived severity of eating disorders scores from total perceived severity of obesity scores. Thus, higher scores indicated greater perceived severity of eating disorders relative to obesity.

Initial examinations of the effect of manipulated information on perceptions of severity were conducted with obesity and eating disorders separately. One-way ANOVAs were carried out, using the general linear model (GLM) procedure, to test for the main effect of information condition on perceived severity for each health problem. A one-way ANOVA was then performed to determine if the relative perceived severity of obesity and eating disorders (difference score) was different between information conditions. A two-way ANOVA was conducted to test for an interaction effect of gender and information condition on the relative perceived severity of eating disorders and obesity.

To further explore the role of other potential covariates on perceived severity, multiple regression analysis with backward elimination procedure was applied to find a reasonable subset of predictor variables. The covariates included in this analysis were BMI, age, gender,

body dissatisfaction, physical health status, mental health status, causal beliefs, perceived prevalence, and familiarity. This analysis was performed separately for the perceived severity of obesity, eating disorders, and the relative perceived severity of these conditions. In cases where the information condition emerged as a significant predictor variable alongside other covariates, a follow-up analysis of covariance (ANCOVA) with post-hoc tests was conducted, to aid interpretation of the adjusted effect of the information condition.

Statistical significance was set at .05 for all omnibus analyses, whilst all individual post-hoc tests were Bonferroni adjusted. Effect sizes for the paired-samples t-test and independent samples t-tests were calculated using Cohen's  $d$  and interpreted using Cohen's (1988; 1992) guidelines for a small ( $d = 0.2$ ), medium ( $d = 0.5$ ) and large ( $d = 0.8$ ) effect size. Effect sizes for ANOVAs were calculated using partial eta squared and interpreted using Cohen's (1988) guidelines for small ( $partial \eta^2 = .01$ ), medium ( $partial \eta^2 = .06$ ), and large ( $partial \eta^2 = .14$ ) effect sizes for this statistic.

### **Pilot Study**

A pilot study was undertaken to establish whether the information provided, as well as the survey measures, were appropriate and understood across all four conditions. Participants included 25 students (20 females and 5 males) aged between 18 years and 26 years ( $M = 20.29$ ,  $SD = 2.58$ ) recruited from an introductory psychology course at Macquarie University. After consent had been obtained, participants were randomly assigned to one of the four information conditions. The procedure of the study was followed as described below. Examination of the pilot data suggested that the information was well understood and the study measures were appropriate. The content of the newly developed perceived severity scale was examined and deemed appropriate for the study's purposes. The scale also demonstrated excellent internal reliability for the perceived severity of obesity ( $\alpha = .87$ ) and eating disorders

( $\alpha = .85$ ). Participants from the pilot study were therefore included in the final study, as no changes were made to either the information provided or to the procedure of the study.

## Results

### Characteristics of Participants

**Demographic characteristics and weight status.** The final sample size for this study was  $N = 288$  participants. Item-level missing data was negligible among these participants, due to the nature of the online survey, where responses to all items are required for survey progression. The demographic characteristics and weight status of participants, by information condition, are shown in Table 1. As can be seen, the sample comprised of 151 females (52.4%) and 137 males (47.6%), ranging in age from 18 to 44 years ( $M = 21$  years,  $SD = 4.10$  years). The majority of participants were born in Australia (80.9%) and had English as their first language (87.8%), and most were in the normal weight (54.6%) or overweight (28.2%) ranges. There were no significant differences on any of these variables across information conditions.

Table 1

*Demographic Characteristics and Weight Status of Participants by Information Condition*

	No information condition	Neutral information condition	Eating disorders information condition	Obesity information condition		
					<i>F</i>	<i>p</i>
Age ( <i>M, SD</i> )	20 (3.71)	21 (5.18)	21 (5.50)	21 (5.42)	1.37	.122
					$\chi^2$	<i>p</i>
Gender ( <i>n, %</i> )					0.15	.985
Male	35 (48.6)	34 (47.2)	33 (45.8)	35 (48.6)		
Female	37 (51.4)	38 (52.8)	39 (54.2)	37 (51.4)		
First language ( <i>n, %</i> )					1.56	.124
English	62 (86.1)	59 (81.9)	62 (86.1)	63 (87.5)		
Other	10 (13.9)	13 (18.1)	10 (13.9)	9 (12.5)		
Country of birth ( <i>n, %</i> )					2.12	.468
Australia	58 (80.6)	51 (70.8)	60 (83.3)	56 (77.8)		
Other	14 (19.4)	21 (29.2)	12 (16.7)	16 (22.2)		
BMI status ( <i>n, %</i> )					2.21	.988
Underweight	6 (8.3)	6 (8.3)	7 (9.7)	5 (6.9)		
Normal weight	37 (51.4)	38 (52.8)	40 (55.6)	40 (55.6)		
Overweight	22 (30.6)	20 (27.8)	17 (23.6)	20 (27.8)		
Obese	7 (9.7)	8 (11.1)	8 (11.1)	7 (9.7)		

**Perceived quality of information.** The majority of participants (in the 3 information conditions) reported that the quality of the information presented was good (37.1%) or very good (42.4%) and the perceived quality of information presented did not differ between the Neutral, Eating Disorders and Obesity Information conditions ( $\chi^2(8) = 8.75, p = .364$ ).

**Perceived prevalence.** When asked about the prevalence of eating disorders among adults in the general community, the modal response was ‘about 10 - 30 %’, chosen by 51.4% of respondents. Also, a substantial minority of participants (19.4%) believed that ‘about 30 - 50%’ of the population currently has an eating disorder. For obesity, there was a bimodal distribution, such that the most common responses were that the prevalence of obesity in the Australian community was ‘about 10 - 30%’ (34.0%) and ‘about 30 - 50%’ (39.2%). A substantial minority of participants (20.5%) also believed that about 50 - 70% of the population is currently obese. There were no significant differences in perceptions of prevalence between information conditions for obesity ( $\chi^2(15) = 14.48, p = .489$ ) or eating disorders ( $\chi^2(12) = 20.16, p = .164$ ).

**Familiarity.** Most participants reporting having a high level of familiarity with obesity, indicating that they had a friend or relative who was currently obese (60.1%) or that they had previously been overweight or obese themselves (20.3%). By contrast, most participants reported having a low level of familiarity with eating disorders, close to half (49.5%) stating that their highest level of contact involved watching a movie or television show about an eating disorder, while 27.0% of participants indicated that they knew a friend or relative who had an eating disorder in the past. There were no differences in level of familiarity between information conditions for obesity ( $\chi^2(21) = 22.56, p = .166$ ) or eating disorders ( $\chi^2(21) = 15.71, p = .786$ ).

**Causal beliefs.** Dispositional factors were most often seen as the cause of obesity. Specifically, participants endorsed ‘poor eating/dietary habits’ (79.9%), ‘lack of willpower’ (50.7%) and ‘negative emotional state’ (59.7%) as being ‘very to extremely likely’ to be causes of obesity, whereas biological factors (36.4%) were least likely to be seen to be a cause of obesity. Dispositional factors were also commonly seen to be a cause of eating disorders, as participants endorsed ‘poor eating/dieting habits’ (56.9%) and ‘negative emotional state’ (76.0%) as being ‘very to extremely likely’ to be the causes of eating disorders. As were environmental causes, namely, ‘stressful life events’ (62.5%) and ‘family problems’ (59.7%), whereas biological factors (27.4%) were least likely to be seen to be causes of eating disorders. There were no significant differences between information conditions in terms of the importance attributed to biological, environmental and dispositional factors as causes for either obesity ( $p = .406; .433; .172$ , respectively) or eating disorders ( $p = .677; .369; .441$ , respectively).

**Health status.** On average, participants had low levels of physical and mental health impairment, as would be expected in a university student sample. The mean mental health status (MCS) score in the total sample was 44.40 ( $SD = 10.48$ ,  $Mdn = 46.25$ , range = 21 - 64), whereas the mean physical health status (PCS) score was 48.62 ( $SD = 8.32$ ,  $Mdn = 50.71$ , range = 19 - 59). MCS scores were similar between female ( $M = 43.72$ ,  $SD = 10.75$ ) and males participants ( $M = 45.14$ ,  $SD = 10.16$ ). PCS scores were also similar between female ( $M = 48.28$ ,  $SD = 8.10$ ) and male participants ( $M = 48.98$ ,  $SD = 8.56$ ). There were no significant differences between information conditions on physical health status ( $F(91, 196) = 0.75$ ,  $p = .940$ ) and mental health status ( $F(187, 100) = 0.94$ ,  $p = .656$ ).

**Body dissatisfaction.** The mean score on the measure of body dissatisfaction in the total sample was 2.29, indicating relatively low levels of dissatisfaction ( $SD = 1.67$ ,  $Mdn = 2.08$ ). Mean body dissatisfaction scores were higher among female participants ( $M = 2.72$ ,  $SD$

= 1.77), than male participants ( $M = 1.82$ ,  $SD = 1.42$ ). There were no significant differences in body dissatisfaction between the four conditions ( $F(68, 219) = 0.81$ ,  $p = .847$ ).

### **Relative Perceived Severity of Obesity and Eating Disorders**

Prior to analysis, the distributions of all variables were checked. All variables of interest were normally distributed, with skewness values between  $\pm 1$  and no notable outliers.

Among participants in the No Information conditions, a paired-samples  $t$ -test found that eating disorders were seen to be a more severe condition ( $M = 35.72$ ,  $SD = 6.28$ ) than obesity ( $M = 31.42$ ,  $SD = 6.30$ ), a statistically significant difference of 4.3, 95% CI [2.69, 5.92],  $t(71) = 5.33$ ,  $p = .001$ ,  $d = 0.61$ .

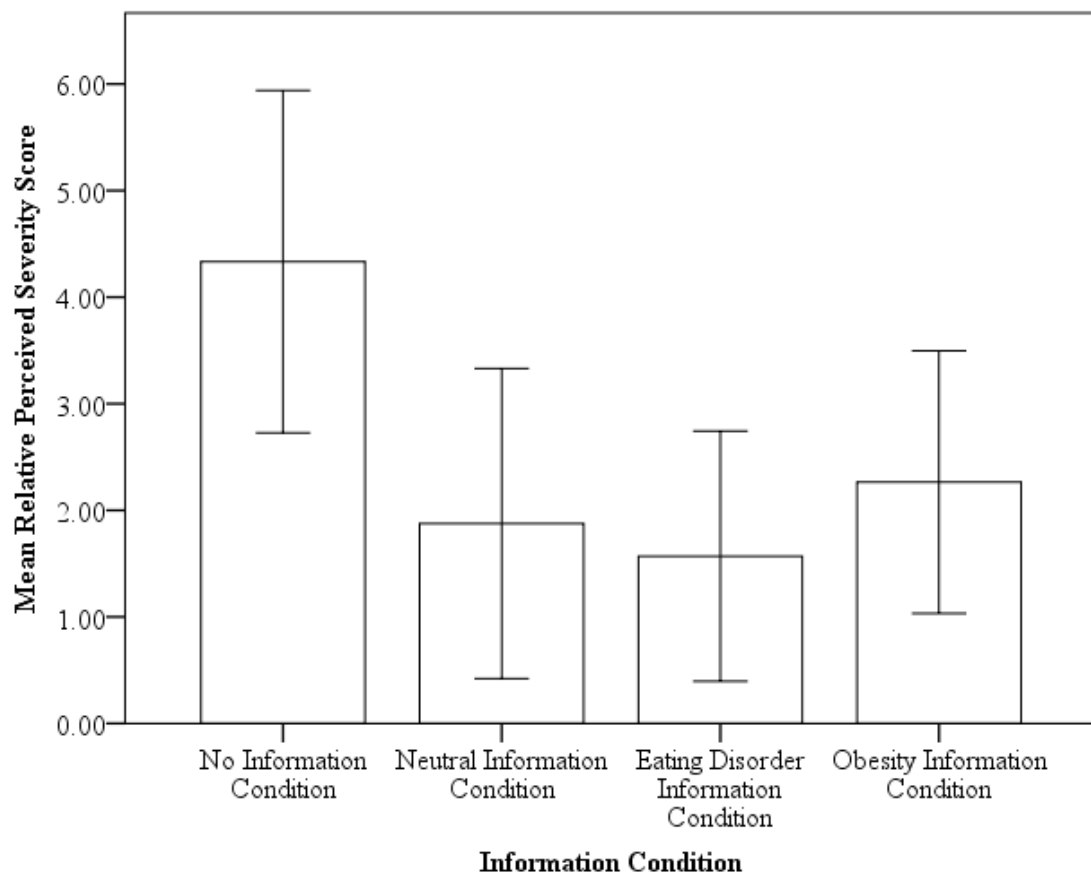
Considering eating disorders and obesity separately, an independent-samples  $t$ -test found that severity scores for eating disorders were lower (indicating lower perceived severity) among male participants ( $M = 33.62$ ,  $SD = 7.17$ ) than among female participants ( $M = 37.70$ ,  $SD = 6.29$ ). This was a statistically significant difference of -4.07, 95% CI [-7.23, -.91],  $t(70) = -2.57$ ,  $p = .012$ ,  $d = 0.57$ . Perceptions of the severity of obesity did not differ between male ( $M = 30.97$ ,  $SD = 6.90$ ) and female participants ( $M = 31.84$ ,  $SD = 5.74$ ),  $t(70) = -0.58$ ,  $p = .563$ ,  $d = 0.14$ .

### **Effect of the Information Manipulation**

Considering perceptions of the severity of obesity and eating disorders taken separately, there was no effect of information condition on the perceived severity of either eating disorders,  $F(3, 284) = 1.38$ ,  $p = .248$ ,  $partial \eta^2 = .01$ , or obesity,  $F(3, 284) = 0.83$ ,  $p = .471$ ,  $partial \eta^2 = .01$ .

A one-way ANOVA indicated that the relative perceived severity of obesity and eating disorders (difference score) was different between information conditions,  $F(3, 284) =$

3.27,  $p = .022$ ,  $\text{partial } \eta^2 = .03$ . (Figure 1). Post-hoc analysis revealed that relative perceived severity scores were higher in the No Information condition ( $M = 4.33$   $SD = 6.83$ ) compared to the Eating Disorders Information condition ( $M = 1.57$   $SD = 4.50$ ). The mean increase from Eating Disorders Information condition to No Information condition (2.76, 95% CI [0.17, 5.36]) was statistically significant ( $p = .030$ ). None of the other pairwise comparisons between information conditions were statistically significant (all  $p > .05$ ).



*Figure 1.* Mean relative perceived severity score by information condition. Positive scores indicate greater perceived severity of eating disorders relative to obesity (error bars denote standard errors).

A two –way ANOVA was conducted to examine the effects of gender and information condition on the relative perceived severity of eating disorders and obesity. The interaction effect between gender and information conditions was not statistically significant,  $F(3, 280) = 0.09, p = .963, \text{partial } \eta^2 = .01$ . Therefore, an analysis of the main effect for gender was performed, which indicated that the main effect was statistically significant,  $F(1, 280) = 16.53, p = .001, \text{partial } \eta^2 = .06$ . This effect indicates that relative perceived severity scores were higher for females ( $M = 3.82, SD = 0.47$ ) than males ( $M = 1.07, SD = 0.49$ ), a statistically significant mean difference of 2.75, 95% CI [1.42, 4.08],  $p = .001$ . The main effect of information condition on relative perceived severity scores was also significant,  $F(3, 280) = 3.54, p = .015, \text{partial } \eta^2 = .04$ . The relative perceived severity scores were higher for the No Information condition ( $M = 4.29, SD = 0.68$ ) than the Eating Disorders Information condition ( $M = 1.44, SD = 0.68$ ), a statistically significant mean difference of 2.85, 95% CI [0.30, 5.39],  $p = .019$ .

### **Role of Covariates**

Multiple linear regression analysis was conducted to assess the contribution of potential covariates to variance in the perceived severity of eating disorders. The variables included in this analysis, i.e., in addition to information condition, were age, gender, BMI, body dissatisfaction, physical health status, mental health status, causal beliefs, perceived prevalence, and familiarity. The multiple regression model statistically significantly predicted the perceived severity of eating disorders,  $F(4, 283) = 7.66, p = .001$ . As can be seen in Table 2, female gender, poorer physical health, greater familiarity with an eating disorder, and higher levels of body dissatisfaction predicted greater perceived severity of eating disorders, whereas information condition did not emerge as a significant predictor. All of the other variables included in the analysis (i.e., age, BMI, mental health status, casual beliefs, and

perceived prevalence) were not significant. The adjusted  $R^2$  for the overall model was 0.09, a small effect size according to Cohen (1988).

Table 2

*Multiple Linear Regression Analysis of Variables Associated with Perceived Severity of Eating Disorders*

			95% CI			
	<i>b</i> ( <i>SE</i> )	<i>B</i>	<i>LL</i>	<i>UL</i>	<i>T</i>	<i>p</i>
Information condition	-0.14(0.32)	-.03	-0.78	0.24	-0.44	.630
Gender	2.32(0.75)	.18	0.84	3.79	3.09	.002
Eating disorder familiarity	0.36(0.16)	.14	0.04	0.67	2.97	.027
Physical health status	0.13(0.45)	.18	0.05	0.23	3.06	.003
Body dissatisfaction	0.44(0.24)	.16	0.14	1.06	2.55	.011

*Note.* *b* = unstandardized regression coefficient; *SE* = Standard error of the coefficient; *B* = standardized coefficient.

Similar analysis was conducted with perceived severity of obesity as the outcome variable. The multiple regression model statistically significantly predicted the perceived severity of obesity,  $F(3, 284) = 3.50, p = .004$ . As can be seen in Table 3, poorer physical health status, greater body dissatisfaction and higher perceived prevalence of obesity predicted higher perceived severity of obesity. The other covariates in the model (i.e., age, BMI, gender, mental health status, casual beliefs and familiarity) were not significantly associated with the perceived severity of obesity. Adjusting for covariates, information condition did not emerge as a significant predictor of perceived severity of obesity. The

adjusted  $R^2$  for the overall model was 0.06, a small effect size according to Cohen's (1988) classification.

Table 3

*Multiple Linear Regression Analysis of Variables Associated with Perceived Severity of Obesity*

	<i>b</i> ( <i>SE</i> )	<i>B</i>	95% CI		<i>t</i>	<i>p</i>
			<i>LL</i>	<i>UL</i>		
Information condition	0.49(0.31)	.09	-0.12	1.10	1.60	.116
Physical health status	0.09(0.04)	.13	0.00	0.18	2.05	.039
Body dissatisfaction	0.65(0.22)	.19	0.22	1.08	2.93	.003
Perceived prevalence of obesity	0.84(0.44)	.11	0.00	0.17	2.03	.037

*Note.* *b* = unstandardized regression coefficient; *SE* = Standard error of the coefficient; *B* = standardized coefficient.

Similar analysis was conducted with relative perceived severity of obesity and eating disorders (difference score) as the outcome variable. The multiple regression model statistically significantly predicted relative perceived severity of eating disorders and obesity,  $F(3, 284) = 8.11, p = .001$ . As can be seen in Table 4, female gender, younger age, and a lower BMI predicted higher perceived severity of eating disorders relative to obesity. Information condition also emerged as a significant predictor. The other covariates in the model (i.e., body dissatisfaction, mental health status, physical health status, causal beliefs, perceived prevalence and familiarity) were not significantly associated with the relative

perceived severity of obesity and eating disorders. The adjusted  $R^2$  for the overall model was 0.08, a small effect size according to Cohen (1988).

Table 4

*Multiple Linear Regression Analysis of Variables Associated with Relative Perceived Severity of Obesity and Eating Disorders*

		95% CI				
	<i>b(SE)</i>	<i>B</i>	<i>LL</i>	<i>UL</i>	<i>t</i>	<i>p</i>
Information condition	-0.62(0.30)	-.12	-1.22	-0.03	-2.07	.040
Gender	2.80(0.68)	.24	1.47	4.13	4.15	.001
Age	-0.14(0.68)	-.12	-0.27	-0.01	-2.04	.042
BMI	-0.64(0.30)	-.12	-1.23	-0.05	-2.12	.035

*Note.* *b* = unstandardized regression coefficient; *SE* = Standard error of the coefficient;  $\beta$  = standardized coefficient.

An ANCOVA was conducted to aid interpretation of information condition as a significantly adjusted predictor of relative perceived severity. After controlling for age, gender and BMI, there was a statistically significant difference in the relative perceived severity of obesity and eating disorders between information conditions,  $F(3, 282) = 3.32$ ,  $p = .020$ , *partial*  $\eta^2 = .03$ . Post-hoc analysis revealed that relative perceived severity scores were higher in the No Information condition compared to the Eating Disorders information condition. This difference, 2.73, 95% CI [0.22, 5.26], was statistically significant ( $p = .025$ ). All other pairwise comparisons between information conditions were not statistically

significant. Table 5 displays the adjusted and unadjusted condition means and variability for the relative perceived severity of obesity and eating disorders with gender, and BMI as covariates.

Table 5

*Adjusted and Unadjusted Information Conditions Means and Variability for the Relative Perceived Severity of Obesity and Eating Disorders with Gender, Age and BMI as Covariates*

		Unadjusted		Adjusted	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SE</i>
No information condition	72	4.33	6.83	4.28	0.67
Neutral information condition	72	1.88	6.19	1.90	0.67
Eating Disorders information condition	72	2.26	5.24	1.55	0.67
Obesity information condition	72	2.51	5.93	2.32	0.67

*Note.* *N* = Number of participants, *M* = Mean, *SD* = Standard deviation, *SE* = Standard error.

Higher scores indicate greater perceived severity of eating disorders relative to obesity.

## Discussion

### Recapitulation of Study Aims and Summary of Main Findings

The present study aimed to provide a better understanding of the perceived severity of obesity and eating disorders. A key area of interest was investigating the relative perceived

severity of obesity and eating disorders. It was expected that both eating disorders and obesity would be seen to be serious health problems in terms of their adverse effects on individuals with these problems. The results provided support for this hypothesis as both eating disorders, and obesity were seen to be severe health conditions. Furthermore, eating disorders were seen to be a more severe condition than obesity.

The present study also examined the effect of an information manipulation on the perceived severity of obesity and eating disorders, while also considering the potential contribution to variance in perceptions of severity of several covariates deemed to be of interest, namely: gender; age; BMI; physical health status; mental health status; body dissatisfaction; perceived prevalence of eating disorders and obesity; causal beliefs regarding eating disorders and obesity; and familiarity with/experience of eating disorders and obesity. It was predicted that there would be an effect of the information manipulation on perceptions of severity, such that the perceived severity of eating disorders and obesity would be relatively greater among participants assigned to the Eating Disorders Information and Obesity Information conditions, respectively, when compared with participants assigned to the No Information and/or Neutral Information conditions. The results indicate that manipulating information about eating disorders and obesity had little effect on the relative perceived severity of these conditions. It was also expected that perceptions of severity would also be found to vary as a function of one or more of the covariates assessed. A number of covariates were found to be significantly associated when the perceived severity of eating disorders and obesity were considered separately. In regards to the relative perceived severity of these conditions, gender, age and BMI emerged as significant predictors alongside the effect of the information manipulation.

### **Relative Perceived Severity of Obesity and Eating Disorders**

The current study found that whilst both eating disorders and obesity are considered serious health conditions, eating disorders were perceived to be a more severe problem than obesity. This finding is encouraging for eating disorder prevention researchers advocating for greater health promotion and messages which communicate the serious nature of these disorders (Austin, 2016; McLean et al., 2016). This is particularly important given the concern that eating disorders are apt to be seen as either serious but uncommon or common but trivial (Mond, 2016; Palmer, 2003). It is clear when taking the findings relating to perceived severity and prevalence together, that eating disorders were seen to be both common and serious among participants in the current study. Furthermore, previous research indicates that obesity is considered a serious problem (Olds et al., 2013; Oliver & Lee, 2005; Tompson et al., 2012), therefore if eating disorders are considered relatively more serious, then it might be expected that people will be responsive to eating disorder public health initiatives.

The current findings also have implications for obesity prevention research. Whilst obesity was considered a less serious problem than eating disorders, it was considered relatively common. These findings demonstrate appropriate awareness that, when considering prevalence and severity together, obesity is a bigger public health problem than eating disorders. Nevertheless, previous research has advocated for integrated prevention efforts, in recognition of the number of links between the obesity and eating disorders (Ferrari, 2011; Macpherson-Sanchez, 2015; Neumark-Sztainer, 2005b; 2012). The key to such efforts is to ensure that there is appropriate recognition of the awareness of the severity of each problem, without detracting from awareness of the severity of the other. This has proven challenging given the different origins of the respective fields and lack of collaboration between prevention researchers (Austin, 2016; Fairburn & Brownell, 2002).

Exploring gender differences in perceptions of severity associated with obesity and eating disorders can provide further insight into integrated prevention efforts. The findings of the current study suggest that male participants were less likely than females to consider eating disorders to be a more severe condition than obesity. Furthermore, males considered eating disorders to be a less serious problem than females, consistent with previous research (Anderson et al., 2016; Mond & Arrighi, 2011; Wilson et al., 2009). Indeed, males generally perceive mental health conditions to be less severe than females (Cotton, Wright, Harris, Jorm, & McGorry, 2006; Jorm & Wright, 2008; Kaneko & Motohashi, 2007; Sheffield et al., 2004). In contrast, perceptions of the severity of obesity did not differ between males and females in the present sample. This is contrary to previous research which has found that women are more likely than men to consider obesity a serious health problem (Olds et al., 2013; Tompson et al., 2012). This suggests that both males and females in the present study saw obesity as a severe condition.

### **Effect of the Information Manipulation**

The information manipulated in the present study had an effect on the relative perceived severity of obesity and eating disorders. Specifically, although all groups perceived eating disorders to be more severe than obesity, the gap was greater in the No Information condition compared to the Eating Disorders Information condition, in which the gap between perceptions of obesity and eating disorder severity was found to be relatively smaller. Although no hypotheses were generated given the exploratory nature of this study, this finding is somewhat surprising given that the Eating Disorders Information condition received extra information that emphasised the severity of eating disorders relative to obesity. However, no differences in the relative perceived severity were observed between the other information conditions. This finding may be accounted for by examining the high relative perceived severity scores found amongst the no information condition (as detailed above). As

such, sample variability dictated that only the difference between the Eating Disorders Information condition was statistically significant. Furthermore, when comparisons were made between groups on just the perceived severity of eating disorders, no differences between information conditions were found. Similarly, there were no differences between information conditions on the perceived severity of obesity. This suggests that the information presented in the information conditions had little to no effect on the perceived severity of obesity and eating disorders.

Hence, reasons for the minimal effects of the intervention need to be considered. Although null findings must be interpreted with caution, the absence of differences is surprising as past research has indicated that manipulating the information presented to participants can increase perceptions of severity, of certain health problems at least (Chen et al., 2016; Khalil et al., 2016). The nature of the particular health conditions considered in the current study, namely, obesity and eating disorders, is likely a factor in this regard. In particular, anti-obesity advertising which focuses on providing information about the severe consequences of obesity is increasingly being ignored by individuals that consider it irrelevant to themselves (Sikorski et al., 2012). Furthermore, anti-obesity campaigns can provoke strong defensive and negative reactions from overweight and obese individuals (Puhl, Luedicke, & Peterson, 2013). Similarly, assessing negative attitudes about eating disorders is complicated by the fact that certain disordered eating behaviours, such as dieting and the pursuit of thinness by individuals of normal or low body weight, may be considered common or even acceptable (Mond & Marks, 2007). Previous research has also demonstrated that the perceived severity of eating disorders can change in relation to the type of eating disorder that is presented (Anderson et al., 2016; Mond & Arrighi, 2011). It would be of interest to investigate the effect of presenting information about a particular eating disorder (e.g. binge eating disorder, bulimia nervosa) against the perceived severity of obesity.

The lack of a clear effect of the information manipulation aside, the findings have implications for integrated eating disorders and obesity prevention and health promotion strategies. Providing biased information about the significance of obesity as a public health problem did not affect the perceived severity of eating disorders, and vice versa. This suggests that raising awareness of the severity of each problem doesn't appear to detract from awareness of the severity of the other. This content may be particularly useful when included in school and community based health promotion campaigns (Irving & Neumark-Sztainer, 2003). Furthermore, schools have been recognised as an appropriate setting for the prevention of childhood obesity (O'Dea & Abraham, 2000), which raises concerns about potential iatrogenic effects; that is, increasing one health issue while trying to prevent another (Irving & Neumark-Sztainer, 2002). For example, strategies which aim to prevent obesity (e.g. measurement of weight/BMI) might unintentionally foster an unhealthy fixation with weight and shape and disordered eating habits (O'Dea, 2000). Integrated prevention efforts such as, discouraging dieting, promoting self-esteem, teaching critical media literacy skills and emphasising a healthful approach to nutrition, can help to prevent unintended iatrogenic effects (Neumark-Sztainer et al., 2006). Such interventions could also be applied in a university setting, given the body image concerns found among young Australians (Cave, Fildes, Luckett, & Wearing, 2015). Further research on the implementation and efficacy of such interventions is greatly needed.

The format in which the information was presented to participants might also have impacted the study's findings. The information presented in the current study was in written form and may have lacked the impact that it might have had if delivered by a persuasive communicator or in a more engaging format (e.g. video, magazine article) in which information about these health conditions are typically found (Bonfiglioli, 2007). Social marketing messages that are delivered by experts and in audio-visual format can often

influence the persuasiveness of messages (Clark, Wegener, Habashi, & Evans, 2012; Khalil et al., 2016; Nourian et al., 2016). Future research using different media forms might be used to determine the most persuasive format.

Further, the content of the information presented to participants may need to be changed (e.g. newspaper article, narrative story). A recent qualitative study with 25 participants explored the effect that recovery stories have on stigma towards individuals suffering from an eating disorder on stigma (Sheens, Rhodes, & Dawson, 2016). After exposure to a recovery story, individuals who had previously minimised the effects of eating disorders shifted to a new understanding of the severity and legitimacy of anorexia nervosa as a mental illness. This included recognising the complexity of the illness in terms of the main causes of it, as well as the significant challenge of recovery (Sheens et al., 2016). These findings highlight the benefit of using recovery narratives to modify negative public perceptions and beliefs. Whilst this study had a relatively small sample size, exploring this effect in a larger sample size will be useful to better understand the effect of narrative stories on the perceived severity of eating disorders. Similarly, further research on the effects of a narrative story about obesity will be beneficial.

Previous research has investigated the role of sociodemographic factors in influencing perceptions of severity (Mond & Arrighi, 2011; Olds et al., 2013). This study supports this previous work as a number of demographic and weight-related characteristics played a role in influencing perceptions of severity. Specifically, female gender, younger age, and a lower BMI predicted higher relative perceived severity of eating disorders and obesity. However, these covariates did not lead to any major changes in the effects of the information manipulation, as the perceived severity scores were still higher in the No Information condition compared to the Eating Disorders Information condition. Nevertheless, further research on the association between these variables and perceptions of severity is needed.

The other covariates in the sample (familiarity, body dissatisfaction, causal beliefs and health status) were not significantly related to perceptions of severity. Possibly these characteristics of the respondents were not relevant for the perceived severity measure that they completed. The perceived severity measure used in the present study was framed in terms of the negative consequences of these conditions on another person's life, and as such, more personally relevant characteristics such as body dissatisfaction and health status may have had little effect on participants' responses. Specifically, the current study sample displayed low levels of body dissatisfaction and mental and physical health impairment, suggesting that the personal relevance of both eating disorders and obesity is low. Indeed, there was no effect of familiarity with eating disorders on perceptions of severity, which is consistent with the previous literature (Mond et al., 2007). Interestingly, familiarity with obesity did not affect responses to its perceived severity, although this may reflect the high levels of sympathy observed in this study which may have precluded an effect. Participants also endorsed dispositional factors as the main causal reason for obesity and eating disorders, however these variables were not significantly related to perceptions of severity. Again, this may represent the already high levels of perceived severity found in the current study, which may have precluded an effect on responses.

It appears that specific covariates differ according to the perceived severity of obesity or eating disorders. Female gender, poorer physical health, more familiarity with an eating disorder, and higher body dissatisfaction appear to influence higher perceived severity of eating disorders. While, poorer physical health status, higher body dissatisfaction and higher perceived prevalence of obesity influenced higher perceived severity of obesity. However, while these factors appeared to influence perceptions of severity, we did not find evidence that these factors moderated the effect of the information manipulation. Nevertheless, future

research wanting to explore the perceived severity of obesity and eating disorders should take into consideration the effect of these factors.

Furthermore, identifying those factors which influence perceptions of severity is instructive when considering how information might be delivered to individuals in different demographic subgroups. A targeted approach involves identifying attitudes and beliefs common to subgroups of individuals with similar characteristics and has previously been effective for communicating about other health conditions (Kreuter & Wray, 2003). However, it would also be possible to employ a tailored approach by assessing individuals' knowledge and attitudes on a pre-determined set of domains and then providing personalised feedback. This approach has previously been employed, with promising results, in other fields of health promotion (e.g., Larimer & Cronce, 2007), and would fit well with recent developments in dissonance-based and media literacy based approaches to eating disorder prevention (Stice, Shaw, Becker, & Rohde, 2008; Wilksch & Wade, 2009). Although web-based eating disorder prevention programs have been developed, to date these programs have been confined to selective prevention approaches in which all participants receive the same program content (Barr-Taylor et al., 2006). More effective interventions may be achieved by tailoring content or targeting certain groups based on individual differences (Hampson et al., 2006).

### **Study Strengths, Limitations, and Directions for Future Research**

To the best of the authors' knowledge, this is the first study to examine the relative perceived severity of obesity and eating disorders and the effects of manipulating information about these conditions on perceptions. The results of this study are further supported through the use of an experimental design to test hypotheses, in which participants were randomly assigned to conditions. The present study also controlled for a number of covariates (e.g. familiarity, causal beliefs, body dissatisfaction) to ensure that the effect of the information on perceptions of severity could be appropriately interpreted.

Furthermore, the study recruited a comparatively large sample size, comprised of a roughly proportionate number of male and female participants. The inclusion of male participants is particularly notable, as research into the knowledge and beliefs of males concerning eating disorders is limited compared to investigations in female populations (Mond et al., 2010). This lack of information is regrettable as men's knowledge and beliefs concerning the nature and treatment of eating disordered behaviour can impact the way in which women at risk or with early symptoms think, feel, and behave (Austin, 2000). The need to target both at-risk individuals and those with whom they interact has become accepted practice in other fields of health promotion and represents a new area for eating disorder prevention research (Abromos, & Mailbach, 2008; Barry, Allegrante, Lamarre, Auld, & Taub, 2009). Furthermore, research has demonstrated that eating disorders and eating disorder behaviours are increasing among males (Hay et al., 2008; Mitchison et al., 2014). In particular, muscle dysmorphia, a disorder characterised by an obsession with muscularity, is largely confined to males (Mitchison & Mond, 2015).

Limitations of the current research also need to be considered, however, when interpreting the findings. These include, most notably and as previously discussed, the use of undergraduate psychology students who choose to complete an online assessment, as opposed to men and women recruited from a general population sample. This sample, who inherently have an interest in mental health conditions risked ceiling effects regarding perceived severity of eating disorders. Further, other characteristics (e.g. young age, higher education, higher socio-economic status) of student samples limit the generalisability of the findings. On the other hand, interventions of this kind may be particularly important for psychology students and in student populations more generally, given that eating disorder behaviours and other mental health problems may be over-represented in these populations (Lavender, De Young, & Anderson, 2010; Luce, Crowther, & Pole, 2008; Stallman, 2010). Nevertheless, future

research in a more socio-economically and/or ethnically diverse population may well uncover different findings relating to both perceptions of severity and the effects of information manipulation and demographic and other potential covariates on these.

As with all self-report surveys relating to health and mental health problems, the results may be susceptible to a “social desirability bias” such that participants felt obliged to express sympathy about these health conditions, perhaps by means of overstating the perceived severity of the eating disorders (Mond & Arrighi, 2011). Further, the nature and extent of such bias might differ as a function of gender (Jorm & Wright, 2008). Given that eating disorders are largely disorders of adolescent and young adult women, there might be an obligation for female participants to express sympathy towards individuals then compared to young males. Furthermore, when considering the fact that the majority of participants in this study had a healthy BMI, as well as the young age of the sample, the threat of obesity may have been perceived as being more distant than eating disorders for both males and females. Whilst self-reported weight and height tends to be less reliable than objective anthropometric measurements (Gorber, Tremblay, Moher, & Gorber, 2007), it is nonetheless the most common method used in surveys.

A potential limitation of the current study was the lack of a pre- and post-test design, which precluded assessment of the changes in perceptions of severity before and after the information manipulation. This was due in part to the resource and time restrictions on the number of questions and participants it was feasible for the author to include in the study. Furthermore, pre-testing participants on the perceived severity measure may have primed respondents in their responses, and potentially dilute any between-group differences that might have been detected on the post-test administration of the measure (Hartley, 1973; Hoogstraten, 1980). Hence, random assignment and post-only assessment were considered the strongest possible research design by which to address the study aims. Nevertheless, this

study design feature would be worth including in future efforts to replicate and expand on the present study.

While participants were asked to rate their perceived severity in relation to the information presented, no attempt was made in the current study to assess whether the information improved participants' knowledge or promoted early, appropriate help seeking (Mond, 2014; Paxton, 2013). Individuals' attitudes and beliefs are only one aspect which can influence health behaviours (Fishbein & Capella, 2006) and changing attitudes and beliefs relating to health behaviours does not necessarily lead to behavioural change (O'Dea & Abraham, 2000; Webb & Sheeran, 2006). On the other hand, there is no question the attitudes and beliefs of the public concerning the nature of mental illness affect the health, and health behaviours, of individuals with mental disorders (Crisp et al., 2000). Future replications of this study should also consider assessing the effect of health information on the behavioural intentions of participants. It is hoped that the present findings will encourage researchers to explore the potential for inclusion of specific aspects of obesity and eating disorders mental health literacy in health promotion and prevention programs.

Gender differences, in particular, have the potential to inform the audience targeted in health promotion campaigns for obesity and eating disorders. Whilst men's knowledge of eating disorder symptoms and classification has improved over time (Hunt & Rothman, 2007; Smith et al., 2006), they are still behind women in terms of recognition of the severity associated with these conditions, and perhaps have attitudes that are conducive to the stigmatisation and discrimination of sufferers (Crisp et al., 2000; Kelly et al., 2007; Roerig & McLean, 2010). The results of the present study have implications for future health promotion initiatives for eating disorders, as they suggest a need to target the knowledge and beliefs of young men in particular in such initiatives.

**Conclusion**

The current study investigated the relative perceived severity of eating disorders and obesity. The findings of the current study suggest that eating disorders are considered to be a more severe health condition than obesity. Manipulating information about eating disorders and obesity had little effect on the relative perceived severity of these conditions, possibly reflecting, in part, the recruitment of a psychology student sample and consequent ceiling effects and/or influence of social desirability bias. Hence, in this population, there may not be a need to raise awareness of the public health significance of eating disorders at least. This null finding notwithstanding, the current research is an important first step in research that has the potential to inform health promotion for eating disorders, obesity, and the integration of these. Further research in more diverse study populations, exploring the effects of different information content and methods of delivery, will be of interest. This will be important in ensuring both problems receive the public health attention they deserve moving forward.

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## Appendix A: Study Advertisement



**MACQUARIE**  
University  
SYDNEY • AUSTRALIA



### Study of Opinions about Health Problems

If you're aged 18 years or over, you are invited to participate in an online questionnaire that will take no longer than **30 minutes**. The questionnaire will look at your opinion concerning health problems. You will receive 1 credit point in exchange for your participation.

The research is being conducted by a Macquarie University student. Study and consent information will be provided at the link to the online survey:

[https://mqedu.qualtrics.com/SE/?SID=SV\\_0HcK1cJSVSOHggd](https://mqedu.qualtrics.com/SE/?SID=SV_0HcK1cJSVSOHggd)

Do not hesitate to contact Bianca Bullivant at [bianca.bullivant@students.mq.edu.au](mailto:bianca.bullivant@students.mq.edu.au) if you have any questions or concerns.

## Appendix B: Ethics Letter of Approval

Office of the Deputy Vice-Chancellor  
(Research)

Research Office  
Research Hub, Building C5C East  
Macquarie University  
NSW 2109 Australia  
T: +61 (2) 9850 4459  
<http://www.research.mq.edu.au/>  
ABN 90 952 801 237



6 May 2016

Dear Dr Mond

**Reference No:** 5201600195

**Title:** *Obesity and Eating Disorders Health Literacy*

Thank you for submitting the above application for ethical and scientific review. Your application was considered by the Macquarie University Human Research Ethics Committee (HREC (Human Sciences & Humanities)).

I am pleased to advise that ethical and scientific approval has been granted for this project to be conducted by:

- Macquarie University

This research meets the requirements set out in the *National Statement on Ethical Conduct in Human Research* (2007 – Updated May 2015) (the *National Statement*).

### Standard Conditions of Approval:

1. Continuing compliance with the requirements of the *National Statement*, which is available at the following website:

<http://www.nhmrc.gov.au/book/national-statement-ethical-conduct-human-research>

2. This approval is valid for five (5) years, subject to the submission of annual reports. Please submit your reports on the anniversary of the approval for this protocol.

3. All adverse events, including events which might affect the continued ethical and scientific acceptability of the project, must be reported to the HREC within 72 hours.

4. Proposed changes to the protocol and associated documents must be submitted to the Committee for approval before implementation.

It is the responsibility of the Chief investigator to retain a copy of all documentation related to this project and to forward a copy of this approval letter to all personnel listed on the project.

Should you have any queries regarding your project, please contact the Ethics Secretariat on 9850 4194 or by email [ethics.secretariat@mq.edu.au](mailto:ethics.secretariat@mq.edu.au)

The HREC (Human Sciences and Humanities) Terms of Reference and Standard Operating Procedures are available from the Research Office website at:

[http://www.research.mq.edu.au/for/researchers/how\\_to\\_obtain\\_ethics\\_approval/human\\_research\\_ethics](http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics)

The HREC (Human Sciences and Humanities) wishes you every success in your research.

Yours sincerely



**Dr Karolyn White**

Director, Research Ethics & Integrity,

Chair, Human Research Ethics Committee (Human Sciences and Humanities)

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research* (2007) and the *CPMP/ICH Note for Guidance on Good Clinical Practice*.

Details of this approval are as follows:

**Approval Date:** 4 May 2016

The following documentation has been reviewed and approved by the HREC (Human Sciences & Humanities):

Documents reviewed	Version no.	Date
Macquarie University Ethics Application Form		Received 9/3/2016
Responses addressing the issues raised by the HREC		Received 9/4/2016 & 3/5/2016
MQ Participant Information and Consent Form – Parents (Clean and Tracked versions)	1.2	3/5/2016
MQ Participant Information and Consent Form – Students (Clean and Tracked versions)	1.2	3/5/2016
Debriefing Statement	1.1	9/4/2016
Condition 1 Information	1.0	9/3/2016
Condition 2 Information	1.0	9/3/2016
Condition 3 Information	1.0	9/3/2016
Advertisement	1.0	9/3/2016
Survey	1.0	9/3/2016

**\*If the document has no version date listed one will be created for you. Please ensure the footer of these documents are updated to include this version date to ensure ongoing version control.**

## Appendix C: Participant Information and Consent Form



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University

### Study of Opinions about Health Problems

#### Student Participant Information and Consent Form

##### Study Description

The present study seeks to examine opinions about obesity and eating disorders.

##### Course Credit

This survey will take approximately 25-30 minutes to complete, and each participant will receive 1 credit point.

##### Researchers

This study is being conducted to meet the requirements for the degree of Master of Research at Macquarie University, under the supervision of Dr Jonathan Mond (telephone: (02) 9850 1465; email: jonathan.mond@mq.edu.au). The student researcher is Bianca Bullivant (email: bianca.bullivant@students.mq.edu.au). If you have any questions about the study, please feel free to contact the student researcher at the email addresses provided above.

##### Requirements, Consent to Participate, and Right to Cease Participation

Participation in this study is voluntary. Please note that as a research participant, you are responsible for:

- Completely reading the information and consent form
- Carefully weighing the risks and benefits of participation
- Knowing when, where, and for how long participation is required
- Talking to the researcher when concerns arise

Please also note the following:

- This is an online study. You are under no obligation to participate and will not be given the study URL until you have signed up for the study.
- In order to sign up for the study, you must agree to the terms of participation noted in the information and consent form. This includes not receiving course credit for participation until the end of the survey.
- You are free to stop the survey at any stage without having to give a reason. However, you will not receive credit for participating unless you complete the entire survey.
- As a participant, you are obligated to answer all questions accurately and honestly. Answering fictitiously or haphazardly jeopardises the quality of the research.
- If you terminate your research participation due to adverse circumstances, please contact the student researcher.
- The return of the questionnaire, when taken with the information sheet provided to all participants, will be regarded as consent to participate in the research and to use the information provided for research purposes only.

### Privacy

This is an anonymous survey. Further, any information gathered in the course of this research is confidential, except as required by law, and access to the data is limited to those directly involved in the research. If the results of this study are published then any such publication will not include information potentially identifying individual study participants.

### Statement of Risks

All of the measures included in this study have been used in population-based research, including studies of university students, and none have been found to cause distress. Whilst it is unlikely, should you experience distress or discomfort, please note that it is never too early or too late to seek help or advice about mental health issues. If you think that you or someone you know might need help, below are some contact details for support services:

#### Macquarie University Counselling and Psychological Services

Provides free counselling and psychological services to all students currently enrolled at Macquarie University.

9850 7497; [http://students.mq.edu.au/support/health\\_and\\_wellbeing/counselling\\_service/](http://students.mq.edu.au/support/health_and_wellbeing/counselling_service/)

#### The Butterfly Foundation

Confidential phone counselling and online resources about body image and eating issues 1800 33 4673; <http://thebutterflyfoundation.org.au/>

#### Lifeline

Confidential telephone counselling (including crisis counselling) and online resources 13 11 14; [www.lifeline.org.au](http://www.lifeline.org.au)

### Complaints

This study has been approved by the Macquarie University Human Research Ethics Committee. If you have any concerns or reservations about any aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone (02) 9850 7854; email [ethics@mq.edu.au](mailto:ethics@mq.edu.au)). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

### Research Findings

A summary of the research findings will be placed on the Psychology noticeboard on Level 5 of Building C3A when they are available. Alternatively, participants can contact the student researcher (Bianca Bullivant) using the contact details provided above.

**Appendix D: Questionnaire****Demographics**

1. What is your gender?

☐ Male

☐ Female

2. How old are you (in years)?

years

3. Is English your first language?

☐ Yes

☐ No

4. Were you born in Australia?

☐ Yes

☐ No

5. How tall are you (in centimetres)?

cm

6. How much do you weigh (in kilogrammes)?

kg

**Information**

INSERT EITHER NO INFORMATION OR EXPERIMENTAL INFORMATION (See Appendix E for experimental information)

Overall, how would you rate the quality of the information presented?

☐ Poor

☐ Fair

☐ Good

☐ Very good

☐ Excellent

### Perceived Severity

We are interested in your views about the negative impact of these different conditions.

Please rate the extent to which you think that **OBESITY** has a negative impact on each of the following aspects of life by ticking the appropriate box.

Obesity has a negative impact on a person's...	Not at all	Slightly	Moderately	Very much	Extremely
Physical health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mental health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Academic/ job functioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Daily activities more generally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships with family members and friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships with partners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social life more generally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leisure activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall quality of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Now please rate the extent to which you think that **EATING DISORDERS** have a negative impact on each of the following aspects of life by ticking the appropriate box.

Eating disorders have a negative impact on a person's...	Not at all	Slightly	Moderately	Very much	Extremely
Physical health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mental health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Academic/ job functioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Daily activities more generally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships with family members and friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships with partners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social life more generally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leisure activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall quality of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Familiarity**

Please read each of the following statements carefully. After you have read all of the statements, place a tick by **EVERY** statement that indicates your level of familiarity with the condition concerned, first for obesity, then for eating disorders...

Obesity	Yes	No
I have watched a movie or television show in which a person with this condition was featured	<input type="checkbox"/>	<input type="checkbox"/>
I have observed, in passing, a person with this condition	<input type="checkbox"/>	<input type="checkbox"/>
My job involves/involved helping people with this condition	<input type="checkbox"/>	<input type="checkbox"/>
A friend or relative currently has this condition or a similar condition	<input type="checkbox"/>	<input type="checkbox"/>
A friend or relative has had this condition or a similar condition in the past	<input type="checkbox"/>	<input type="checkbox"/>
I live or have lived with a person who has/had this condition	<input type="checkbox"/>	<input type="checkbox"/>
I currently have this condition or a similar condition	<input type="checkbox"/>	<input type="checkbox"/>
I have had this condition or a similar condition in the past	<input type="checkbox"/>	<input type="checkbox"/>
Eating Disorders	Yes	No
I have watched a movie or television show in which a person with this condition was featured	<input type="checkbox"/>	<input type="checkbox"/>
I have observed, in passing, a person with this condition	<input type="checkbox"/>	<input type="checkbox"/>
My job involves/involved helping people with this condition	<input type="checkbox"/>	<input type="checkbox"/>
A friend or relative currently has this condition or a similar condition	<input type="checkbox"/>	<input type="checkbox"/>
A friend or relative has had this condition or a similar condition in the past	<input type="checkbox"/>	<input type="checkbox"/>
I live or have lived with a person who has/had this condition	<input type="checkbox"/>	<input type="checkbox"/>
I currently have this condition or a similar condition	<input type="checkbox"/>	<input type="checkbox"/>
I have had this condition or a similar condition in the past	<input type="checkbox"/>	<input type="checkbox"/>

### Physical and Mental Health Status

The following questions ask for your views about your own health. Answer every question by choosing just one answer.

In general, would you say your health is:

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
<u>Moderate activities</u> , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Climbing <u>several</u> flights of stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	Yes	No
<u>Accomplished less than</u> you would like	<input type="checkbox"/>	<input type="checkbox"/>
Were limited in the <u>kind</u> of work or other activities	<input type="checkbox"/>	<input type="checkbox"/>

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	Yes	No
<u>Accomplished less than</u> you would like	<input type="checkbox"/>	<input type="checkbox"/>
Did work or other activities <u>less carefully than usual</u>	<input type="checkbox"/>	<input type="checkbox"/>

During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

These questions are about how you feel and how things have been during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
Have you felt calm and peaceful?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you have a lot of energy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have you felt downhearted and blue?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

## Body Dissatisfaction

The following questions are about any weight or shape concerns that you might have had over the past 28 days. For each question, please choose the answer that appears most appropriate.

[illegible]

The following questions are about any weight or shape concerns that you might have had over the past 28 days. For each question, please choose the answer that appears most appropriate.

[illegible]

### Perceived Causes

Please indicate the extent to which you think each of the following factors is likely to be a cause of **OBESITY** by ticking the appropriate box...

	Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely
Biological (e.g. metabolic disturbances, hormonal, neurological)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heredity – it runs in the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stressful life event(s) (e.g. marriage, loss of job, divorce, death of a family member)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family problems (e.g. broken home, lack of parental affection)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of will power	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor eating/dietary habits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Negative emotional state (e.g. feeling down, lonely, anxious)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low socio-economic status (e.g. low education and/or income)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please indicate the extent to which you think each of the following factors is likely to be a cause of **EATING DISORDERS** by ticking the appropriate box...

	Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely
Biological (e.g. metabolic disturbances, hormonal, neurological)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heredity – it runs in the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stressful life event(s) (e.g. marriage, loss of job, divorce, death of a family member)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family problems (e.g. broken home, lack of parental affection)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of will power	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor eating/dietary habits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Negative emotional state (e.g. feeling down, lonely, anxious)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low socio-economic status (e.g. low education and/or income)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Perceived Prevalence

1. What proportion of the Australian adult population do you think is currently obese?
  - ☐ less than 10 %
  - ☐ 10-30 %
  - ☐ 30-50%
  - ☐ 50-70%
  - ☐ 70-90%.
  - ☐ 90% or more
  
2. What proportion of the Australian adult population do you think currently has an eating disorder?
  - ☐ less than 10 %
  - ☐ 10-30 %
  - ☐ 30-50%
  - ☐ 50-70%
  - ☐ 70-90%
  - ☐ 90% or more

End of the questionnaire.

## Appendix E: Experimental Condition Information

### Neutral Information Condition

Please read the following information carefully, then answer the questions on the following page.

Body Mass Index (BMI), which is calculated as weight in kilogrammes divided by the square of height in metres, is commonly used to classify weight status as follows:

BMI	Classification
$\text{BMI} \leq 18.5$	Underweight
$18.5 \leq \text{BMI} < 25.0$	Normal Weight
$25.0 \leq \text{BMI} < 30.0$	Overweight
$30.0 \leq \text{BMI} < 35.0$	Mild Obesity
$35.0 \leq \text{BMI} < 40.0$	Moderate Obesity
$\text{BMI} \geq 40.0$	Severe Obesity

As can be seen in the table above, obesity is currently defined as having a  $\text{BMI} \geq 30$ .

- In the latest Australian National Health Survey, 28% of the Australian adult population (males: 28%; females: 28%) had a BMI of  $\geq 30$  and were therefore considered obese.
- Obesity is strongly associated with physical health problems, including high blood pressure, type 2 diabetes, heart disease, stroke, joint problems, respiratory problems and several different types of cancer.
- Obesity may also be associated with psychological problems such as low self-esteem and depressive symptoms, particularly when physical health is poor, or there are high levels of body dissatisfaction.

The most common eating disorders fall into the following 5 categories:

1. Anorexia Nervosa: self-starvation leading to a significantly low body weight.
2. Bulimia Nervosa: episodes of binge eating followed by the use of extreme weight-control behaviours, such as self-induced vomiting or excessive exercise, to prevent weight gain.
3. Binge-eating Disorder: binge eating without extreme-weight-control behaviours.
4. Other Specified Feeding or Eating Disorder: e.g., “purging disorder” (vomiting without binge eating) and “Night Eating Syndrome” (binge eating after waking from sleep).
5. Unspecified Feeding or Eating Disorder: e.g., episodes of binge eating and/or extreme weight-control behaviours not frequent enough for a diagnosis of bulimia nervosa or

binge eating disorder or weight loss less than required for a diagnosis of anorexia nervosa.

- Regardless of whether body weight is low or high and regardless of which eating disorder behaviours are present at any one time, all eating disorders involve body image disturbance in the form of extreme concerns about weight or shape.
- Eating disorders, as defined above, affect between 5% and 10% of the population, are more common in females than in males and are strongly associated with mental health problems, symptoms of anxiety and depression in particular.
- Eating disorders may also be associated with physical health problems, particularly when body weight is very low or very high and/or when purging behaviours, such as self-induced vomiting and laxative misuse, are used regularly.

### **Eating Disorders Information Condition**

It is important to keep in mind that, rather than eating disorders being simply “present” or “absent”, there is a continuum of body image disturbance and disordered eating and that in practice there is no clear separation between different points on this continuum.

While eating disorders, as defined above, affect 5-10% of people, variants of these disorders are equally if not more common. This includes conditions, such as muscle dysmorphia, that are more common in males than in females. Moreover, high levels of body dissatisfaction cause considerable distress whether or not eating disorder behaviours are present at any given point in time.

Considering these facts, it is apparent that the spectrum of body image disturbance and disordered eating – including but not limited to conditions such as anorexia and bulimia – constitutes a very substantial public health problem, an “epidemic” in its own right as some authorities have suggested.

The social and economic costs of this spectrum, both the direct costs to the healthcare system and the costs of lost productivity, are staggering. Thus, a recent economic analysis estimated that the total annual cost of eating disorders in Australia in 2012 was \$52.5 billion, compared with costs of \$52.9 billion for obesity and \$41.2 billion for anxiety and depression combined.

When considering the relative importance of eating disorders and obesity as public health problems, it is important to note that it is only when BMI reaches levels of 35 -40, i.e., moderate to severe obesity, that physical and mental health begins to suffer. Indeed, findings from several studies suggest that overweight is associated with *better* physical and mental health relative to normal-weight.

When it's also considered that overweight and mild obesity are far more common than moderate to severe obesity, it becomes apparent that statistics such as “70% of Australians are overweight or obese” are meaningless and that body dissatisfaction and eating-disordered behaviour pose a far greater threat to community health and well-being than the so-called “obesity epidemic”.

### **Obesity Information Condition**

It is important to keep in mind that, rather than obesity being simply “present” or “absent”, excess body weight occurs on a continuum – ranging from “overweight” to “severe obesity” – and that in practice there is no clear separation between different points on this continuum.

While obesity – mild, moderate and severe – affects approximately 30% of the Australian population, overweight is even more common and also associated with chronic medical conditions and, in turn, increased risk of premature death, as well as reduced quality of life associated with both medical problems and mental health problems such as negative body image and low self-esteem.

Considering these facts, it is apparent that the spectrum of excess body weight constitutes a very substantial public health problem, that statistics such as 70% of the population being overweight or obese truly are alarming, and that we really are in the midst of an “obesity epidemic”.

The social and economic costs of excess body weight both the direct costs to the healthcare system and the costs of lost productivity are staggering. For example, in 2008, the annual financial cost of obesity was estimated at AUD\$8.3 billion with an additional AUD\$49.9 billion in the form of lost well-being, bringing the combined cost of obesity to AUD\$58.2 billion.

When considering the relative importance of obesity and eating disorders as public health problems, it is important to note that it is only in the most severe cases of eating disorders, i.e., anorexia nervosa and bulimia nervosa, that serious physical and mental health problems requiring treatment from a health professional occur. Other forms of disordered eating are far less serious.

When it's also considered that body dissatisfaction and the various, milder forms of disordered eating are far more common than serious eating disorders such as anorexia and bulimia – to the point of being “normative” in most western nations – it is apparent that overweight and obesity pose a far greater threat to community health and well-being than eating disorders.

### Appendix F: Debriefing Statement

Thank you for taking the time to complete this questionnaire!

The goal of this study is to determine the effect of an information manipulation on the perceived severity of obesity and eating disorders as public health problems. In this experiment, participants were randomly assigned to one of four conditions that either contained no information or different types of information concerning obesity and eating disorders. For your interest, the information provided in each of the different conditions can be found here: [Condition 1+2+3+4 Information](#)

**You were assigned to condition: \_\_**

This research has the potential to provide better information concerning key aspects of obesity and eating disorder health literacy. It will provide a greater understanding of the community's knowledge and beliefs about the relative importance of these public health problems.

If you have any questions or concerns about this study, please email Bianca Bullivant at [bianca.bullivant@students.mq.edu.au](mailto:bianca.bullivant@students.mq.edu.au). We urge you not to discuss this study with anyone else who is currently participating or might participate in the future. Our efforts will be greatly compromised if participants come into this survey knowing what is about and how the ideas are being tested.

Could you please now reconfirm your willingness to have your data included in this study:

- ☐ I do give my permission for my data to be included in this study
- ☐ I do NOT give permission for my data to be included in this study