Sex Differences in Psychosocial Impairment Associated with
Eating Disorder Features

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Declaration

This is to certify that:

I. The work presented in this thesis towards the Doctor of Psychology (Clinical) is, to the best of my knowledge and belief, original except as acknowledged in the text.

II. I have not submitted this material in full or partial fulfillment of a degree at this or any other institution.

III. The thesis is less than 40,000 words in length, exclusive of tables, figures and references.

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Caroline Bentley

January 2017
Author Contribution

All of the components of this thesis are based on the original work of the author, except where acknowledged as follows:

Study One: *Sex differences in psychosocial impairment associated with eating disorder features: What if there aren’t any?* The author conceived the study aims and hypotheses, completed the data analysis, interpreted the results, prepared the manuscript for submission, and revised and approved the final published manuscript. The data featured in this study were based on data from the article: Lucas, N., Windsor, T. D., Caldwell, T. M., & Rodgers, B. (2010). Psychological distress in non-drinkers: Associations with previous heavy drinking and current social relationships. *Alcohol and Alcoholism, 45*, 95–102. doi:10.1093/alcalc/agp080

Study Two: *Sex differences in psychosocial impairment associated with eating disorder features: A school-based study.* The author designed the study, gained ethics committee approval, and assisted with participant recruitment, data collection and data entry. The author also conceived the study aims and hypotheses, completed the data analysis, interpreted the results, prepared the manuscript for submission, and revised and approved the final published manuscript.

Study Three: *Perceived psychosocial impairment associated with eating disorder features: Responses to a mental health literacy intervention.* The author designed the study, gained ethics committee approval, and assisted with participant recruitment, data collection and data entry. The author also conceived the study aims and hypotheses, completed the data analysis, interpreted the results, prepared the manuscript for submission, and revised and approved the final published manuscript. The eating disorders mental health literacy intervention ("Should I Say Something?") that was delivered as part of this study was used under license agreement from the developers: Doctor Laura Hart, Professor Anthony Jorm and Professor Susan Paxton.
The journal articles presented in this thesis feature the author as the primary investigator in each instance. However, it is important to identify the other authors of each paper, as listed below:


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Abstract

Recent epidemiological research suggests that the prevalence of eating disorder features (EDF), namely, binge eating, extreme weight-control behaviors (i.e., extreme dietary restriction, purging and/or excessive exercise), and key cognitive features, such as the overvaluation of body weight/shape, may be increasing in both men and women. There is also some evidence that men, like women, experience significant psychosocial impairment associated with the occurrence of EDF. If so, then there may be important implications for prevention and health promotion initiatives, which currently focus exclusively or primarily on female audiences. The current research comprised two, community-based studies designed to further understanding of sex differences in psychosocial impairment associated with EDF. A third study, included in an appendix, was conducted in fulfillment of the University’s DPsych Program’s Research Practicum requirement. All three studies have been published in peer-reviewed scientific journals.

Study 1 examined sex differences in psychosocial impairment associated with EDF in adults (N = 2,856), whereas Study 2 examined potential sex differences in psychosocial impairment associated with EDF in adolescents (N = 1,666). In both studies, binge eating, purging (i.e., self-induced vomiting and/or laxative misuse) and overvaluation of weight/shape were associated with similarly high levels of impairment in males and females. In adolescents, extreme dietary restriction and excessive exercise were also associated with similarly high levels of impairment in male and female participants. In adults, extreme dietary restriction was associated with greater impairment in females than in males, whereas excessive exercise was not associated with impairment in either males or females.

Findings from these studies suggest that the occurrence of EDF is associated with similarly high levels of impairment for males and females and that this is the case for both adults and adolescents. The primary implication of these findings, when taken
with evidence for increases in the prevalence of EDF in both males and females, is that health promotion and prevention programs will need to: (a) include both male and female participants; and (b) improve community mental health literacy relating to males’ experiences of EDF in particular. These steps will be needed in order for progress to be made in reducing the individual and community health burden of EDF moving forward. Future research examining the help-seeking behavior of males experiencing EDF would be of interest.

Study 3 examined young men’s (n = 35) and women’s (n = 141) perceptions of psychosocial impairment associated with EDF, as well as the effect on these perceptions of an eating disorders “mental health literacy” intervention. Participants generally perceived binge eating, purging and extreme dietary restriction to be associated with significant psychosocial impairment and this did not change with the provision of the intervention. Overvaluation of weight/shape and excessive exercise were initially perceived to be less impairing than other EDF, though perceptions of impairment increased following the intervention. Few sex differences were present. These findings suggest that failure to recognize the adverse impact of overvaluation of weight/shape and excessive exercise on quality of life may warrant particular attention in health promotion and preventive interventions.
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Chapter One

“Eating Disorders” and “Eating Disorder Features”
1.1. Background

Evidence from recent epidemiological research suggests that the prevalence of eating disorder behaviors and cognitions may be increasing in both men and women (Hay, Mond, Darby & Buttner, 2008; Mond, Mitchison, & Hay, 2013). Some eating disorder behaviors – binge eating, for example – may now be as common, or nearly as common, in men as in women (Hay et al., 2008; Mond et al., 2013; Striegel, Berosian, Wang & Schwartz, 2012). Other behaviors, such as extreme dietary restriction, likely remain more prevalent in women than men, although the gap may be diminishing (Hay et al., 2008; Mond et al., 2013; Striegel et al., 2012). Recent studies also suggest that men, like women, may experience significant impairment in psychosocial functioning associated with eating disorder behaviors and cognitions (Mitchison, Mond, Slewa-Younan & Hay, 2013; Mond & Hay, 2007; Striegel et al., 2012).

Findings indicating increased prevalence of eating disorder behaviors and cognitions in males, when taken with findings of comparable psychosocial impairment associated with these behaviors and cognitions in males and females, may have important implications for public health policy (Mond et al., 2013). For example, eating disorder prevention programs, which currently focus primarily on young female audiences, may need to be modified so as to be appropriate for both male and female participants (Mond et al., 2013). There may also be implications for health service utilization – greater demand for treatment services by males, for example – given that psychosocial impairment is strongly predictive of help-seeking among individuals with eating disorder symptoms, for females at least (Mitchison, Hay, Slewa-Younan & Mond, 2014; Mond et al., 2009). For these reasons, it is increasingly important to include both males and females in research examining the prevalence and correlates of eating disorder behaviors and cognitions.
1.2. Limitations of a Diagnostic Approach

At the same time, there is increasing recognition that a diagnostic approach, that is, an approach focused on the prevalence and correlates of eating disorder diagnoses, is inadequate for the purpose of elucidating the health burden of eating disorder pathology. This is because decisions concerning which behaviors and cognitions comprise which diagnoses are necessarily subjective to some extent and therefore subject to debate at any given point in time, as well as subject to change over time (Mitchison & Mond, 2015; Mond, 2013). For example, even with recent changes in the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; APA, 2013), eating disorder diagnoses are still regarded by many authorities as being “female-centric” in that they may fail to take adequate account of those forms of eating pathology, such as musculature-oriented eating disorder behaviors and cognitions, that are most likely to be observed among males (Mitchison & Mond, 2015; Mond et al., 2013).

To the extent that the occurrence and frequency of specific eating disorder behaviors and cognitions comprising different eating disorder diagnoses is subjective, subject to debate, and subject to change over time, estimates of the health burden of eating pathology derived from research focusing on eating disorder diagnoses are problematic. For this reason it has been suggested that, for the purpose of informing the health burden of eating pathology, research addressing the prevalence and correlates of individual eating disorder behaviors and cognitions (collectively referred to here as “eating disorder features”) may be more informative, and more reliable, than research addressing the prevalence and correlates of the constellations of features comprising specific eating disorder diagnoses as these are currently defined (Jenkins, Hoste, Meyer & Blissett, 2011; Mitchison & Mond, 2015; Mond et al., 2013; Wade, Bergin, Martin, Gillespie & Fairburn, 2006).
1.3. **Eating Disorder Features**

Eating disorder features (EDF) include binge eating, extreme weight-control behaviors (i.e., extreme dietary restriction, purging and/or excessive exercise), and key cognitive aspects of eating disorder pathology such as the overvaluation of weight and/or shape. Definitions of these EDF are provided below. Where EDF lack current, agreed-upon operational definitions (e.g., extreme dietary restriction, excessive exercise), the definitions provided below and used throughout the thesis are those considered to be the most appropriate and widely used in the current literature.

**Objective binge eating** is defined as consuming an objectively large amount of food (given the circumstances) in a discrete period of time, accompanied by an experience of loss of control over eating (APA, 2013).

**Subjective binge eating** entails the experience of a loss of control over eating when consuming an amount of food that is not objectively large (Kelly, Cotter, Tanofsky-Kraff & Mazzeo, 2015; Wolfe, Baker, Smith & Kelly-Weeder, 2009).

**Extreme dietary restriction** involves not eating for long periods of time (e.g., eight waking hours or more) in order to influence one’s body weight and/or shape (Fairburn & Beglin, 2008; Mond et al., 2014).

**Purging** refers to the use of self-induced vomiting and/or laxative misuse and, less commonly, the use of diuretics and/or diet pills, to influence body weight and/or shape (Mond & Hay, 2007; Mitchison et al., 2013).

**Excessive exercise** refers to exercising in a driven or compulsive way to influence body weight and/or shape or to “burn off calories” (Fairburn & Beglin, 2008; Mond et al., 2014).

**Overvaluation of body weight and/or shape** refers to an individual’s body weight or shape having a very strong (“undue”) influence on the way in which they
view or judge themselves as a person (Fairburn & Beglin, 2008; Grilo, Masheb & White, 2010).

Males may also be particularly vulnerable to muscularity-oriented eating disorder cognitions and behaviors, such as muscle dysmorphia, muscularity-oriented excessive exercise and steroid abuse (Mitchison & Mond, 2015; Mond et al., 2013). Assessment of these EDF were considered beyond the scope of the current thesis.
Chapter Two

Eating Disorder Features: Prevalence
2.1. Prevalence of Eating Disorder Features

While relatively little is known regarding age of onset and predisposing factors of EDF, evidence is accumulating concerning two key descriptive aspects of the epidemiology of EDF, namely, prevalence and associated psychosocial impairment, including age and sex differences in these trends. Prevalence and psychosocial impairment are key considerations because mental health problems, and health problems more generally, are deemed to constitute a public health burden to the extent that they are both common and disabling (Mitchison et al., 2014; Mond et al., 2013).

As has been noted, recent evidence suggests that the prevalence of EDF is increasing, particularly in men but also in older individuals (Hay et al., 2008; Mitchison et al., 2014), perhaps reflecting a “democratization” of eating-disordered behavior. In large, general population samples of over 3,000 Australian women and men surveyed in 1995 and 2005, the prevalence of regular extreme dietary restriction, binge eating and purging were found to have increased more than twofold in both men and women (Hay et al., 2008). Further, the prevalence of certain features, such as regular extreme dietary restriction, increased more rapidly in men than in women during this period. Similar findings were reported when the results of more recent surveys, conducted in 1998 and 2008, were considered (Mitchison et al., 2014). The prevalence of some EDF, such as binge eating, may be approaching or have reached parity in men and women (Hay et al., 2008; Mond et al., 2013; Striegel et al., 2012).

The paragraphs that follow provide an outline of the current state of knowledge concerning estimates of the prevalence of EDF derived from the most rigorous and recent epidemiological studies available, conducted primarily in Australia, the USA, and Europe, broken down by age and sex. Then, in the following chapter, evidence concerning psychosocial impairment associated with EDF is considered. Since the study
methods entailed in these bodies of research are variable, the nature, quality and quantity of the information bearing on specific EDF is necessarily variable.

2.2. **Binge Eating**

For adolescents, the prevalence of any objective binge eating (OBE) in the past year is estimated at 2.0% for boys and 7.1% for girls (Haines, Kleinman, Rifas-Shiman, Field & Austin, 2010). For monthly or more OBE, prevalence estimates are 9.2-23.6% for boys and almost double for girls at 17.0-43.4% (Allen, Byrne, Oddy & Crosby, 2013; Haines et al., 2010; Mond et al., 2014; Reas, Øverås & Rø, 2012; White, Haycraft, Goodwin & Meyer, 2014). For weekly or more OBE, prevalence estimates are 2.0-6.0% for boys and more than double for girls at 4.4-16.6% (Mond et al., 2014; Nakai, Noma, Nin, Teramukai & Wonderlich, 2015; Reas et al., 2012; White et al., 2014).

For adults, sex differences appear less pronounced concerning the prevalence of monthly or more OBE, which is estimated at 4.2-7.5% for men and 4.2-11.2% for women (Hilbert, de Zwaan & Braehler, 2012; Striegel et al., 2012). Similarly, for weekly or more OBE, prevalence estimates are 0.9-4.1% for men and 1.4-5.7% for women (Hilbert et al., 2012; Mitchison et al., 2013).

The prevalence of weekly or more subjective binge eating is estimated at 3.4% and 12.3% in adolescent boys and girls, respectively, and 1.7% and 2.5% in adult men and women, respectively (Mitchison et al., 2013; Mond et al., 2014).

2.3. **Extreme Dietary Restriction**

For adolescents, the prevalence of monthly or more extreme dietary restriction is estimated at 3.2-11.3% for boys and around triple this for girls at 16.0-32.0% (Allen et al., 2013; Mond et al., 2014; Reas et al., 2012). For weekly or more extreme dietary restriction, the prevalence is estimated at 0-2.3% for boys and up to five times greater for girls at 0-11.5% (Mond et al., 2014; Nakai et al., 2015; Reas et al., 2012).
For adults, the prevalence of monthly or more extreme dietary restriction is estimated at 7.7% for men and 11.9% for women (Hilbert et al., 2012). For weekly or more extreme dietary restriction, prevalence estimates are 1.4-2.4% for men and almost double for women at 2.4-4.3% (Hilbert et al., 2012; Mitchison et al., 2013).

2.4. Purging

For adolescents, the prevalence of any self-induced vomiting in the past three months is estimated at 3% for boys and four times that for girls at 12% (Haines et al., 2011). For monthly or more self-induced vomiting, prevalence estimates are 0.8-2.2% for boys and again, almost four times that figure for girls at 1.1-8.3% (Mond et al., 2014; Nakai et al., 2015; Reas et al., 2012; White et al., 2014). For weekly or more self-induced vomiting, prevalence estimates are 0.2-1.1% for boys and up to triple for girls at 0.2-3.3% (Mond et al., 2014; Nakai et al., 2015; Reas et al., 2012; White et al., 2014).

The prevalence of monthly or more laxative misuse is estimated at 0.2-2.4% for boys and more than double for girls at 1.5-5.3% (Mond et al., 2014; Nakai et al., 2015; Reas et al., 2012; White et al., 2014). For weekly or more laxative misuse, prevalence estimates are 0.0-1.6% for boys and again, more than double for girls at 0.2-3.5% (Mond et al., 2014; Nakai et al., 2015; Reas et al., 2012; White et al., 2014).

The prevalence of any self-induced vomiting and/or laxative misuse (i.e., “purging”) in the past year is estimated at 0.7% for boys and much higher for girls at 3.7% (Haines et al., 2010). Likewise, the prevalence of monthly or more purging is estimated at 1.2-2.7% for boys and much higher for girls at 3.7-14.0% (Allen et al., 2013).

For adults, the prevalence of monthly or more self-induced vomiting is estimated at 0.4% for men and over triple that for women at 1.3% (Hilbert et al., 2012). The prevalence of weekly or more self-induced vomiting is estimated at 0.1% for men and also triple for women at 0.3% (Hilbert et al., 2012).
The prevalence of any laxative misuse in the past month is estimated at 0.8% for men and triple for women at 2.4% (Hilbert et al., 2012). Likewise, the prevalence of weekly or more laxative misuse is estimated at 0.2% for men and over triple for women at 0.7% (Hilbert et al., 2012).

The prevalence of weekly or more purging (i.e., self-induced vomiting and/or laxative misuse) is estimated at 0.5% for men and triple for women at 1.5% (Mitchison et al., 2013).

2.5. **Excessive Exercise**

For adolescents, the prevalence of engaging monthly or more in excessive exercise is estimated at 2.2-50.8% for boys and 4.2-69.4% for girls (Allen et al., 2013; Mond et al., 2014; Nakai et al., 2015; Reas et al., 2012; White et al., 2014). For weekly or more excessive exercise, the prevalence is estimated at 1.6% for boys and over double for girls at 3.2% (Reas et al., 2012). For excessive exercise more than five times per week, prevalence estimates are a comparable 4.0-5.3% for boys and 5.4-6.8% for girls (Mond et al., 2014; White et al., 2014).

For adults, the prevalence of engaging monthly or more in excessive exercise is estimated at 3.5% for men and 3.7% for women (Hilbert et al., 2012).

2.6. **Overvaluation of Weight/Shape**

For adolescents, the prevalence of thinness preoccupation is estimated at 8% for boys and triple for girls at 24% (Haines et al., 2011). The prevalence of weight/shape overvaluation is estimated at 4.9% for boys and almost five times greater for girls at 24.2% (Mond et al., 2014). For adults, the prevalence of overvaluation of weight/shape is estimated at 13.5% for men and less than double for women at 23.0% (Mitchison et al., 2013).
2.7. Summary

In sum, the prevalence rates of EDF in both males and females and in both adolescents and adults are concerning, particularly when considering that the prevalence of EDF is increasing and that even the most recent research to have been conducted may be outdated by the time it is published. Frequent purging appears to be less prevalent than other EDF in most subgroups (men: 0.5%; women: 1.5%; boys: 1.2-2.7%), with the exception of adolescent girls (3.7-14.0%). Frequent extreme dietary restriction also appears to be of relatively low prevalence compared to other EDF (men: 1.4-2.4%; women: 2.4-4.3%; boys: 0-2.3%), except for adolescents girls (0-11.5%). Similarly, the prevalence of frequent binge eating appears to be similar among men (0.9-4.1%), women (1.4-5.7%) and adolescent boys (2.0-6.0%), but greater for adolescents girls (4.4-16.6%). That is, adolescent girls appear to be at greater risk of experiencing frequent purging, extreme dietary restriction and binge eating episodes, than individuals in the other demographic groups mentioned. This may be attributable to greater internalization of physical appearance ideals in adolescent girls than boys (Gonzalez et al., 2015), and/or that adolescent boys may be likely to develop EDF later in adolescence than girls (Allen et al., 2013). The prevalence of frequent excessive exercise, however, appears comparable among men (3.5%) and women (3.7%), boys (4.0-5.3%) and girls (5.4-6.8%). This is perhaps unsurprising, given that excessive exercise may be considered to address both the characteristically female thin ideal and the characteristically male muscular ideal, as well as being considered more socially acceptable than other EDF (Mond, Mitchison & Hay, 2014). While the prevalence of overvaluation appears to be greater for women (23.0%) and girls (24.2%), than men (13.5%) and boys (4.9%). These findings are consistent and concerning, suggesting that females experience greater objectification, gender role socialization and internalization of appearance ideals than do males (Lewinsohn et al 2002; Gonzalez et al., 2015).
Chapter Three

Eating Disorder Features: Psychosocial Impairment
3.1. Psychosocial Impairment Associated with Eating Disorder Features

Evidence is now accumulating concerning not only the prevalence of EDF but also impairment in psychosocial functioning associated with different EDF (Mitchison et al., 2013; Mond & Hay, 2007; Striegel et al., 2012). While psychosocial impairment is a broad term that currently lacks consensus-based definition in the literature, it is generally accepted to entail psychological distress, social support, role functioning and/or quality of life (Mitchison et al., 2013; Mond & Hay, 2007; Striegel et al., 2012). As has been noted, when information concerning associated impairment is taken with information concerning prevalence, this has implications for the individual and community health burden of EDF and for efforts to reduce this burden (Mitchison et al., 2014; Mitchison & Mond, 2015). For example, on an individual level, identifying EDF and associated impairment may characterize clinical presentations and initial point(s) of intervention based on motivation to reduce associated impairment (Fairburn, 2008). On a community level, EDF prevalence and associated impairment may better predict health service utilization and funding thereof, as well as the design and implementation of prevention and intervention programs (Mond, Mitchison & Hay, 2014).

A brief outline – brief because the evidence base is still relatively small – of what is known regarding psychosocial impairment associated with EDF is given in the paragraphs that follow. Where possible, information is presented separately for males and females and for adults and adolescents.

3.2. Adults

Only three recent studies have examined impairment in psychosocial functioning associated with EDF in population-based samples of men and women. These research findings suggest that men, like women, experience significant psychosocial impairment associated with EDF (Mitchison et al., 2013; Mond & Hay, 2007; Striegel et al., 2012).
Mond and Hay (2007) found, in an Australian sample of men and women (N = 3,047) aged 15 years and over, that the presence of extreme dietary restriction, binge eating and purging were all associated with greater impairment in role functioning in both men and women, relative to those who did not report such behaviors. Further, when one or more EDF was accompanied by overvaluation, participants reported even greater role impairment, although impairment was more closely linked to the presence of overvaluation in women.

Mitchison and colleagues (2013), also in an Australian sample of men and women (N = 3,034) aged 15 years and over, found that the presence of extreme dietary restriction, binge eating, purging and overvaluation were all associated with comparable levels of impairment in quality of life in women and men, with the exception that impairment in mental health associated with overvaluation was greater in women.

Striegel and colleagues (2012) found, in a very large sample of US employees (N = 46,351) aged 18 to 64 years, that the occurrence of binge eating was associated with significantly greater distress and impairment, and this did not differ by sex. No other EDF were assessed in this study.

3.3. Adolescents

Recent evidence concerning psychosocial impairment associated with EDF among adolescents, and sex difference in this regard, is particularly scant. This is despite the fact that EDF typically have their onset in adolescence (Hudson, Hiripi, Pope & Kessler, 2007) and the occurrence of EDF early in life is likely to be associated with increased risk of EDF and other adverse health outcomes later in life (Johnson, Cohen, Kasen & Brook, 2002). In those few epidemiological studies of young people that have included measures of both EDF and impairment, attention has focused on the constellations of symptoms required for eating disorder diagnoses. For example, binge eating disorder was found to be associated with depressive symptoms and low self-
esteem in a US study (N = 4,746) of adolescents boys and girls (Ackard, Neumark-Sztainer, Story & Perry, 2003). Binge-purge cycling was associated with depressive symptoms, low self-esteem, suicidal ideation and drug and alcohol use in a US sample (N = 6,728) of adolescent boys and girls (Neumark-Sztainer & Hannan, 2000). More recently, binge eating disorder, bulimia nervosa and purging disorder were associated with depressive symptoms and reduced mental health-related quality of life in an Australian sample (N = 1,383) of adolescent girls and boys (Allen et al., 2013). Other studies that have examined psychosocial impairment associated with EDF in adolescents have included only females (Field et al., 2012; Patton, Coffey, Carlin, Sanci & Sawyer, 2008) or males (Field et al., 2014) or, where both males and females have been included, have combined data from both sexes for the purpose of the analysis and presentation of results (e.g., Jenkins et al., 2014; Tanofsky-Kraff et al., 2011; Sonneville et al., 2013).

One recent exception is a study conducted in a large US sample (N = 15,425) of adolescent girls and boys, aged 12 to 18 years, examining the correlates of “extreme dieting behavior”, namely, fasting, purging and/or use of diet pills/powders/liquids (Brown, Kola-Palmer & Dhingra, 2015). This behavior was found to be associated with depressive symptoms and victimization experiences (i.e., bullying, rape and/or partner violence) in both boys and girls. For girls, extreme dieting behavior was also associated with binge drinking, suicidal ideation and planning, whereas for boys extreme dieting behavior was also associated with cigarette smoking, marijuana use and suicide attempts. The researchers highlight the need for additional research examining the correlates of extreme weight-control behaviors in adolescent girls and boys.

To the author’s knowledge, no study has yet examined sex differences in psychosocial impairment associated with overvaluation in adolescents. As has been noted, research in adults suggests that the association between overvaluation and
impairment may not be as strong for men as for women (Mitchison et al., 2013; Mond & Hay, 2007).
Chapter Four

The Current Research
As outlined previously, findings from recent epidemiological studies suggest that the prevalence of EDF may be increasing in both males and females and that males, like females, may experience significant psychosocial impairment associated with EDF. If this is the case, there may be important implications for prevention and health promotion programs and, potentially, for help-seeking behavior and clinical practice. For example, programs designed to reduce the health burden of eating pathology that have been designed for implementation in young women may need to be modified in order to be more inclusive, while health professionals may experience greater demand for their services among both males and females.

However, evidence concerning psychosocial impairment associated with EDF and sex differences in this regard is only now beginning to accumulate, and evidence concerning psychosocial impairment associated with EDF in adolescents is particularly limited. The goal of the current research was, therefore, to expand this evidence base by examining sex differences in psychosocial impairment associated with EDF in population-based samples of adolescents and adults. Clinical samples were not considered, due to the potentially confounding relationship between psychosocial impairment and treatment seeking (Mond et al., 2009). In view of the paucity of the existing evidence, the only a priori hypotheses were that: (i) EDF would be associated with psychosocial impairment in both males and females; and (ii) sex differences in psychosocial impairment associated with EDF would not be observed, with the possible exception of greater impairment associated with overvaluation in females than in males.
Chapter Five

Study One: Sex Differences in Psychosocial Impairment Associated with Eating Disorder Features: What if There Aren’t Any?
Background to Study One

Prior to the commencement of the current research, only three recent studies had examined impairment in psychosocial functioning associated with EDF in population-based samples of women and men (Mitchison et al., 2013; Mond & Hay, 2007; Striegel et al., 2012). Findings from these studies suggested that men and women may experience significant, comparable levels of psychosocial impairment associated with extreme dietary restriction, binge eating and purging, whereas the overvaluation of weight/shape appeared to be associated with greater impairment in women than in men (Mitchison et al., 2013; Mond & Hay, 2007). The aim of this first study was to expand this evidence by examining sex differences in psychosocial impairment associated with EDF in a large, population-based sample of men and women. The EDF assessed included extreme dietary restriction, binge eating, purging, excessive exercise and the overvaluation of weight/shape. In light of the paucity of existing evidence, hypotheses were tentatively made, first, that the occurrence of EDF would be associated with significant impairment in psychosocial functioning in both women and men; and second, that EDF would be associated with comparable levels of impairment in men and women, with the possible exception of greater impairment associated with weight/shape overvaluation in women.
This study was accepted for publication on the 21st August 2014. The reference for this paper is: Bentley, C., Mond, J., & Rodgers, B. (2014). Sex differences in psychosocial impairment associated with eating-disordered behavior: What if there aren’t any? 

Abstract

**Objective:** We sought to test the hypothesis that eating disorder features (EDF) are associated with comparable levels of impairment in psychosocial functioning in men and women. **Method:** Postal questionnaires that assessed EDF (binge eating, purging, extreme dietary restriction, excessive exercise and weight/shape overvaluation) and psychosocial impairment (general psychological distress, life satisfaction and social support) were completed by a general population sample of men (n = 957) and women (n = 1,899). **Results:** Binge eating, purging and overvaluation were associated with comparable levels of psychosocial impairment for both men and women and this was the case for each of the three measures of psychosocial functioning employed. Extreme dietary restriction was associated with greater psychosocial impairment in women than in men, whereas excessive exercise was not associated with psychosocial impairment in either women or men. **Conclusions:** There appear to be few differences between men and women in terms of psychosocial impairment associated with EDF. It may no longer be appropriate to base the development of eating disorder prevention programs on the premise that EDF are primarily a problem of women. Health professionals may be more likely to see more men with EDF in their practices in the future.
Findings from recent population-based studies suggest that the prevalence of eating disorder features (EDF), namely, binge eating, extreme weight-control behaviors, and key cognitive features, such as the overvaluation of body weight/shape, may be increasing in men (Hay, Mond, Darby, & Buttner, 2008; Mond, Mitchison, & Hay, 2013). Thus, cross-sectional surveys of some 3,000 men and women aged 15 years or more (mean in 1995 = 43.4 years, SD = 19.2; mean in 2005 = 45.1 years, SD = 24.5) conducted in Australia in 1995 and 2005 found that the prevalence of each of three behaviors assessed – binge eating, purging and extreme dietary restriction – more than doubled in both men and women during this (10-year) period (Hay et al., 2008). Some behaviors, such as binge eating, may now be as common, or nearly as common, in men as in women (Striegel, Bedrosian, Wang & Schwartz, 2012). Others, such as extreme dietary restriction, likely remain more common in women but may be increasing more rapidly in men (Hay et al., 2008).

Recent research evidence also suggests that men, like women, experience significant distress and disability associated with EDF (Mond et al., 2014; Striegel et al., 2012). Findings that EDF may be associated with comparable levels of psychosocial impairment in men as in women, when taken with evidence for increases in the prevalence of EDF in men, may have public policy implications. For example, there may be a need to give greater attention to the occurrence of EDF in males when developing preventive interventions (Mond et al., 2014). This would be an important shift in the field in that eating disorder prevention programs have, thus far, been developed on the premise that EDF are primarily a problem of women (Stice, Black-Becker & Yokum, 2013; Wilfley, Agras, & Taylor, 2013). There may also be implications for clinical practice, such as demand for treatment, given that impairment in psychosocial functioning is strongly predictive of help-seeking behavior among individuals with eating disorders and individuals with mental health problems more
generally (Mond et al., 2009). For these reasons, it has been suggested that greater priority may need to be given to the inclusion of males in studies of the prevalence and correlates of EDF (Mond et al., 2014; Striegel et al., 2012).

To our knowledge, only three recent studies have examined impairment in psychosocial functioning associated with EDF in population-based samples of men and women. Mond and Hay (2007), in an Australian sample of men and women (N = 3,047) aged 15 years or more (mean = 49.6 years, SD = 18.7), found that participants who reported regular extreme dietary restriction, binge eating or purging, experienced greater impairment in role functioning than individuals who did not report these behaviors and that this was the case for both men and women. Further, women and men who reported regular eating disordered behavior and weight/shape overvaluation experienced greater impairment that those who reported eating disordered behavior alone, although impairment was more closely linked to the presence of overvaluation in women. Mitchison and colleagues (Mitchison, Mond, Slewa-Younan & Hay, 2013), also in an Australian sample of men and women (N = 3,034) aged 15 years or more (mean = 45.7 years, SD = 18.9), found that extreme dietary restriction, binge eating, purging and overvaluation, were associated with comparable levels of impairment in quality of life in women and men, with the exception that impairment in mental health associated with overvaluation was greater in women. Striegel and colleagues (2012) found, in a very large sample of USA employees (N = 46,351) aged 18 to 64 years (mean = 42.16-44.25 years, SD = 10.15-11.28), that participants who reported binge eating experienced significantly greater distress and disability than those who did not. Further, on a range of different measures, impairment associated with binge eating did not differ by sex. No other EDF were assessed in this study. In all of these studies, men constituted a substantial minority – in excess of one third – of participants reporting EDF.
Findings from these studies suggest that impairment in psychosocial functioning associated with EDF may be similar in men and women, although further research, employing a more comprehensive assessment of EDF, is needed. The goal of the current study was to conduct research of this kind. Specifically, we sought to examine sex differences in psychosocial impairment associated with a broad range of EDF in a large, general population sample of men and women. In view of the paucity of existing evidence, hypotheses were tentatively made, first, that the occurrence of EDF would be associated with significant impairment in psychosocial functioning in both men and women; and second, that EDF would be associated with comparable levels of impairment in men and women, with the possible exception of greater impairment associated with weight/shape overvaluation in women.

**Methods**

**Study Design and Recruitment of Participants**

Participants were Australian men and women aged 20 to 44 years who completed a postal survey questionnaire in 2006, namely, the Food, Drink, Lifestyle and Wellbeing Survey (FDLWBS) (Lucas, Windsor, Caldwell, & Rodgers, 2010; Van Zutven, Mond, Latner, & Rodgers, 2015). The questionnaire included measures of EDF, psychosocial functioning, height and weight and socio-demographic information as well as other measures not relevant to the present study which are detailed elsewhere (Lucas et al., 2010; Van Zutven et al., 2015).

Questionnaires were posted to 18,000 Australian residents born in 1983–1985, 1973–1975 and 1963–1965, selected at random from the Australian electoral roll (inclusion on the Australian electoral roll is a legal requirement). Questionnaires were sent to an equal number of females and males in each of these subgroups. No remuneration or other incentives to participation were provided. The research was approved by the Australian National University Human Research Ethics Committee.
(protocol no. 2006/97). Completed questionnaires were received from 2,856 individuals (crude response rate = 15.9%), of whom 1,899 (66.5%) were females. The demographic characteristics of study participants are shown in Table 1.

**Table 1.** Demographic Characteristics of Study Participants

<table>
<thead>
<tr>
<th></th>
<th>Women (n = 1899)</th>
<th>Men (n = 957)</th>
<th>Total Sample (N = 2856)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>66.5</td>
<td>33.5</td>
<td>100</td>
</tr>
<tr>
<td>Born in Australia</td>
<td>85.9</td>
<td>85.2</td>
<td>85.6</td>
</tr>
<tr>
<td>Married/Living as Married</td>
<td>52.9</td>
<td>53.1</td>
<td>53.0</td>
</tr>
<tr>
<td>Educated Beyond Year 12</td>
<td>59.3</td>
<td>63.1</td>
<td>60.6</td>
</tr>
<tr>
<td>Employed Full-Time</td>
<td>41.7</td>
<td>71.2</td>
<td>52.0</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>31.39 (8.31)</td>
<td>32.74 (8.43)</td>
<td>31.86 (8.37)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.90 (6.15)</td>
<td>26.68 (5.60)</td>
<td>25.5 (6.02)</td>
</tr>
</tbody>
</table>

**Study Measures**

**Assessment of EDF**

EDF were assessed using the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994; Fairburn & Beglin, 2008), a 36-item, self-report version of the Eating Disorder Examination interview (EDE; Fairburn & Cooper, 1993) that focuses on the past 28 days. Scores on four subscales (Restraint, Eating Concerns, Weight Concerns and Shape Concerns) and a Global Score are derived from 22 items addressing attitudinal aspects of eating disorder psychopathology (Mond, Hay, Rodgers & Owen, 2006a). Scores on these items (and subscale scores) range from 0 to 6, with higher scores indicating higher symptom levels. In the current study, as in previous studies (Berg, Peterson, Frazier & Crow, 2012; Mond, Hay, Rodgers & Owen, 2007), scores on the Weight and Shape Concerns subscales were highly correlated in both women (r = 0.92) and men (r = 0.89). Hence the items of these scales were combined to
form a single, Weight/Shape Concerns subscale. Reliability (Cronbach’s alpha) coefficients for the Restraint, Eating Concerns, Weight/Shape Concerns, and Global Score scales in the current study were 0.77, 0.70, 0.92, and 0.92, respectively, for men, and 0.79, 0.82, 0.94, and 0.95, respectively, for women.

Remaining items of the EDE-Q assess the occurrence and frequency of specific EDF, namely, binge eating, self-induced vomiting, laxative misuse and excessive exercise. For binge eating, self-induced vomiting and laxative misuse, “regular” occurrence was defined as, on average, at least weekly during the past four weeks (APA, 2013), whereas regular excessive exercise was defined as “exercising really hard or in a driven or compulsive way as a means of controlling your weight or shape” on average at least five times per week during the past four weeks (Lavender, De Young & Anderson, 2010; Mond, Hay, Rodgers & Owen, 2006b; Reas, Øverås & Rø, 2012). Regular extreme dietary restriction was defined, using an item of the Restraint subscale, as “going for long periods of time (for example, 8 hours or more in the daytime) without eating anything at all to control your weight or shape” on average at least three times per week during the past four weeks (Lavender et al., 2010; Mond et al., 2006b; Reas et al., 2012). Overvaluation of weight/shape was defined as a score of 5 or 6 on one or both of the (Weight/Shape Concerns subscale) items addressing this construct (Mond et al., 2007; Grilo, Masheb & White, 2010).

A high level of agreement between self-report (EDE-Q) and interview (EDE) assessment of attitudinal features, as measured by the EDE-Q subscales, has been demonstrated in various study populations (Fairburn & Beglin, 1994; Fairburn & Beglin, 2008; Mond, Hay, Rodgers, Owen & Beumont, 2004; Berg et al., 2012), whereas agreement between self-report and interview assessment of eating-disordered behavior has been found to be lower and more variable and this is generally taken to reflect the superiority of interview assessment (Fairburn & Beglin, 1994; Fairburn &
In particular, the prevalence of binge eating may be overestimated when using self-report assessment due to a tendency for participants to overstate the amount of food consumed and/or the experience of loss of control over eating (APA, 2013; Fairburn & Beglin, 1994; Mond et al., 2004).

**Kessler 6-Item Psychological Distress Scale (K-6)**

The K-6 (Furukawa, Kessler, Slade & Andrew, 2003; Kessler et al., 2002) is a brief measure of general psychological distress designed to screen for cases of anxiety and affective disorders in epidemiological research and widely used for this purpose (Furukawa et al., 2003; Kessler et al., 2002). Participants are asked how often they experienced each of a number of manifestations of psychological distress (e.g., feeling hopeless; feeling restless or fidgety) during the past four weeks. Items are scored on 5-point scale ranging from “none of the time” to “all of the time”, so that total scores range from 0 to 24, with higher scores indicating greater distress. In the present study, participants’ scores were reversed so that lower scores indicated greater psychological distress. The K-6 has very good psychometric properties, including demonstrated validity in screening for anxiety and affective disorders in general population samples and consistency across demographic and illness subgroups (Furukawa et al., 2003; Kessler et al., 2002). Cronbach’s alpha in the current study was 0.88 (0.88 for females and 0.87 for males).

**Satisfaction with Life Scale (SWL)**

The SWL scale is a 5-item measure of global life satisfaction developed by Diener and colleagues (Diener, Emmons, Larsen & Griffin, 1985). Respondents are asked to indicate their agreement with each of five statements, for example, “In most ways my life is close to my ideal”, “So far I have gotten the important things I want in life” and “If I could live my life over, I would change almost nothing”. Responses are scored on a 7-point scale (1 = “strongly disagree” to 7 = “strongly agree”), with higher
scores indicating greater perceived satisfaction with one’s life. High internal consistency, test-retest reliability, temporal stability and convergent validity have been demonstrated in various study populations (Diener et al., 1985; Pavot & Diener, 1993). Cronbach’s alpha in the current study was 0.90 (for both females and males).

**Medical Outcomes Study Perceived Social Support Survey (MOSPSS)**

The MOSPSS (Sherbourne & Stewart, 1991) is a 19-item measure that requires participants to rate how often different forms of social support (e.g., emotional support, tangible support, positive social interaction) are available to them should they be needed. Responses are scored on a 5-point scale (ranging from “none of the time” to “all of the time”), so that possible scores range from 19-95, with higher scores indicating greater perceived social support. The MOSPSS has demonstrated reliability and validity (Sherbourne & Stewart, 1991). Cronbach’s alpha in the current study was 0.97 (for both females and males).

**Statistical Analysis**

The occurrence of specific EDF (dietary restriction, binge eating, purging, excessive exercise and overvaluation) was compared between men and women using Chi-square tests. EDE-Q subscales and measures of psychosocial functioning (psychological wellbeing, life satisfaction and social support) were compared between men and women using independent samples t-tests. Correlations between the occurrence of specific EDF and measures of psychosocial functioning, by sex, were calculated using the Pearson correlation coefficient. In order to test for sex differences in the effect of specific EDF on psychosocial functioning, a series of 2 (male, female) x 2 (feature absent, feature present) factorial analyses of covariance (ANCOVAs) was conducted for each of the five EDF and each of the three measures of psychosocial functioning. Sex differences in the effects of specific EDF on psychosocial functioning would then be evident in a significant interaction term for the effect in question. Tests of simple main
effects were employed to clarify the source of any significant interaction terms. Demographic variables (other than sex), including BMI, were included as covariates in all multivariable analysis. A significance level of .05 was adopted for all tests and all analysis was conducted using SPSS version 20.0.

Results

Preliminary Analysis

In view of the low response rate to the FDLWBS survey, Lucas and colleagues (2010) conducted analysis to determine the representativeness of the sample in terms of socio-demographic characteristics. For the present study, additional analysis was conducted to determine the representativeness of the study sample in terms of levels of eating disorder psychopathology. For female participants, EDE-Q data from FDLWBS were compared with those of a large, general population sample of women, also from Australia, aged 18 to 42 years (Mond et al., 2006a). There were no significant differences between the samples with respect to scores on subscales of the EDE-Q, nor with respect to the occurrence of specific behaviors. For example, mean (SD) EDE-Q global scores for the FDLWBS and normative samples were 1.44 (1.22) and 1.52 (1.25), respectively, and the prevalence of regular binge eating in the different samples was 9.9% and 10.6%, respectively.

For males, the only comparative data available were those for US college students aged 18 to 26 years (N = 404; Lavender et al., 2010). Levels of eating disorder psychopathology among men in the present study were lower than those of this student sample. Thus, mean (SD) scores on the EDE-Q global scale were 0.79 (0.86) and 1.09 (1.0), respectively, and the prevalence of regular binge eating was 5.1% and 7.9% respectively. Since the prevalence of EDF appears to be similar in Australia and the US (Hay et al., 2008; Hudson, Hiripi, Pope & Kessler, 2007), and since levels of EDF have been found to be higher among college students than in the general population in both
countries (Lavender et al., 2010; Luce, Crowther & Pole, 2008; Mond & Arrighi, 2011), it was reasonable to assume that men who completed the FDLWBS survey were also representative of the general population in terms of EDF.

**Main Analysis**

Mean (SD) scores on the EDE-Q subscales and on measures of psychosocial functioning, by sex, are shown in Table 2. Women had higher scores on the EDE-Q subscales and greater perceived social support, life satisfaction and general psychological distress than men (all $p < .05$).

**Table 2.** Mean (SD) Scores on Subscales of the Eating Disorder Examination Questionnaire (EDE-Q) and Measures of Psychosocial Impairment by Sex

<table>
<thead>
<tr>
<th></th>
<th>Women (n = 1899)</th>
<th>Men (n = 957)</th>
<th>Total (N = 2856)</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDE-Q subscales:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restraint</td>
<td>1.31 (1.40)</td>
<td>0.87 (1.19)</td>
<td>1.16 (1.34)</td>
<td>-8.77</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Eating Concerns</td>
<td>0.60 (1.00)</td>
<td>0.24 (0.52)</td>
<td>0.48 (0.88)</td>
<td>-12.69</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Weight/Shape Concerns</td>
<td>2.08 (1.63)</td>
<td>1.11 (1.20)</td>
<td>1.74 (1.56)</td>
<td>-17.81</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Global Score</td>
<td>1.44 (1.22)</td>
<td>0.79 (0.86)</td>
<td>1.21 (1.15)</td>
<td>-16.42</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Psychological distress$^1$</td>
<td>18.98 (4.25)</td>
<td>19.78 (3.84)</td>
<td>19.26 (4.13)</td>
<td>5.06</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Social support</td>
<td>78.18 (16.01)</td>
<td>74.13 (16.70)</td>
<td>76.77 (16.36)</td>
<td>-6.31</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>17.53 (4.50)</td>
<td>17.09 (4.55)</td>
<td>17.4 (4.52)</td>
<td>-2.50</td>
<td>.01</td>
</tr>
</tbody>
</table>

$^1$Lower scores indicate greater distress

The prevalence of EDF, by sex, is shown in Table 3 (in view of the low prevalence of purging behaviors, any occurrence of purging, i.e., any occurrence of self-induced vomiting and/or laxative misuse, was used in this and subsequent analyses). As can be seen, the most common features in the current study sample, for both men and women, were binge eating and weight/shape overvaluation. The prevalence of binge eating, purging and weight/shape overvaluation was higher in women than in men.
(p < .01), whereas the prevalence of dietary restriction (p = .55) and excessive exercise (p = .80) did not differ by sex.

Table 3. Prevalence of Eating Disorder Features by Sex

<table>
<thead>
<tr>
<th></th>
<th>Women (n = 1899)</th>
<th>Men (n = 957)</th>
<th>Total (N = 2856)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Dietary restriction&lt;sup&gt;i&lt;/sup&gt;</td>
<td>44</td>
<td>2.4</td>
<td>19</td>
</tr>
<tr>
<td>Binge eating&lt;sup&gt;ii&lt;/sup&gt;</td>
<td>153</td>
<td>9.9</td>
<td>43</td>
</tr>
<tr>
<td>Purging&lt;sup&gt;iii&lt;/sup&gt;</td>
<td>75</td>
<td>4.0</td>
<td>15</td>
</tr>
<tr>
<td>Excessive exercise&lt;sup&gt;iv&lt;/sup&gt;</td>
<td>54</td>
<td>2.9</td>
<td>31</td>
</tr>
<tr>
<td>Overvaluation&lt;sup&gt;v&lt;/sup&gt;</td>
<td>268</td>
<td>14.4</td>
<td>38</td>
</tr>
</tbody>
</table>

<sup>i</sup>“Going for long periods of time (for example, 8 hours or more in the daytime) without eating anything at all to control your weight or shape” on average at least three times per week during the past four weeks.
<sup>ii</sup>Occurrence of this behavior, on average, at least once per week during the past four weeks.
<sup>iii</sup>Any occurrence of this behavior during the past four weeks.
<sup>iv</sup>“Exercising really hard or in a driven or compulsive way as a means of controlling your weight or shape” on average at least five times per week during the past four weeks.
<sup>v</sup>A score of 5 or 6 on one or both of the Weight Concerns and Shape Concerns subscales.

Table 4. Correlations Between Study Variables by Sex (data for males is shaded)

<table>
<thead>
<tr>
<th></th>
<th>DR</th>
<th>BE</th>
<th>P</th>
<th>EE</th>
<th>O</th>
<th>LS</th>
<th>SS</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary restriction (DR)</td>
<td></td>
<td>.08*</td>
<td>.10**</td>
<td>.02</td>
<td>.29**</td>
<td>-.08*</td>
<td>-.06</td>
<td>-.10**</td>
</tr>
<tr>
<td>Binge eating (BE)</td>
<td>.08**</td>
<td></td>
<td>.07*</td>
<td>.05</td>
<td>.26**</td>
<td>-.10**</td>
<td>-.10**</td>
<td>-.15**</td>
</tr>
<tr>
<td>Purging (P)</td>
<td>.19**</td>
<td>.14**</td>
<td></td>
<td>.03</td>
<td>.20**</td>
<td>-.13**</td>
<td>-.12**</td>
<td>-.07*</td>
</tr>
<tr>
<td>Excessive exercise (EE)</td>
<td>.04</td>
<td>.18**</td>
<td>.10**</td>
<td></td>
<td>-.01</td>
<td>.05</td>
<td>.01</td>
<td>-.02</td>
</tr>
<tr>
<td>Overvaluation (O)</td>
<td>.17**</td>
<td>.30**</td>
<td>.17**</td>
<td>.09**</td>
<td></td>
<td>-.24**</td>
<td>-.13**</td>
<td>-.23**</td>
</tr>
<tr>
<td>Life satisfaction (LS)</td>
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<td>-.10**</td>
<td>-.03</td>
<td>-.29**</td>
<td></td>
<td>.52**</td>
<td>.50**</td>
</tr>
<tr>
<td>Social support (SS)</td>
<td>-.08**</td>
<td>-.12**</td>
<td>-.05*</td>
<td>-.03</td>
<td>-.16**</td>
<td>.54**</td>
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<td>.31**</td>
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<td>-.18**</td>
<td>-.12**</td>
<td>-.05*</td>
<td>-.29**</td>
<td>.51**</td>
<td>.36**</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01
Correlations between EDF and measures of psychosocial impairment, by sex, are shown in Table 4. Small to moderate positive correlations were observed between specific EDF, ranging from .01 to .30 (with one exception of -.01). Moderate positive correlations were observed between different measures of psychosocial functioning, with correlations ranging from .31 to .54. Small to moderate negative correlations were observed between specific EDF and each of the three measures of psychosocial functioning, with correlations ranging from -.03 to -.29 (with two exceptions of .01 and .05). As can be seen, correlations occurred in the expected direction and were generally similar for women and men.

**Table 5.** Sex Differences in Psychosocial Impairment Associated with Eating Disorder Features (EDF): Results of Analyses of Covariance for Each Measure of Psychosocial Impairment and Each EDF

<table>
<thead>
<tr>
<th>Psychosocial Functioning</th>
<th>EDF Interaction</th>
<th>EDF</th>
<th>p</th>
<th>Interaction</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological distress</td>
<td>Dietary restriction</td>
<td>39.49</td>
<td>&lt;.01</td>
<td>11.61</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td>Binge eating</td>
<td>45.21</td>
<td>&lt;.01</td>
<td>11.61</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td>Purging</td>
<td>12.08</td>
<td>&lt;.01</td>
<td>.47</td>
<td>.49</td>
</tr>
<tr>
<td></td>
<td>Excessive exercise</td>
<td>1.69</td>
<td>.19</td>
<td>.20</td>
<td>.66</td>
</tr>
<tr>
<td></td>
<td>Overvaluation</td>
<td>103.82</td>
<td>&lt;.01</td>
<td>.21</td>
<td>.64</td>
</tr>
<tr>
<td>Social support</td>
<td>Dietary restriction</td>
<td>9.91</td>
<td>&lt;.01</td>
<td>2.04</td>
<td>.15</td>
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<td></td>
<td>Binge eating</td>
<td>23.08</td>
<td>&lt;.01</td>
<td>.12</td>
<td>.73</td>
</tr>
<tr>
<td></td>
<td>Purging</td>
<td>16.71</td>
<td>&lt;.01</td>
<td>2.51</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>Excessive exercise</td>
<td>.53</td>
<td>.47</td>
<td>1.53</td>
<td>.22</td>
</tr>
<tr>
<td></td>
<td>Overvaluation</td>
<td>53.69</td>
<td>&lt;.01</td>
<td>3.45</td>
<td>.06</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>Dietary restriction</td>
<td>23.40</td>
<td>&lt;.01</td>
<td>3.23</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>Binge eating</td>
<td>22.24</td>
<td>&lt;.01</td>
<td>.30</td>
<td>.59</td>
</tr>
<tr>
<td></td>
<td>Purging</td>
<td>24.33</td>
<td>&lt;.01</td>
<td>1.58</td>
<td>.21</td>
</tr>
<tr>
<td></td>
<td>Excessive exercise</td>
<td>.46</td>
<td>.50</td>
<td>3.25</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>Overvaluation</td>
<td>64.75</td>
<td>&lt;.01</td>
<td>.09</td>
<td>.77</td>
</tr>
</tbody>
</table>

1 Main effects of sex are not shown (see table 2)

Results of the ANCOVAs examining sex differences in the associations between EDF and psychosocial functioning are summarized in Table 5. Significant main effects of dietary restriction, binge eating, purging and overvaluation were observed for each measure of psychosocial functioning, such that individuals who reported these features...
reported greater psychological distress, poorer social support, and poorer life satisfaction, than those who did not (all \( p < .01 \)). There was one significant interaction effect, namely, the interaction between sex and extreme dietary restriction for general psychological distress (\( F_{(3,2540)} = 11.61, p < .01 \)). Tests of simple main effects indicated that dietary restriction was associated with higher levels of distress in women (\( t_{(41)} = 6.61, p < .001 \)) than in men (\( t_{(18)} = 2.13, p < .05 \)).

**Discussion**

**Summary of Main Findings**

This study examined sex differences in psychosocial impairment associated with EDF in a population-based sample of Australian women and men. The features assessed were extreme dietary restriction, binge eating, purging, excessive exercise and weight/shape overvaluation. It was hypothesized, first, that EDF would be associated with significant impairment in psychosocial functioning in both men and women; and second, that EDF would be associated with comparable levels of impairment in men and women, with the possible exception of greater impairment associated with weight/shape overvaluation in women. The findings were largely consistent with these hypotheses. Binge eating, purging and overvaluation were associated with significant, and comparable levels of, impairment for men and women, and this was the case for each of the three measures of psychosocial functioning employed. Extreme dietary restriction was associated with greater psychosocial impairment in women than in men, whereas excessive exercise was not associated with psychosocial impairment in either women or men. EDF tended to be more common in women than in men, as would be expected, although the prevalence of extreme dietary restriction and excessive exercise did not differ by sex.
Study Implications

The current findings replicate and extend findings from other recent, population-based studies in demonstrating, first, that EDF are associated with psychosocial impairment in both men and women; second, that the extent of this impairment is similar in men and women; and third, that these findings are observed for several different measures of psychosocial functioning. Although findings from previous studies similarly suggested that sex differences in psychosocial impairment associated with EDF may be minimal (Mitchison et al., 2013; Mond & Hay, 2007; Striegel et al., 2012), the small number of specific EDF assessed and/or measures of impairment included in these studies limited the impact of the findings.

The primary implication of the findings from the current study, when taken with those of other recent studies, is that it is no longer appropriate to assume that EDF are primarily a problem of women. Hence, eating disorder prevention programs that have been developed based on this premise may need to be reconsidered (Mond et al., 2014; Stice et al., 2013; Wilfley et al., 2013). Key issues that will likely need to be considered include whether it is appropriate to continue eating disorder prevention programs that are confined to adolescent and young adult women deemed to be at high risk or with early symptoms; whether and how these programs might be modified to include males; the relative priority given to prevention and early intervention efforts; and the need to integrate eating disorder prevention and early intervention programs that include both men and women with obesity prevention and general mental health promotion initiatives (Mond et al., 2014; Van Zutven et al., 2015).

Given that both the prevalence of and impairment in psychosocial functioning associated with EDF are increasing in men, and given that psychosocial impairment is one of the best predictors of whether individuals with eating disorder symptoms seek professional treatment (Mond et al., 2009), an additional implication of the current
findings is that primary care and specialist treatment providers may expect to see more men with EDF in their practices in the future. Hence, there may be an increase not only in the individual health burden of EDF in men, but also in the demand for treatment services and costs associated with this and consequent public health burden. An increase of this kind will most likely manifest itself in relation to the diagnosis of binge eating disorder, which is relatively common in men and which has recently been included as a formal diagnosis in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013). On the other hand, increased demand for treatment may be counterbalanced, to some extent, by the fact that men with eating disorder symptoms are less likely to seek treatment for those symptoms (Hart, Granillo, Jorm & Paxton, 2011; Mond et al., 2014).

Three findings of the current study warrant additional comment. First, in contrast to findings from previous studies (Mitchison et al., 2013; Mond & Hay, 2007), weight/shape overvaluation was not associated with greater psychosocial impairment in women than in men in the current study. It is possible that men are becoming increasingly preoccupied with their weight and/or shape, perhaps due in part to the influence of obesity-related health promotion messages (Mond et al., 2014). Alternatively, or in addition, self-report assessment of overvaluation, as employed in the current study, may be less accurate than interview assessment, as employed in the studies of Mitchison et al. (2013) and Mond & Hay (2007).

Second, and in contrast to all other EDF, extreme dietary restriction was associated with significantly greater distress in women than in men. Again we can only speculate as to the source of this finding. It is possible that caloric restriction is more closely linked to negative affect in women than in men, perhaps through some neurochemical substrate (e.g., Redman & Ravussin, 2011; Vitousek, Manke, Gray, & Vitousek, 2004). It is also possible that the EDE-Q item assessing extreme dietary
restriction is interpreted differently by women and men or otherwise more or less valid in one sex than the other (Stice, Fisher, & Lowe, 2004). Stronger associations between extreme dietary restriction and other EDF may also be a factor, although in the current study correlations between dietary restriction and other EDF were similar in women and men or, in some instances, marginally higher in men.

Finally, it is notable that excessive exercise was not associated with psychosocial impairment in either women or men on any of the outcome measures. This finding, which has been observed in previous studies of young adult women (e.g., Mond et al., 2006b), likely reflects ego-syntonic aspects of exercise behavior and/or the failure of current assessment instruments, including the EDE-Q, to capture those aspects of exercise behavior most likely to be associated with eating disorder and comorbid psychopathology (Mond et al., 2006b). As with “extreme dietary restriction”, there is currently no agreed-upon, operational definition of “excessive exercise” in the eating disorders literature (Mond et al., 2014).

**Study Strengths and Limitations**

Strengths of the current study included the use of a large, population-based sample of men and women, the assessment of a broad range of EDF and the inclusion of three different, established measures of psychosocial impairment. Limitations of the current study include the self-report assessment of EDF and the cross-sectional study design, the latter precluding any inferences concerning the direction of the observed associations and possible change in the impact of different EDF on psychosocial functioning over time. The low participation rate might also be considered a limitation, although we were able to demonstrate the representativeness of the sample in terms of socio-demographic characteristics and EDF. It should also be noted that the current findings apply only to adults with EDF. Replication of these findings in a younger, e.g., adolescent, population would be welcome, as would research in more ethnically diverse
and/or non-Western populations. Finally, power to detect interaction effects involving the more uncommon EDF, namely, purging and extreme dietary restriction, was likely limited by the relatively small number of participants – male participants in particular – reporting these features.

**Conclusion**

The findings suggest that there may be little or no difference between men and women in the degree of psychosocial impairment associated with EDF. When taken with recent findings showing increases in the prevalence of EDF in males, the current findings suggest that it is no longer appropriate to base the development of preventive interventions on the premise that EDF are primarily a problem of women. Health professionals may be more likely to see males with EDF in their practices in the future.
References


Chapter Six

Study Two: Adolescent Sex Differences in Psychosocial Impairment Associated with Eating Disorder Features: A School-Based Study
Background to Study Two

Findings from study one supported the hypothesis that men and women experience comparable levels of psychosocial impairment associated with EDF. Given that EDF typically have their onset in adolescence (Hudson et al., 2007), and given that the occurrence of EDF early in life may be associated with increased risk of EDF and other adverse health outcomes later in life (Johnson et al., 2002), research addressing psychosocial impairment associated with EDF among adolescents would be of interest. A review of the literature indicated that few studies of this kind had been conducted and that research bearing on sex differences in psychosocial impairment associated with EDF in adolescents was particularly limited. The aim of study two was, therefore, to examine sex differences in psychosocial impairment associated with EDF in adolescents. In view of the paucity of existing evidence, the only hypotheses were, first, that the occurrence of EDF would be associated with impairment in both boys and girls; and second, that the occurrence of overvaluation of weight/shape would be associated with greater impairment in girls than in boys. Evidence bearing on the latter hypothesis would be of particular interest, given that men and women were found to experience comparable levels of impairment associated with EDF in study one and given that the current study was the first to examine sex differences in psychosocial impairment associated with the overvaluation of weight/shape in young people.
Abstract

Objective: To examine sex differences in psychosocial impairment associated with eating disorder features (EDF) in adolescents. Method: Questionnaires that assessed EDF (extreme dietary restriction, objective binge eating, subjective binge eating, purging, excessive exercise and weight/shape overvaluation) and psychosocial impairment (general psychological distress and quality of life) were completed by a school-based sample of adolescent males (n = 531) and females (n = 1,135) in the Australian Capital Territory region of Australia. Results: Each of the EDF assessed was associated with significant impairment in both male and female participants and this was the case for measures of both general psychological distress and quality of life, the only exception being that subjective binge eating was associated with elevated levels of distress in girls but not boys. The occurrence of subjective binge eating was associated with greater impairment in quality of life in girls than in boys. Otherwise, the effects of EDF on psychosocial functioning did not differ by sex. The prevalence of most EDF was higher in girls than in boys, although EDF were not uncommon in boys. Discussion: There appear to be few differences between male and female adolescents in terms of psychosocial impairment associated with EDF. The findings support the need for preventive interventions that seek to reduce the adverse impact of EDF in both boys and girls. The logistic and policy challenges inherent in such efforts warrant greater consideration. Further research is needed to elucidate the help-seeking behavior of young men with EDF who experience psychosocial impairment.
Evidence from recent epidemiological studies indicates that the prevalence of eating disorder features (EDF), namely, binge eating, extreme weight-control behaviors, and key cognitive features, such as the overvaluation of body weight/shape, may be increasing in both men and women (Hay, Mond, Darby & Buttner, 2008). Some behaviors, such as binge eating, may now be as common, or nearly as common, in men as in women (Hay et al., 2008; Mond, Mitchison & Hay, 2013; Striegel, Berosian, Wang & Schwartz, 2012). Other behaviors, such as extreme dietary restriction, likely remain more common in women than men, though the gap may be narrowing (Hay et al., 2008; Mond et al., 2013; Striegel et al., 2012). Findings from recent studies also suggest that men, like women, may experience significant impairment in psychosocial functioning associated with EDF (Mitchison, Mond, Slewa-Younan & Hay, 2013; Mond & Hay, 2007; Striegel et al., 2012). These findings, when taken with evidence for increases in prevalence, may have implications for preventive interventions (Mond et al., 2013). For example, greater consideration may need to be given to EDF in males when developing preventive interventions. There may also be implications for clinical practice, such as greater demand for treatment services by males (Mond et al., 2009, Mond et al., 2013).

Currently, evidence concerning sex differences in psychosocial impairment associated with EDF is largely confined to adults. This is despite the fact that EDF typically have their onset in adolescence (Hudson, Hiripi, Pope & Kessler, 2007) and the occurrence of EDF early in life is associated with increased risk of adverse health outcomes later in life (Johnson, Cohen, Kasen & Brook, 2002). In those few epidemiological studies of young people that have included measures of both EDF and impairment, attention has typically focused on the constellations of symptoms required for eating disorder diagnoses (Allen, Byrne, Oddy & Crosby, 2013; Stice, Marti & Rohde, 2013) or on a single behavior, such as binge eating (Sonneville et al., 2013).
Although data bearing on the prevalence and correlates of eating disorder diagnoses are of interest, their utility may be limited by the inherent limitations of classification schemes (Mond & Hay, 2007). Further, no study has examined sex differences in psychosocial impairment associated with the overvaluation of weight/shape in young people. Research in adults suggests that overvaluation may not have the same significance, in terms of its association with distress and disability, in men as in women (Mitchison et al., 2013; Mond & Hay, 2007). Available evidence does suggest that EDF remain more common in young women than in young men, with the possible exception of excessive exercise (Mond et al., 2014; Stephen, Rose, Kenney, Rosselli-Navarra & Weissman, 2014).

A separate literature in adolescents has focused on associations between body dissatisfaction and impairment in emotional wellbeing, such as low self-esteem and depressive symptoms, and the role of body dissatisfaction in mediating the association between obesity and these outcomes (Mond, van den Berg, Boutelle, Hannan & Neumark-Sztainer, 2011; Neumark-Sztainer, Paxton, Hannan, Haines & Story, 2006). This research, while of interest, may be of limited benefit in informing the nature and extent of impairment in psychosocial functioning associated with EDF, for several reasons. First, body dissatisfaction, even when extreme, is not always associated with EDF (Mond et al., 2013; Vogt Yuan, 2010). Second, impairment in psychosocial functioning, which incorporates both distress and disability, is a broader construct than impairment in emotional wellbeing and more relevant from a public health perspective (Mond et al., 2013). Finally, only females have been included in many studies of the associations between body dissatisfaction, body weight, and impairment in emotional wellbeing (Stice & Bearman, 2001; Stice, Marti & Rohde, 2013).

With these considerations in mind, the goal of the present study was to examine sex differences in psychosocial impairment associated with EDF in a school-based
sample of adolescents. In light of the paucity of existing evidence, the only hypotheses were: (i) the occurrence of EDF would be associated with impairment in both boys and girls; and (ii) the occurrence of overvaluation of weight/shape would be associated with greater impairment in girls than in boys. Evidence bearing on possible sex differences in impairment associated with other EDF did not permit specific hypotheses in this regard, hence analyses involving these features were exploratory.

Method

Study Design and Recruitment of Participants

Participants were recruited as part of the ACT Schools Mental Health Literacy Survey, a cross-sectional study of EDF among male and female secondary school students attending schools in the Australian Capital Territory (ACT) region of Australia, which includes the (national capital) city of Canberra (ABS, 2011; Mond et al., 2014).

The recruitment procedures have been detailed previously (Mond et al., 2014). In brief, participants were recruited from 12 ACT schools, which varied in terms of type (Government, Independent and Catholic), location and numbers of students at the school. The study was presented as an opportunity for schools to promote “mental health literacy” and no remuneration was provided. Both students and their parents were informed, in advance, as to the study aims and methods and their right to decline participation. An “opt-out” consent process was employed for parents whereas an “opt-in” process was employed for students. That is, parental consent was assumed unless parents indicated that they did not wish for their child to participate whereas students were required to confirm in writing their willingness to participate. The study design and methods were approved by the Australian National University Human Research Ethics Committee, the ACT Department of Education and Training and the Catholic Education Office.
All students in classes selected for participation who attended class on the day assigned for data collection were invited to complete a printed, self-report questionnaire, in their classrooms, under the supervision of a teacher and one or more members of the research team. The questionnaire included measures of eating disorder symptoms, general psychological distress, quality of life and basic demographic information. Body mass index (BMI: kg/m²) was calculated from self-reported height and weight. Classification of weight status was based on the age- and sex-specific BMI percentile cut-points recommended by the US Centers for Disease Control and Prevention (Kuczmarski et al., 2002).

Completed questionnaires were received from 1,749 students, a participation rate of 78.7%. Data for nine participants who were younger than 12 years of age or older than 18 years of age and for a further 70 participants (4.0%) who were found to have unacceptably high levels of missing or corrupt data were excluded. The final sample therefore comprised 1,670 students aged 12-18 years. Of these, 1,135 (68.0%) were female, 531 were male and four did not indicate their gender. The vast majority of participants were born in Australia (88.3%) and had English as a first language (90.4%), reflecting the demographic profile of the ACT region (ABS, 2011). The mean (SD) ages of male and female participants were, respectively, 14.85 (1.70) years and 15.51 (1.63) years. The proportions of male participants who were underweight, normal-weight, overweight, and obese, were, respectively, 7.3%, 76.7%, 10.7%, and 5.2%. For female participants, these proportions were 7.7%, 81.5%, 8.1%, and 2.8%, respectively. The sample comprised 3.6% of all male secondary school students in the ACT in 2012 and 7.8% of all female secondary school students (ETD, 2012).
Study Measures

Eating Disorder Examination Questionnaire (EDE-Q)

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994, 2008) is a 36-item self-report measure that assesses the occurrence and frequency of key components of eating disorder pathology during the past 28 days. A global score, indicating overall levels of eating disorder pathology, and scores on four subscales (Restraint, Eating Concerns, Weight Concerns and Shape Concerns) may be derived from 22 items assessing core attitudinal features. Scores on these items (and subscale and global scores) range from “0” to “6”, with higher scores indicating higher symptom levels. As in previous studies (Carter, Stewart & Fairburn, 2001; Mond, Marks et al., 2007), minor changes to the wording of some questions were made in order to ensure the suitability of the instrument for an adolescent population. Cronbach’s alphas for the global score in the present study sample were 0.94 and 0.97 for male and female participants, respectively.

Remaining items of the EDE-Q assess the occurrence and frequency of key eating disorder behaviors, namely, objective binge eating and the use of purging (i.e., self-induced vomiting and/or laxative misuse) and excessive exercise as means of controlling weight or shape. For the present study, an additional item was included to assess the occurrence and frequency of subjective binge eating episodes; that is, episodes of perceived overeating in which a loss of control is experienced but the amount of food consumed is not unusually large (Matheson et al., 2012; Mond et al., 2014). Also as in previous studies, (Mond et al., 2006, Mond et al., 2014) the use of extreme dietary restriction to control weight/shape was assessed using an item of the Restraint subscale (“going without food”) that assesses this construct.

For objective binge eating, subjective binge eating and purging, “regular occurrence” was defined as at least weekly (APA, 2013). In the absence of any agreed-
upon operational definitions of non-purging weight-control behaviors, regular extreme dietary restriction was defined, using the aforementioned item of the EDE-Q Restraint subscale, as “going for long periods of time (for example, 8 hours or more in the daytime) without eating anything at all to control your weight/shape” on average at least three times per week; whereas regular excessive exercise was defined as “exercising really hard or in a driven or compulsive way as a means of controlling your weight/shape” on average at least five times per week (Mond et al., 2014; Reas, Øverås & Rø, 2012). Overvaluation of weight/shape was defined as a score of ≥ 5 on either (or both) of the EDE-Q (Weight/Shape Concerns subscale) items (Importance of Weight, Importance of Shape) assessing this construct (Grilo, Masheb & White, 2010; Mond, Hay, Rodgers & Owen, 2007). In the current study, as in previous studies, scores on these items were highly correlated ($r = .87$) (Mond et al., 2013). The occurrence of each EDF assessed was coded as present or absent, based on the aforementioned criteria.

Assessment of Psychosocial Functioning

Psychosocial functioning was assessed using measures of general psychological distress and quality of life as detailed below.

Kessler Psychological Distress Scale (K-10)

The K-10 (Kessler et al., 2002, 2003) is a 10-item measure of general psychological distress developed for use as a screening instrument of mental disorders in epidemiological studies and is widely used for this purpose. Participants are required to indicate the frequency of occurrence of each of 10 symptoms of anxiety or depression during the past four weeks, for example: “How often have you felt so sad that nothing could cheer you up?”, and “How often did you feel so nervous that nothing could calm you down?”. Responses are scored on a 5-point, Likert-type scale ranging from “none of the time” (“1”) to “all of the time” (“5”). Total scores therefore range from 10 to 50, with higher scores indicating higher levels of distress. The K-10 has sound
psychometric properties, including high internal consistency and demonstrated validity in predicting clinically significant levels of distress in general population samples (Kessler et al., 2002, 2003). Cronbach’s alphas for male and female participants in the present study sample were, respectively, 0.87 and 0.91.

**Pediatric Quality of Life Inventory™ 4.0 – Short Form (PedsQL™ 4.0 SF15)**

The PedsQL™ 4.0 SF15 is a 15-item, self-report, generic measure of quality of life developed by Varni and colleagues specifically for use in pediatric populations (Chan, Mangione-Smith, Burwinkle, Rosen & Varni, 2005; Varni, Seid & Kurtin, 2001). Participants are asked how true each of a series of 15 statements were for them during the past four weeks, with items designed to address individuals’ perceived functioning in each of four domains: Emotional Wellbeing (4 items); Social Functioning (3 items); Academic Functioning (3 items); and Physical Health (5 items). Examples of items from each domain are: “I feel sad or blue” (emotional); “I have trouble getting along with other teenagers” (social); “I find it hard to pay attention in class” (academic); and “It is hard for me to walk more than one block” (physical). Responses are scored on a 5-point, Likert-type scale ranging from “never” (“0”) to “almost always” (“4”). Scores are then reversed and standardized to range from 0 to 100, with higher scores indicating higher quality of life. In the present study, the Psychosocial Health Summary score, which is the average of scores on the Emotional Wellbeing, Social Functioning and Academic Functioning domains, was employed as a measure of overall psychosocial functioning. The PedsQL™ 4.0 SF15 has been found to be a reliable and valid measure of quality of life in young people (Chan et al., 2005; Varni et al., 2001). Cronbach’s alphas in the present study were 0.83 and 0.88 for male and female participants, respectively.
Statistical Analysis

Sex differences in the occurrence of specific EDF (dietary restriction, objective binge eating, subjective binge eating, purging, excessive exercise and overvaluation) were examined using Chi-square tests, whereas sex differences on the EDE-Q subscales and measures of psychosocial functioning (K-10, PedsQL) were examined by means of independent samples t-tests. Correlations between study measures, by sex, were calculated using the Pearson correlation coefficient. In order to test for sex differences in the “effects” of specific EDF on psychosocial functioning, a series of 2 (male, female) x 2 (feature absent, feature present) factorial analyses of covariance (ANCOVAs) was conducted for each of the six EDF and for each measure of psychosocial functioning (i.e., twelve ANCOVAs in total). Sex differences in the effects of specific EDF on psychosocial functioning would then be indicated by significant interaction terms. Tests of simple main effects were employed to clarify the source of any such effects. Demographic variables (other than sex), including BMI, were included as covariates in multivariable analyses. A significance level of .05 was adopted for all tests. No adjustment was made for Type-I error since concerns in this regard needed to be weighed against concerns about Type-II error, relating to the relatively small number of males reporting certain EDF. All analysis was conducted using SPSS version 22.0.

Results

Mean (SD) EDE-Q global scores and scores on measures of psychosocial functioning, by sex, are shown in Table 1. It can be seen that females reported significantly higher levels of eating disorder pathology and significantly poorer psychosocial functioning than males (all \( p < .01 \)).

The prevalence of EDF by sex is presented in Table 2 (due to the low prevalence of purging in males, “any”, rather than “regular”, occurrence was considered for these behaviors). It can be seen that the prevalence of extreme dietary restriction, objective
and subjective binge eating, purging and weight/shape overvaluation, was significantly higher in females than in males \( (p < .01) \), whereas the prevalence of excessive exercise did not differ by sex \( (p = 1.00) \).

Table 1. Mean (SD) Scores on Measures of Eating Disorder Psychopathology (EDE-Q Global Score) and Psychosocial Impairment (K-10, PedsQL) by Sex

<table>
<thead>
<tr>
<th></th>
<th>Females ( (n = 1135) )</th>
<th>Males ( (n = 531) )</th>
<th>Total Sample ( (N = 1670) )</th>
<th>( t )</th>
<th>( \eta^2 )</th>
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<tbody>
<tr>
<td>EDE-Q Global Score(^i)</td>
<td>1.84 (1.54)</td>
<td>0.61 (0.86)</td>
<td>1.44 (1.48)</td>
<td>20.75**</td>
<td>.21</td>
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<tr>
<td>K-10(^ii)</td>
<td>22.67 (8.46)</td>
<td>18.52 (6.69)</td>
<td>21.34 (8.24)</td>
<td>10.77**</td>
<td>.07</td>
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<tr>
<td>PedsQL(^iii)</td>
<td>65.18 (18.77)</td>
<td>74.23 (15.69)</td>
<td>68.10 (18.34)</td>
<td>-10.28**</td>
<td>.06</td>
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</table>

\(^i\) Eating Disorder Examination Questionnaire global score.
\(^ii\) Kessler (10-item) Psychological Distress Scale.
\(^iii\) Pediatric Quality of Life Inventory Psychosocial Health Summary score.

*\( p < .05; **p < .01 \)

Table 2. Prevalence of Eating Disorder Features by Sex

<table>
<thead>
<tr>
<th></th>
<th>Females ( (n = 1135) )</th>
<th>Males ( (n = 531) )</th>
<th>Total ( (N = 1670) )</th>
<th>( \chi^2 )</th>
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<tbody>
<tr>
<td>Extreme dietary restriction(^i)</td>
<td>131 11.6</td>
<td>12 2.3</td>
<td>8.6 8.6</td>
<td>38.60**</td>
<td>-.16</td>
</tr>
<tr>
<td>Objective binge eating(^ii)</td>
<td>188 16.6</td>
<td>32 6.0</td>
<td>13.2 13.2</td>
<td>34.13**</td>
<td>-.15</td>
</tr>
<tr>
<td>Subjective binge eating(^ii)</td>
<td>141 12.4</td>
<td>18 3.4</td>
<td>9.5 9.5</td>
<td>33.15**</td>
<td>-.14</td>
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<tr>
<td>Purging(^iii)</td>
<td>85 7.5</td>
<td>10 1.9</td>
<td>5.7 5.7</td>
<td>20.11**</td>
<td>-.11</td>
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<tr>
<td>Excessive exercise(^iv)</td>
<td>61 5.4</td>
<td>28 5.3</td>
<td>5.3 5.3</td>
<td>0.00</td>
<td>.00</td>
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<tr>
<td>Overvaluation of weight/shape(^v)</td>
<td>274 24.2</td>
<td>26 4.9</td>
<td>18.0 18.0</td>
<td>89.58**</td>
<td>-.23</td>
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</table>

\(^i\) “Going for long periods of time (for example, 8 hours or more in the daytime) without eating anything at all to control your weight/shape” on average at least three times per week during the past four weeks.
\(^ii\) Occurrence of this behavior, on average, at least once per week during the past four weeks.
\(^iii\) Any occurrence of this behavior during the past four weeks.
\(^iv\) “Exercising really hard or in a driven or compulsive way as a means of controlling your weight/shape” on average at least five times per week during the past four weeks.
\(^v\) A score of 5 or 6 on one or both of the Weight Concerns and Shape Concerns subscales.
Correlations between the occurrence of EDF and measures of psychosocial functioning are shown in Table 3. Small to moderate positive correlations were observed between the occurrence of different EDF in both male and female participants (ranging from .05 to .40), whereas strong negative correlations were observed between the two different measures of psychosocial functioning (males: $r = -.72$; females: $r = -.79$). That is, higher levels of general psychological distress were associated with poorer quality of life (greater psychosocial impairment) and vice versa. Small to moderate correlations were observed between the occurrence of EDF and impairment in psychosocial functioning; this was the case for both measures and for both male and female participants. As would be expected, correlations between EDF and general psychological distress (0.10 to 0.43) were positive, indicating that individuals reporting EDF tended to have higher levels of distress, whereas correlations between EDF and quality of life (-.07 to -.38) were negative, indicating that individuals reporting EDF tended to have poorer quality of life.

**Table 3. Correlations Between Study Variables by Sex (data for males is shaded)**

<table>
<thead>
<tr>
<th></th>
<th>DR</th>
<th>OBE</th>
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<tr>
<td>Dietary restriction</td>
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<td>Objective binge eating (OBE)</td>
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<tr>
<td>Subjective binge eating (SBE)</td>
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<td>Purging (P)</td>
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<td>Excessive exercise (EE)</td>
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<td>Overvaluation (O)</td>
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<td>Psychological distress (PD)</td>
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<td>Quality of life (QL)</td>
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<td>-.31**</td>
<td>-.28**</td>
<td>-.29**</td>
<td>-.28**</td>
<td>-.10**</td>
<td>-.38**</td>
<td>-.79**</td>
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*p < .05; **p < .01
Results of the ANCOVAs are summarized in Table 4. As can be seen, significant main effects of dietary restriction, objective and subjective binge eating, purging, excessive exercise and weight/shape overvaluation were observed for both measures of psychosocial functioning. Individuals who reported these EDF had higher levels of distress and poorer quality of life than those who did not (all \( p < .01 \)). Significant interactions between sex and EDF were observed in two cases, namely, those involving the effects of subjective binge eating on levels of distress (\( F_{(3,1458)} = 5.79, \ p < .05 \)) and quality of life (\( F_{(3,1458)} = 5.23, \ p < .05 \)). Tests of simple main effects indicated that the presence of subjective binge eating was associated with elevated levels of distress in females (\( t_{(155)} = -11.74, \ p < .05 \)) but not in males (\( t_{(11)} = -2.11, \ p = 0.59 \)) and with greater impairment in quality of life in females (\( t_{(1131)} = 11.07, \ p < .01 \)) than in males (\( t_{(528)} = 2.07, \ p < .05 \)).

**Table 4.** Sex Differences in Psychosocial Impairment Associated with Eating Disorder Features: Results of Analyses of Covariance for Each Measure of Psychosocial Impairment and Each Feature

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Feature</th>
<th>( F )</th>
<th>( \text{Partial } \eta^2 )</th>
<th>Interaction</th>
<th>( F )</th>
<th>( \text{Partial } \eta^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological distress</td>
<td>Dietary restriction</td>
<td>37.82**</td>
<td>.03</td>
<td>0.55</td>
<td>.03</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Objective binge eating</td>
<td>38.91**</td>
<td>.03</td>
<td>1.32</td>
<td>.03</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Subjective binge eating</td>
<td>29.23**</td>
<td>.02</td>
<td>5.79*</td>
<td>( &lt;.01 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purging</td>
<td>62.85**</td>
<td>.05</td>
<td>3.16</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Excessive exercise</td>
<td>19.30**</td>
<td>.01</td>
<td>0.40</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Overvaluation</td>
<td>66.14**</td>
<td>.04</td>
<td>1.26</td>
<td>.04</td>
<td>.01</td>
</tr>
<tr>
<td>Quality of life</td>
<td>Dietary restriction</td>
<td>20.15**</td>
<td>.01</td>
<td>0.98</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Objective binge eating</td>
<td>44.86**</td>
<td>.03</td>
<td>0.01</td>
<td>.03</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Subjective binge eating</td>
<td>23.50**</td>
<td>.02</td>
<td>5.23*</td>
<td>( &lt;.01 )</td>
<td></td>
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<tr>
<td></td>
<td>Purging</td>
<td>18.99**</td>
<td>.02</td>
<td>0.22</td>
<td>.02</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Excessive exercise</td>
<td>9.63**</td>
<td>.01</td>
<td>1.13</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>Overvaluation</td>
<td>49.29**</td>
<td>.03</td>
<td>0.61</td>
<td>.03</td>
<td>.01</td>
</tr>
</tbody>
</table>

*\( p < .05 \); **\( p < .01 \)
1 Main effects of sex are not shown (see table 2)
Discussion

Summary of Main Findings

We examined sex differences in psychosocial impairment associated with EDF in a school-based sample of adolescents. EDF assessed were extreme dietary restriction, objective binge eating, subjective binge eating, purging, excessive exercise and weight/shape overvaluation. Each of these features was associated with significant impairment in both male and female participants and this was the case for measures of both general psychological distress and quality of life, the only exception being that subjective binge eating was associated with elevated levels of distress in girls but not boys. The occurrence of subjective binge eating was associated with greater impairment in quality of life in girls than in boys. Otherwise, the effects of EDF on psychosocial functioning did not differ by sex. The prevalence of most EDF was higher in girls than in boys, although EDF were not uncommon in boys.

Study Implications

In recent years, there has been increasing awareness that eating disorder features can no longer be regarded as a “female problem” (Cohn, 2012). The public health implications of this have, however, rarely been considered (Mond et al., 2013). If, as the current findings suggest, EDF are associated with similar levels of impairment in boys as in girls, and if, as research in adults suggests, the prevalence of EDF is increasing in both males and females, then preventive interventions for eating disorders may need to be reevaluated (Mond et al., 2013). Despite renewed interest in school-based interventions that include both boys and girls (Wilsch, 2014), the fact remains that most eating disorder prevention programs have been designed for, and trialed in, the “high-risk” populations of adolescent and young adult women (Stice, Becker & Yokum, 2013). The current findings support the need for interventions that seek to reduce the adverse impact of EDF in both boys and girls. Issues that will need to be addressed in
this context include: whether and how to include males in programs for at-risk individuals, i.e., given sex differences in the presentation of certain EDF and sensitivities surrounding these issues; the relative priority given to universal, selective and targeted prevention initiatives; and the need to integrate eating disorder prevention programs with obesity prevention and mental health promotion programs in ways that are relevant and appropriate for both males and females (Darcy, 2011; Mond et al., 2013). Improving community mental health literacy relating to prevalence and correlates of eating disorder features in males would be a good start (Mond, 2014).

Also when considering the implications of the current findings for health promotion and prevention programs, it needs to be remembered that in the current study, as in other recent, population-based studies (Stephen et al., 2014), EDF were substantially more common in females than in males. Although this likely reflects, in part, the “female-centric” nature of classification schemes for eating disorders and of the assessment instruments developed with these schemes in mind (Mond et al., 2014; Mond et al., 2013), there is no doubt that the prevalence of EDF remains substantially higher in young women than in young men. This poses both practical challenges, such as the recruitment of adequate numbers of male participants for prevention trials, and policy challenges, such as the relative priority given to universal versus selective and indicated prevention programs. An open exchange of ideas surrounding these challenges would be welcome moving forward. While there has been considerable discussion of the need to integrate eating disorders and obesity prevention (Neumark-Sztainer, 2012), and some discussion of the need to integrate health promotion, prevention, early intervention and treatment approaches to reducing the health burden of EDF in young women (Wilfley, Agras & Taylor, 2013), little consideration has been given to the logistic and policy challenges posed by increases in the prevalence and/or adverse impact of EDF in young men (Mond et al., 2013).
A second implication of the current findings is that research is needed to elucidate the help-seeking behavior of young men with EDF and the potential implications of this for treatment demand (Hart, Granillo, Jorm & Paxton, 2011; Mond et al., 2013). In young women with eating disorder symptoms, impairment in psychosocial functioning has been found to be strongly predictive of help-seeking behavior, both whether treatment is sought for an eating or other mental health problem and, if so, the type of treatment sought (Mond et al., 2009). Although it is often assumed that males with eating problems are less likely to seek professional treatment than their female counterparts, there is little in the way of empirical evidence to support this hypothesis (Hart et al., 2011; Mond et al., 2013; Raisanen & Hunt, 2014). However, evidence does suggest that the number of males with eating disorders presenting to specialist treatment services is increasing (Jones & Morgan, 2010). If psychosocial impairment is similarly predictive of help-seeking among young men with EDF, then health professionals might expect to see increasing numbers of these young men presenting for treatment. Given the very substantial health burden of EDF in young women (Mitchison et al., 2013; Mond et al., 2006), the prospect of this additional burden is concerning.

Two findings from the present study warrant additional comment. First, in contrast to the other EDF assessed, the presence of subjective binge eating was associated with higher levels of impairment in girls than in boys. This finding should be interpreted with caution, given that the assessment of subjective binge eating has been found to be unreliable (Latner, Mond, Kelly, Haynes & Hay, 2014; Mond, Hay, Rodgers, Owen & Beumont, 2004). Further, it is possible that males and females interpreted the item assessing subjective binge eating differently, in which case reliability may have differed by sex. It also is possible that males are less likely than females to experience or identify impairment associated with loss-of-control eating.
when the amount of food consumed is not large (Lewinsohn, Seeley, Moerk & Striegel-Moore, 2002). The development of new measures of loss-of-control eating may facilitate research addressing these issues (Latner et al., 2014).

Second, in contrast to findings from recent studies of adults (Mitchison et al., 2013; Mond & Hay, 2007), weight/shape overvaluation was not associated with greater psychosocial impairment in females than in males in the present study. One possible interpretation of this finding is that young men are becoming increasingly preoccupied with their weight and/or shape – perhaps due in part to increasingly unrealistic media portrayals of the ideal masculine body type and/or the influence of obesity-related health promotion messages – and this preoccupation is having an increasingly deleterious effect on males’ psychosocial functioning (Darcy, 2011; Mitchison et al., 2013; Mond et al., 2013).

**Study Strengths and Limitations**

Limitations of the present study should be noted. First, the occurrence of specific EDF was assessed by self-report, rather than interview. Limitations of self-report assessment of certain EDF, such as binge eating, are well known (Berg, Peterson, Frazier & Crow, 2012; Mond et al., 2004). Further, the validity of self-report assessment of certain features may differ by sex (Berg et al., 2012; Mond et al., 2014). Second, while excessive exercise was assessed as a means of controlling body weight/shape, drive for muscularity – which is more common in young men than in young women (Mond et al., 2013, 2014) – was not specifically assessed. Therefore, the prevalence and/or adverse effects of excessive exercise on boys’ functioning may have been underestimated in the current study. Third, the cross-sectional design of the study precludes any inferences regarding the direction of the observed associations or change in the impact of EDF on psychosocial functioning over time. Finally, the power to detect interaction effects involving the more uncommon EDF, namely, purging
behaviors and extreme dietary restriction, will have been limited by the relatively small number of participants – particularly males – reporting these behaviors. Strengths of the present study include the recruitment of a large, population-based sample of male and female adolescents, the assessment of a broad range of EDF and the use of two established measures of psychosocial impairment. To our knowledge this is the first study to systematically examine sex differences in psychosocial impairment associated with EDF in an adolescent population.

Conclusion

The current findings replicate and extend those of recent epidemiological studies in adult populations by demonstrating that EDF are associated with comparable impairment in psychosocial functioning in male and female adolescents. The findings support the need for preventive interventions that seek to reduce the adverse impact of EDF in both boys and girls. The logistic and policy challenges inherent in such efforts warrant greater consideration. Further research is needed to elucidate the help-seeking behavior of young men with EDF who experience psychosocial impairment.
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Chapter Seven

Discussion
7.1. Recapitulation of Research Aims and Main Findings

The aim of the current research was to expand a small but growing literature examining sex differences in psychosocial impairment associated with EDF. This was achieved through the use of large, population-based samples of adults and adolescents in which impairment in psychosocial functioning associated with a broad range of EDF was examined using established measures.

The findings were generally consistent with those of recent, population-based studies indicating that the occurrence of EDF is associated with comparable levels of impairment in males and females (Mitchison et al., 2013; Striegel et al., 2012). In adults, the occurrence of objective binge eating, purging, and overvaluation were associated with comparable levels of impairment in psychological wellbeing, life satisfaction and perceived social support in men and women. In adolescents, the occurrence of extreme dietary restriction, objective binge eating, purging, excessive exercise and weight/shape overvaluation were associated with comparable levels of impairment in psychological wellbeing and quality of life in girls and boys. Extreme dietary restriction was associated with greater impairment in women than in men, while subjective binge eating was associated with greater impairment in girls than in boys. Excessive exercise was not associated with psychosocial impairment in either women or men. EDF were generally more common in females than males, although the prevalence of extreme dietary restriction did not differ by sex in adults and the prevalence of excessive exercise did not differ by sex in either adults or adolescents.

When considering the two studies together, three findings are of particular interest. First, no sex differences in psychosocial impairment associated with the overvaluation of weight/shape were observed for either adults or adolescents. This is in contrast to previous research findings, in adults at least (Mitchison et al., 2013; Mond & Hay, 2007). One possible interpretation of this discrepancy is that males are becoming
increasingly preoccupied with their body weight and/or shape – perhaps due in part to increasingly unrealistic media portrayals of the ideal masculine body type and/or the influence of obesity-related health promotion messages – and this preoccupation is having an increasingly deleterious effect on males’ psychosocial functioning (Darcy, 2011; Mitchison et al., 2013; Mond et al., 2013). Many current obesity prevention initiatives have been criticized for their overt focus on weight and the negative consequences of overweight/obesity, rather than focusing on health, positive body image and a balanced lifestyle (Mond et al., 2014). Alternatively, or in addition, the use of self-report assessment of overvaluation employed in the current research, which contrasts with the interview assessment employed in the studies of Mitchison et al. (2013) and Mond & Hay (2007), may have had the effect of attenuating sex differences in impairment associated with this feature. For example, it is possible that self-report assessment of overvaluation is relatively more insensitive or otherwise problematic in females than in males. This interpretation seems unlikely, however, given that items of the (EDE and) EDE-Q, including those assessing overvaluation, are widely viewed as being “female-centric” (Darcy et al., 2012). The current findings do suggest, however, that the use of the EDE-Q to assess overvaluation in males may not be as problematic as has been suggested, in terms of sensitivity to impairment associated with this feature at least. An alternative explanation is that males may be more likely to accurately report overvaluation and associated impairment in self-report rather than interview assessment. The increased anonymity afforded by self-report measures may reduce males’ concerns around stigma, shame, embarrassment, and deviation from stereotypically masculine gender roles.

Second, excessive exercise was associated with similar levels of psychosocial impairment in boys and girls, but was not associated with such impairment in either women or men. Adolescent participation in school-based sports activities is unlikely to
account for these differences, as excessive exercise was defined in both studies as driven or compulsive hard exercise, *as a means of controlling body weight/shape*. Therefore, exercise engaged in primarily for other purposes (e.g., academic achievement, social engagement, or occupational requirement) was not captured. One possible interpretation of the findings, albeit speculative, is that adults more effectively rationalize and normalize their excessive exercise behavior than adolescents, thereby reducing the distress potentially associated with this behavior. Adults may more effectively seek like-minded peers to normalize their behavior, use obesity prevention messages to justify their behavior and/or increasingly focus on the ego-syntonic aspects of their behavior as a cognitive dissonance reduction strategy (Harmon-Jones, Harmon-Jones & Levy, 2015). It also is possible that adults interpreted the item assessing exercise behavior differently from adolescents, by applying a broader definition to “driven, compulsive” exercise for example. Further complicating the interpretation of the current findings relating to excessive exercise is the fact that there is currently no agreed-upon operational definition of this term in either adults or adolescents, let alone any agreement as to the validity of the EDE-Q assessment of this construct or how this behavior might manifest differently in younger versus older individuals (Mond, Hay, Rodgers & Owen, 2006; Mond et al., 2013).

A third notable finding of the current research was that extreme dietary restriction was associated with greater psychosocial impairment in women than men, but comparable impairment among girls and boys. One possible interpretation is that women may experience greater impairment associated with dietary restriction if they are engaging in a greater degree of food shopping and preparation for other household members. These findings, however, should also be interpreted with caution, given that an agreed-upon operational definition of extreme dietary restriction has also proved elusive, and given that the validity of the EDE-Q item assessing this construct may
differ by sex for one reason or another (Mond, 2013; Stice, Fisher & Lowe, 2004). Further, the small number of adolescent males reporting extreme dietary restriction (n = 12) may have detracted from statistical power to detect sex differences in impairment associated with this behavior in the adolescent sample. Each of the abovementioned findings awaits replication in different samples of adults and adolescents.

7.2. **Research Implications**

The primary implication of the current findings is that it is no longer tenable to consider EDF to be primarily a “female problem”. While the prevalence of EDF was generally higher in females than males in the current research, in both adults and adolescents, the prevalence of certain EDF was similar among males and females. The latter finding is consistent with findings from recent epidemiological studies of adults suggesting that sex differences in the prevalence of EDF may be diminishing over time (Hay et al., 2008; Mitchison et al., 2014). Most notably, the current research findings suggest that males experience similar levels of psychosocial impairment associated with EDF to that experienced by females, and that this is the case in both adults and adolescents. This finding, when taken with evidence for increases in the prevalence of EDF among males, indicates the substantial proportion of the individual and community health burden of eating pathology that is accounted for by the occurrence of EDF among males (Mitchison et al., 2014; Mitchison & Mond, 2015; Mond et al., 2014).

A second key implication of the current research is that the development of prevention and health promotion initiatives that accommodate only female audiences, which account for the vast majority of these initiatives currently available, may need to be reconsidered in favor of programs that seek to reduce the health burden of EDF in both males and females. Health promotion efforts, including efforts to improve community “mental health literacy” relating to the nature and adverse impact of EDF in both males and females, have been a particularly neglected component of overall efforts
to reduce the individual and community health burden of eating pathology (Mond, 2016). The current findings suggest that improving community awareness and understanding of the occurrence, presentation and adverse impact of EDF among males may be particularly important moving forward (Mitchison & Mond, 2015). Awareness of this kind is likely to have flow on effects, including greater consideration of the need for inclusion of males in the development and application of preventive interventions, as well as consideration of how to improve recruitment and participation of males in related research. Effects such as these may, in turn, begin to address some of the systemic issues which have limited male engagement in research and treatment in the past. Certainly the development and implementation of selective prevention programs for eating disorders targeting adolescent and young adult females appears increasingly anachronistic (Mond, 2016; Mond et al., 2013). More generally, greater consideration will need to be given to the relative priority of health promotion, prevention and early intervention initiatives in reducing the health burden of eating pathology (Mond, 2016).

A third implication of the current research program is that research addressing the help-seeking behavior of males with EDF will increasingly be of interest and necessary. Evidence suggests that among individuals with eating pathology, as is the case among individuals with mental health problems more generally, the occurrence and degree of psychosocial impairment is strongly predictive of help-seeking behavior, in young adult women at least (Mond et al., 2009). If this is also the case for men and boys, then health professionals may expect to see an increasing number of males presenting for advice or treatment relating to EDF and/or comorbid mental health problems. Indeed, there is already evidence of increases in the numbers of males with eating disorders presenting to specialist services (Jones & Morgan, 2010). Improvements in community awareness and understanding of the occurrence and adverse impact of EDF in males would also be expected to lead to greater uptake of
health services, for example through better awareness of the occurrence and adverse impact of EDF among individuals affected, those with whom they interact, health professionals and the community as a whole (Hart, Jorm, & Paxton, 2012; Mond, 2014; Mond et al., 2010).

7.3. Research Strengths and Limitations and Future Research Directions

Strengths

At least two strengths of the current research are notable. First, samples of both adults and adolescents were utilised and, in each of these populations, both male and female participants were included. This made it possible to examine not only psychosocial impairment associated with EDF, but also age and sex differences in this regard. To the author’s knowledge, this is the first research to examine sex differences in psychosocial impairment associated with a broad range of EDF, including the key cognitive feature of overvaluation of weight/shape, in an adolescent population.

The assessment of a broad range of EDF in both adolescent and adult samples is itself notable, as is the inclusion of several different measures of psychosocial impairment, as previous studies have tended to focus on impairment associated with a single feature or small number of features using a single measure of impairment (Mitchison et al., 2013; Mond and Hay, 2007; Striegel et al., 2012).

Second, for both adult and adolescent studies, participants were recruited from population-based samples. Since the research was designed to inform psychosocial impairment associated with EDF, and since psychosocial impairment has been found to be strongly predictive of help-seeking among individuals with eating disorders and mental health problems more generally (Mond et al., 2009; Mond, Hay, Rodgers & Owen, 2007), the use of treatment-seeking samples would not have been appropriate. The use of relatively large samples of both adolescents and adults also is notable, since
this permitted examination of the correlates of a broad range of EDF, including those with relatively low prevalence, in both males and females.

**Limitations and Future Research Directions**

There were, however, important limitations of the current research. First, the occurrence and frequency of EDF was assessed using a self-report, rather than an interview, measure. The limitations of self-report assessment of certain EDF, binge eating in particular, are well known (Berg, Peterson, Frazier & Crow, 2012; Mond, Hay, Rodgers, Owen & Beumont, 2004). Further, the validity of self-report assessment of certain features may differ by sex (Berg et al., 2012; Mond et al., 2014). As is typically the case in large-scale, population-based research, interview assessment was not feasible in the current research.

Second, the cross-sectional design of the current research limits any inferences regarding the direction of the observed associations or change in the impact of EDF on psychosocial functioning over time or across developmental periods. For example, it is possible that the same features have more or less pronounced effects on psychosocial functioning at different times. Variation of this kind might also interact with sex, such that the developmental stages at which the effects of different features are more or less pronounced may differ for males and females. It would be of interest to test these hypotheses through the use of a longitudinal study design in future research.

Third, notwithstanding the relatively large overall sample sizes, the statistical power to detect interaction effects involving the more uncommon EDF, specifically, purging behaviors and extreme dietary restriction, was likely limited by the relatively small number of participants – male participants in particular – reporting these features in both samples. The recruitment of very large samples and/or oversampling of males would be needed to circumvent this difficulty in future research. Further, the inclusion
of samples recruited outside of Australia would improve the ability to generalize the current research findings.

Fourth, drive for muscularity, an aspect of excessive exercise that is largely confined to males (cf. Mitchison & Mond, 2015; Murray, Rieger, Karlov & Touyz, 2013), was not specifically assessed in the current research. Hence the prevalence and/or adverse effects of excessive exercise on males’ functioning may have been underestimated. While an effort was made to provide for the assessment of “muscularity-oriented” disordered eating in the adolescent study, through the inclusion of items addressing the use of body-building supplements and anabolic steroids, this assessment did not receive ethics approval. Ideally body image disturbance and eating/dieting behaviors associated with the drive for muscularity would be assessed in future research concerning EDF and associated impairment. Research of this kind may be of particular interest, in terms of elucidating the relationships between EDF, associated impairment and stereotypical gender roles. That is, EDF may be found to be less impairing when they align with one’s gender role and self definition. Future research should also consider the assessment of physical impairment (i.e., health measures), which may be particularly relevant to EDF related to drive for muscularity.

Finally, measures of psychosocial impairment employed in the current research do not preclude the potentially confounding influence of comorbid conditions. Future research may consider the inclusion of eating disorder-specific measures of impairment, such as the Eating Disorders Quality of Life Scale (Adair et al., 2007) or the Clinical Impairment Assessment questionnaire (Bohn & Fairburn, 2008).

7.4. Conclusion

In conclusion, few sex differences with respect to psychosocial impairment associated with EDF were observed in the current research in either adults or adolescents. When taken with evidence indicating increases in the prevalence of EDF in
males, these findings suggest that it is no longer tenable to consider EDF to be solely or even primarily a “female problem”. Hence, the development of prevention and health promotion initiatives that accommodate only female audiences may need to be reconsidered in favor of programs that seek to reduce the health burden of EDF in both males and females. Health professionals may expect to see an increasing number of males with EDF presenting for advice or treatment, and research addressing the help-seeking behavior of males with EDF will increasingly be of interest.
References


Appendix

Research Practicum:

Perceived Psychosocial Impairment Associated with Eating Disorder

Features: Responses to a Mental Health Literacy Intervention
Background to the Research Practicum

The current research supports the hypothesis that EDF have an adverse impact on psychosocial functioning and that this is the case in both males and females. Hence, the findings focus attention on the need for interventions that reduce this health burden (Latner, Mond, Vallance, Gleaves & Buckett, 2013; Mitchison & Mond, 2015; Mond, 2016; Mond et al., 2010). One avenue for reducing the adverse impact of EDF on individuals’ quality of life lies in improving community eating disorders “mental health literacy” (Hart, Jorm & Paxton, 2012; Mond, 2014; Mond, Mitchison & Hay, 2013). Improvements in public awareness and understanding of the nature of and impairment associated with EDF may improve the uptake of early, appropriate intervention on the part of individuals affected, if and when this is needed (Clement et al., 2015; Hart et al., 2012; Mond, 2014; Mond et al., 2013).

One aspect of eating disorders mental health literacy that the findings of the current research suggest might be worthy of consideration concerns public perceptions of the adverse impact of EDF on psychosocial functioning. While evidence suggests that the public is generally aware of and sympathetic to the adverse impact of EDF on mental health at least, it is also apparent that a substantial minority of individuals report trivializing and stigmatizing beliefs about the nature and occurrence of eating pathology, such as the belief that having an eating disorder “might not be too bad” (Mond, 2014; Mond, Hay, Rodgers, Owen & Beumont, 2004) and that individuals with an eating disorder “only have themselves to blame” (Crisp, Gelder, Rix, Meltzer & Rowlands, 2000; Mond, 2014). There is also some evidence that the extent to which beliefs of this kind are held may differ by EDF; for example, the adverse effects of purging behaviors may be more likely to be recognized than those of extreme dietary restriction and excessive exercise (Ebneter & Latner, 2013; Gratwick-Sarll, Mond & Hay, 2013; Mond, 2013).
With these considerations in mind, a third study, comprising the Research Practicum component of this research thesis, was designed to (i) elucidate individuals’ perceptions of impairment in psychosocial functioning associated with EDF; and (ii) test the effects on these perceptions of an eating disorders mental health literacy intervention. The research was conducted in young adults, partly for convenience but also taking into account the fact that EDF typically have their onset in adolescence or early adulthood (APA, 2013; Hudson, Hiripi, Pope & Kessler, 2007). Sex differences were also examined, given that young men may be more likely to trivialize the impairment associated with EDF than young women (Anderson, Gratwick-Sarll, Bentley, Harrison & Mond, 2015; Mond & Arrighi, 2011). Perceptions of the severity of impairment associated with various EDF were assessed prior to, immediately following and three months after the intervention. It was hypothesized, first, that purging behaviors would be perceived to be associated with greater psychosocial impairment than other EDF; and second, that males would perceive some EDF to be associated with less impairment than females. It was hoped that the intervention would be beneficial in improving awareness of the adverse impact of certain EDF in at least some participants, should such awareness be lacking, but no specific hypotheses were formulated in this regard.
This study was accepted for publication on the 26th November 2015. The reference for this paper is: Bentley, C., Gratwick-Sarll, K., & Mond, J. (2015). Perceived psychosocial impairment associated with eating disorder features: Responses to a mental health literacy intervention. *Journal of Eating Disorders, 3*, 46.

Abstract

**Background:** Whether and to what extent young adults are aware of the adverse impact of eating disorder features (EDF) on psychosocial functioning is unclear, although such awareness may affect the experience and behavior of sufferers. The aim of the current study was to examine young adults’ perceptions of psychosocial impairment associated with EDF, and the potential effect on these perceptions of an eating disorders “mental health literacy” (ED-MHL) intervention. **Methods:** Undergraduate students (male: n = 35; female: n = 141) completed self-report questionnaires prior to, immediately following, and three months after completion of a 3-hour ED-MHL intervention. Perceived psychosocial impairment associated with EDF – binge eating, purging, extreme dietary restriction, overvaluation of weight/shape, and excessive exercise – was assessed at each time point. **Results:** At all three time points, EDF were considered to have a “slightly negative” to “very negative” impact on psychosocial functioning. Prior to the intervention, binge eating, purging and extreme dietary restriction were generally considered to have a greater negative impact than excessive exercise and overvaluation of weight/shape. Three months after the ED-MHL intervention, participants reported greater perceived impairment associated with excessive exercise and overvaluation; while perceptions of psychosocial impairment associated with binge eating, purging and dietary restriction remained largely unchanged. Females perceived greater impairment associated with EDF than males did immediately after the intervention, but not at the 3-month follow-up. **Conclusions:** The adverse effects on psychosocial functioning of binge eating, purging and extreme dietary restriction appear to be readily recognized by young people. Awareness of the adverse effects of excessive exercise and overvaluation may be poorer, but amenable to improvement by means of a relatively simple intervention. These features may warrant particular attention in health promotion programs.
In recent years, evidence has accumulated concerning the negative impact of eating disorder features, namely, binge eating, extreme weight-control behaviors, and key cognitive features, such as the overvaluation of body weight/shape, on individuals’ quality of life (Bentley, Gratwick-Sarll, Harrison & Mond, 2015; Bentley, Mond & Rodgers, 2014; Mitchison, Mond Slewa-Younan & Hay, 2013). Increasing focus on eating disorder features (EDF) is appropriate, given broad acceptance of the transdiagnostic model of eating disorder psychopathology (Fairburn, 2008) and increasing awareness of the need for a dimensional, symptom-based approach to diagnostic criteria for mental disorders (APA, 2013; Mitchison & Mond, 2015). Assessing EDF rather than eating disorders can provide more stable construct definitions over time and accommodate individuals who might otherwise be excluded by virtue of overly restrictive diagnostic criteria (APA, 2013; Mitchison & Mond, 2015). For these reasons, it is increasingly recognized that reducing the adverse impact of EDF on individuals’ quality of life should be a key target of preventive interventions (Latner, Mond, Vallance, Gleaves & Buckett, 2013; Mitchison & Mond, 2015; Mond, Hay, Rodgers & Owen, 2011).

One way to reduce the adverse impact of EDF on individuals’ quality of life is to improve public awareness and understanding of the nature of these features and of the distress and disability that they engender (Mond, 2014). Improving these and other aspects of eating disorders “mental health literacy” (ED-MHL) would have, potentially, at least two benefits. First, improved community awareness and understanding of the nature and adverse impact of EDF may be conducive to improved uptake of mental health care, where this is needed, among sufferers (Clement et al., 2015; Mond et al., 2009; Mond & Hay, 2007). Improved uptake of mental health care would be expected to follow from improvements in the ED-MHL not only of individuals who have or may develop symptoms, but also of these individuals’ family and friends and members of
their social networks more generally (Hart, Jorm & Paxton, 2012; Mond, 2014; Mond et al., 2010). Evidence suggests that appropriate interventions, including those designed to improve ED-MHL, may be effective in improving awareness and understanding of the nature and treatment of mental health problems, as well as confidence in assisting – and willingness to assist – sufferers to seek appropriate help (Gratwick-Sarll & Bentley, 2014; Hart et al., 2012). Second, improved awareness of the nature and adverse impact of EDF may be conducive to lower levels of stigma towards, and, in turn, among sufferers. Lower levels of internalized stigma would be expected to have a direct benefit in terms of improved quality of life, while also being conducive to improved uptake of mental health care where this is needed (Griffiths, Mond, Murray & Touyz, 2015).

Available evidence suggests that the public is generally sympathetic toward individuals with eating disorders – anorexia nervosa and bulimia nervosa at least – in that people generally recognize the seriousness and distressing nature of these conditions (Mond, Hay, Rodgers, Owen & Beaumont, 2004). However, it is also apparent that a substantial minority (around one third) of people, young adults in particular, hold attitudes that may trivialize and otherwise stigmatize eating disorders, such as the beliefs that having an eating disorder “might not be too bad” (Mond et al., 2004) and that individuals with an eating disorder “only have themselves to blame” and should “pull themselves together” (Crisp, Gelder, Rix, Meltzer & Rowlands, 2000). Further, attitudes of this kind may be more common in young men than in young women (Anderson, Gratwick-Sarll, Bentley, Harrison & Mond, 2015; Mond & Arrighi, 2011).

There is some evidence that individuals’ beliefs about the adverse impact of eating disorders vary as a function of the features comprising the disorder (Anderson et al., 2015; Ebneter & Latner, 2013; Mond & Arrighi, 2011). Thus, the perception that eating disorders are mild or even trivial may be more commonly ascribed to individuals
with binge eating disorder than individuals with anorexia nervosa or bulimia nervosa (Anderson et al., 2015; Ebneter & Latner, 2013). That is, in the absence of extreme weight-control behaviors and/or low body weight, the adverse impact of binge eating may be underestimated. Perceived impairment associated with “non-purging” extreme weight-control behaviors, namely, extreme dietary restriction and excessive exercise, may also tend to be underestimated, given that these behaviors are more “normative” and socially sanctioned, whereas the distress caused by purging behaviors may be more likely to be recognized (Gratwick-Sarll, Mond & Hay, 2013; Mond, Hay, Rodgers & Owen, 2006a). The negative impact of weight/shape overvaluation may also be underestimated, given the overlap of this construct with body dissatisfaction (Mond & Hay, 2011), despite its status as a core feature of eating disorder psychopathology (Fairburn, 2008) and despite evidence suggesting it may be a better predictor of mental health impairment than other EDF (Latner et al., 2013; Mond et al., 2011).

To our knowledge, no study has examined individuals’ perceptions of impairment associated with different EDF. Research of this kind may be helpful in indicating which EDF may be more or less susceptible to trivialization. Ideally, research of this kind would be conducted in young adults, given that eating disorders – and EDF – typically have their onset in adolescence or early adulthood (APA, 2013). Further, it would be helpful not only to document young adults’ perceptions of the impairment associated with EDF, but also to determine whether a brief intervention might be effective in improving this aspect of ED-MHL, should it be found to be problematic. The goal of the current study was, therefore, to examine young adults’ perceptions of psychosocial impairment associated with EDF prior to and following an ED-MHL intervention. A secondary aim of the study was to examine sex differences in perceptions of impairment over time. In view of the paucity of existing evidence, our only a priori hypotheses were that purging behaviors would be seen to be associated
with greater impairment in psychosocial functioning than non-purging behaviors and that young men would perceive at least some EDF to be associated with lower levels of impairment than young women at one or more time points.

**Method**

**Study Design and Recruitment of Participants**

Participants were 141 female and 35 male (N = 176) third-year undergraduate psychology students from the Australian National University who opted in to the voluntary research component of the “Should I Say Something?” workshop, which was offered through a laboratory class. Of the students enrolled in the laboratory classes, 94.6% volunteered to participate in the study at baseline. The dropout rate across time was 8.0%. “Should I Say Something?” is a 3-hour interactive workshop developed by Hart et al. (2012), with promising preliminary findings regarding its effectiveness in promoting ED-MHL (Gratwick-Sarll & Bentley, 2014). The workshop is designed to improve participants’ understanding of the nature and treatment of eating disorders and to provide them with the skills to assist someone close to them (or themselves) to seek early and appropriate treatment for an eating disorder or other mental health issue. The workshop was conducted by the first and second author and included a slide presentation, a vignette on the lived experience of a young woman with anorexia nervosa, and individual and group activities throughout (Gratwick-Sarll & Bentley, 2014). No remuneration or other incentives to participation were provided. Participants completed questionnaires immediately before and after participating in the workshop (Time 1 and Time 2, respectively) and at a 3-month follow-up (Time 3). Questionnaires assessed participants’ perceptions of psychosocial impairment associated with different EDF; as well as ascertaining participants’ socio-demographic information and experience with eating disorders (Table 1). The questionnaires also included other measures not relevant to the present study which are detailed elsewhere (Gratwick-Sarll
& Bentley, 2014). The vast majority of participants (98%) were aged 18 to 26 years at baseline. Participants reported that 31.8% had studied eating disorders at university and 42.0% believed they had known someone personally with an eating disorder. The study design and methods were approved by the Australian National University Human Research Ethics Committee (protocol no. 2012/523).

**Table 1.** Demographic Characteristics of Study Participants (Time 1)

<table>
<thead>
<tr>
<th></th>
<th>Women (n=141)</th>
<th>Men (n=35)</th>
<th>Total (N=176)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>80.1 %</td>
<td>19.9 %</td>
<td>100 %</td>
</tr>
<tr>
<td>Born in Australia</td>
<td>61.7 %</td>
<td>65.7 %</td>
<td>62.5 %</td>
</tr>
<tr>
<td>English as first language</td>
<td>75.2 %</td>
<td>82.9 %</td>
<td>76.7 %</td>
</tr>
<tr>
<td>Studied eating disorders at university</td>
<td>31.9 %</td>
<td>31.4 %</td>
<td>31.8 %</td>
</tr>
<tr>
<td>Knew/knows someone with an eating disorder</td>
<td>44.0 %</td>
<td>34.3 %</td>
<td>42.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>20.00 (2.90)</td>
<td>21.09 (4.79)</td>
<td>20.22 (3.38)</td>
</tr>
</tbody>
</table>

**Study Measures**

Perceived psychosocial impairment associated with different EDF was assessed by asking participants: “How do you think [a specific EDF] would impact on someone’s [psychosocial functioning]?” Psychosocial functioning was defined by two items which were subsequently combined: “emotional wellbeing” and “social relationships (with friends, family and partners)”. Participants responded to each item on a 5-point, Likert-type scale (1=“very positive impact”; 2=“slightly positive impact”; 3=“impact neither positive nor negative”; 4=“slightly negative impact”; 5=“very negative impact”). Cronbach’s alphas in the present study for psychosocial functioning (Time 1) were 0.76 for female participants and 0.75 for male participants.

Specific EDF were defined as follows. Purging was defined as “Inducing vomiting, weekly or more, in order to influence one’s body weight and/or shape” and/or “Taking laxatives, weekly or more, in order to influence one’s body weight and/or
shape”. Extreme dietary restriction was defined as “Going for long periods of time (8hrs+ during the day) without eating anything, on most days, in order to influence one’s body weight and/or shape” (Fairburn & Beglin, 1994; Mond et al., 2014). Binge eating was defined as “Eating what other people would think was a very large amount of food given the situation and feeling a loss of control over eating at the time, weekly or more” (APA, 2013). Excessive exercise was defined as “Exercising really hard in a driven or compulsive way, on most days, in order to influence one’s body weight and/or shape” (Fairburn & Beglin, 1994; Mond et al., 2014). Overvaluation of weight/shape was defined as “Thinking one’s body weight and/or shape is very important to their self-esteem”.

**Statistical Analysis**

Data were stratified by sex for the purpose of descriptive statistics (mean ratings of perceived impairment associated with each EDF at each time point) and in all analyses. Tests of significant differences between ratings of different EDF at each time point, and across different time points were conducted using Friedman tests and post-hoc Bonferroni-corrected Wilcoxon Signed Rank tests. Mann Whitney U tests were employed to test for sex differences in ratings for each EDF at each time point. A significance level of .05 was adopted for all tests where a Bonferroni correction is not specified. All analysis was conducted using SPSS version 22.0.

**Results**

Mean ratings of perceived psychosocial impairment associated with different EDF across the three time points are presented in Figure 1 (females) and Figure 2 (males). It can be seen that all mean ratings – across time points and for both sexes – reflect perceptions of EDF as having a “slightly negative” to “very negative” impact on psychosocial functioning (i.e., mean range is 3.5 to 4.7).
**Perceived Impairment Associated with EDF**

Friedman tests of differences in mean ratings of perceived impairment associated with different EDF (for both sexes, at three time points) were all significant (all $p < .01$). Post-hoc Bonferroni-corrected Wilcoxon Signed Rank tests identified the source of these significant differences, which are reported in text for the sake of brevity. At Time 1, females’ mean ratings of impairment associated with purging, dietary restriction and binge eating were significantly higher than their mean ratings associated...
with overvaluation and excessive exercise (all \( p < .001 \)). For males at Time 1, mean ratings of impairment associated with purging and dietary restriction were significantly higher than mean ratings associated with overvaluation and excessive exercise; mean ratings associated with binge eating were significantly higher than mean ratings associated with excessive exercise (all \( p < .001 \)).

At Time 2, females’ mean ratings of impairment associated with purging, dietary restriction, binge eating and excessive exercise were significantly higher than mean ratings associated with overvaluation (all \( p < .005 \)). For males at Time 2, mean ratings of impairment associated with purging, dietary restriction and binge eating were significantly higher than mean ratings associated with overvaluation (all \( p < .005 \)).

At Time 3, females’ mean ratings of impairment associated with purging, dietary restriction and binge eating were significantly higher than mean ratings associated with excessive exercise; mean ratings associated with purging and dietary restriction were significantly higher than mean ratings associated with overvaluation (all \( p < .005 \)). For males at Time 3, mean ratings of impairment associated with purging and dietary restriction were significantly higher than mean ratings associated with excessive exercise (all \( p < .005 \)).

**Change Over Time in Perceived Impairment Associated with EDF**

Results of Friedman tests of differences across time for mean ratings of perceived impairment associated with specific EDF, by sex, are presented in Table 2. Results of post-hoc Bonferroni-corrected Wilcoxon Signed Rank tests are also presented in Table 2, to identify the source of significant differences (where applicable).

It can be seen that females’ mean ratings of impairment associated with all five EDF significantly increased immediately post-intervention, then significantly decreased by 3-month follow-up. This resulted in no significant difference between baseline and follow-up for female ratings of impairment associated with purging, dietary restriction
and binge eating; while female ratings of impairment associated with overvaluation and excessive exercise remained significantly higher at follow-up than baseline.

For males, there were no significant changes across time points for ratings of impairment associated with purging, dietary restriction and binge eating. For perceived impairment associated with excessive exercise, males significantly increased their ratings between baseline and post-intervention ($p < .001$) and sustained this change (relative to baseline) at 3-month follow-up ($p = .012$). For perceived impairment associated with overvaluation, males appeared to increase their ratings between baseline and post-intervention and sustain this change at follow-up, however these results were not significant (both $p = .033$; Bonferroni-corrected $\alpha = .017$).

Table 2. Results of Friedman Tests and Post-Hoc Wilcoxon Signed Rank Tests (Where Applicable) for Perceived Impairment Associated with Eating Disorder Features (Across Time Points, Split by Sex)

<table>
<thead>
<tr>
<th></th>
<th>Friedman</th>
<th>Time 1 vs. Time 2</th>
<th>Time 2 vs. Time 3</th>
<th>Time 1 vs. Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\chi^2$</td>
<td>$z$</td>
<td>$z$</td>
<td>$z$</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purging</td>
<td>15.29**</td>
<td>-3.92**</td>
<td>-3.19**</td>
<td>-0.71</td>
</tr>
<tr>
<td>Dietary restriction</td>
<td>44.57**</td>
<td>-6.17**</td>
<td>-4.70**</td>
<td>-1.35</td>
</tr>
<tr>
<td>Binge eating</td>
<td>28.66**</td>
<td>-5.04**</td>
<td>-4.15**</td>
<td>-0.68</td>
</tr>
<tr>
<td>Overvaluation</td>
<td>54.45**</td>
<td>-7.10**</td>
<td>-3.51**</td>
<td>-4.06**</td>
</tr>
<tr>
<td>Excessive exercise</td>
<td>111.55**</td>
<td>-8.86**</td>
<td>-6.31**</td>
<td>-4.51**</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purging</td>
<td>3.66</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dietary restriction</td>
<td>4.88</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Binge eating</td>
<td>5.49</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Overvaluation</td>
<td>7.34*</td>
<td>-2.13*</td>
<td>-0.22</td>
<td>-2.13*</td>
</tr>
<tr>
<td>Excessive exercise</td>
<td>19.60**</td>
<td>-4.55**</td>
<td>-2.01*</td>
<td>-2.51*</td>
</tr>
</tbody>
</table>

*<.05; **<.001

Sex Differences in Perceived Impairment Associated with EDF

Sex differences in ratings of perceived psychosocial impairment associated with different EDF at each of the three time points are presented in Table 3. As can be seen, at Times 1 and 3 there were no significant sex differences regarding participants’ ratings of the perceived psychosocial impairment associated with EDF. At Time 2, female participants rated psychosocial impairment associated with EDF as significantly greater
than male participants did for purging ($p < .05$), dietary restriction ($p < .05$), overvaluation ($p < .01$) and excessive exercise ($p < .01$).

**Table 3.** Results of Mann Whitney U tests of Sex Differences in Mean Scores for Perceived Impairment Associated with Eating Disorder Features Across Time Points

<table>
<thead>
<tr>
<th></th>
<th>Time 1 N=141(f) + 35(m)</th>
<th></th>
<th></th>
<th>Time 2 N=140(f) + 35(m)</th>
<th></th>
<th></th>
<th>Time 3 N=131(f) + 31(m)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$z$</td>
<td>$r^2$</td>
<td></td>
<td>$z$</td>
<td>$r$</td>
<td></td>
<td>$z$</td>
<td>$r$</td>
</tr>
<tr>
<td>Purging</td>
<td>-1.87</td>
<td>0.14</td>
<td></td>
<td>-1.99*</td>
<td>0.15</td>
<td></td>
<td>-1.50</td>
<td>0.11</td>
</tr>
<tr>
<td>Dietary restriction</td>
<td>-1.25</td>
<td>0.09</td>
<td></td>
<td>-2.01*</td>
<td>0.15</td>
<td></td>
<td>-1.24</td>
<td>0.09</td>
</tr>
<tr>
<td>Binge eating</td>
<td>-1.87</td>
<td>0.14</td>
<td></td>
<td>-1.79</td>
<td>0.13</td>
<td></td>
<td>-1.95</td>
<td>0.15</td>
</tr>
<tr>
<td>Overvaluation</td>
<td>-1.58</td>
<td>0.12</td>
<td></td>
<td>-3.42**</td>
<td>0.26</td>
<td></td>
<td>-1.58</td>
<td>0.12</td>
</tr>
<tr>
<td>Excessive exercise</td>
<td>-1.81</td>
<td>0.14</td>
<td></td>
<td>-2.79**</td>
<td>0.21</td>
<td></td>
<td>-1.59</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*<.05; **<.01

Small effect size = .1; medium effect size = .3; large effect size = .5

**Discussion**

**Summary of Main Findings**

This study examined individuals’ perceptions of psychosocial impairment associated with EDF and the potential effects of an ED-MHL intervention on these perceptions. EDF included binge eating, purging, extreme dietary restriction, excessive exercise and overvaluation of weight/shape. Prior to the intervention, participants reported, on average, perceptions of each EDF as having a “slightly negative” to “very negative” impact on psychosocial functioning. Generally, binge eating, purging and dietary restriction were considered to have a greater adverse impact on psychosocial functioning than excessive exercise and overvaluation. None of these findings differed by sex. Immediately following the intervention, females’ ratings of perceived impairment associated with EDF were higher than males’ ratings for all EDF except binge eating. Females’ ratings of perceived impairment associated with EDF increased for all five EDF, whereas males’ ratings increased only for excessive exercise. At the 3-month follow-up, perceptions of impairment associated with binge eating, purging and dietary restriction did not differ from those observed at baseline, whereas perceptions of impairment associated with excessive exercise were greater than at baseline. In females,
but not males, perceptions of impairment associated with overvaluation were greater at the 3-month follow-up than at baseline. No sex differences were observed at the 3-month follow-up.

**Study Implications**

Several of these findings are encouraging. First, it is encouraging that participants generally perceived the EDF considered to have a negative impact on psychosocial functioning. Second, it is encouraging that the degree of impairment attributed to EDF was similar among male and female participants. This finding contrasts with those of previous studies suggesting that young men are more prone to trivialize eating disorders than young women (Anderson et al., 2015; Mond & Arrighi, 2011). Third, it is encouraging that participants appeared to be aware that dietary restriction may be associated with impairment in psychosocial functioning comparable to that of binge eating and purging. Concerns have been expressed that impairment associated with extreme dietary restriction (e.g., Brown, Kola-Palmer & Dhingra, 2015; Mond et al., 2011) may be minimized due to the fact that it may be seen to be “normative” or even desirable, particularly in the context of concerns surrounding the “obesity epidemic” (Mond, Mitchison & Hay, 2013). Fourth, it is encouraging that participants’ perceptions of impairment associated with excessive exercise and overvaluation increased following the ED-MHL intervention, and that pre-post differences in this regard were still apparent at the 3-month follow-up. This finding adds to a small but growing literature on the utility of ED-MHL interventions (Gratwick-Sarll & Bentley, 2014; Hart et al., 2012).

Certain other findings were, however, less encouraging. First, the benefits of the intervention in terms of increasing awareness of the negative impact were largely confined to female participants. The content of the intervention (e.g., vignette depicting only a female sufferer), the sex of the presenters (both female) and female participants
being more prone to social desirability effects (Herbert et al., 1997), may all have been factors in this regard. Second, these differential benefits appeared to be short-lived, since sex differences were no longer apparent at the 3-month follow-up, although as noted above some changes were maintained at follow-up by both males and female participants. The tendency for post-intervention changes in knowledge and beliefs concerning eating-disordered behavior to diminish over time, which was observed in early studies of eating disorder prevention trials (Franko & Orosan-Weine, 1998), highlights the importance of including follow-up assessments and, perhaps, the need for booster sessions, in future trials of this kind. Third, perceptions of impairment associated with overvaluation and excessive exercise were lower than for other EDF at baseline and, to a lesser degree, at follow-up. Although this finding may not be surprising, it is concerning given that overvaluation is a core component of eating disorder psychopathology (Fairburn, 2008) and known to be strongly associated with impairment in mental health and quality of life in both males and females (Latner et al., 2013; Mitchison et al., 2013; Mond et al., 2011). Findings relating to perceived impairment associated with excessive exercise are more difficult to interpret, given the lack of any agreed-upon operational definition of this term (Mond et al., 2013), but there is good evidence that certain exercise behaviors, such as exercising primarily as means of controlling weight or shape, are strongly associated with eating disorder psychopathology and, in turn, impairment in quality of life, in young women (Mond, Hay, Rodgers & Owen, 2006b). Further, there is growing concern about the adverse physical and mental health consequences of excessive exercise – that aimed at developing muscle mass in particular – in young men (Mitchison & Mond, 2015). Hence, efforts may be needed to improve community ED-MHL relating to the adverse effects of overvaluation and excessive exercise in particular.
**Study Strengths and Limitations**

A limitation of the current study is the relatively small number of male participants (n = 35) and, in turn, relatively lower statistical power to detect effects involving males and differences between males and females. The use of psychology students as participants might also be considered a limitation of the current study, given the greater potential for ceiling effects regarding ED-MHL in this population and other characteristics of student samples that may limit the generalizability of the findings to the broader population. On the other hand, interventions of this kind may be particularly important among psychology students and in student populations more generally, given that EDF and other mental health problems may be over-represented in these populations (Lavender, De Young & Anderson, 2010; Luce, Crowther & Pole, 2008; Stallman, 2010). Strengths of the current study include the recruitment of male and female participants, assessment of perceptions of impairment associated with a broad range of EDF, assessment immediately following and three months following the intervention, and the low rates of dropout. This is, to our knowledge, the first study to examine individuals’ perceptions of psychosocial impairment associated with different EDF and potential changes in these perceptions in response to an ED-MHL intervention.

**Conclusion**

Findings from the current study suggest that ED-MHL concerning awareness of the adverse effects of EDF on quality of life among male and female psychology students may generally be acceptable. Adverse effects of extreme dietary restriction, binge eating and purging at least appear to be readily recognized in this population. Awareness of the adverse effects of excessive exercise and overvaluation was initially poorer, but improved somewhat following an ED-MHL intervention. These features may warrant particular attention in health promotion programs. Future trials of ED-
MHL interventions may benefit from the inclusion of vignettes depicting male sufferers and/or male facilitators.
References


