Revised: 7th April 2011

A LONGITUDINAL INVESTIGATION OF THE IMPACT OF DISORDERED EATING ON YOUNG WOMEN'S QUALITY OF LIFE

Tracey D. Wade, PhD[1]

Simon M. Wilksch, PhD[1]

Christina Lee, PhD[2]

[1] School of Psychology, Flinders University

[2] School of Psychology, University of Queensland

Correspondence should be addressed to: Professor Tracey Wade, School of Psychology, Flinders University, GPO Box 2100, Adelaide, 5001, South Australia, Australia. E-mail: tracey.wade@flinders.edu.au

Running Head: Impact of disordered eating on young women

Abstract

<u>Objective</u>: The extent to which subclinical levels of disordered eating affect quality of life (QOL) was assessed. <u>Methods</u>: Four waves of self-report data from Survey 2 (S2) to 5 (S5) of a national longitudinal survey of young Australian women (n=9,688) were used to assess the impact of any level of disordered eating at S2 on QOL over the following nine years, and to evaluate any moderating effects of social support and of depression. <u>Results</u>: At baseline, 23% of the women exhibited some level of disordered eating and they scored significantly lower on both the Physical and the Mental component scores of the SF-36 at every survey; differences in mental health were still clinically meaningful at S5. Social support and depressive symptoms each acted as a moderator of the Mental component scores. Women with both disordered eating and low social support, or disordered eating and depression, had the worst initial scores; although they improved the most over time, they still had the lowest scores at S5. Higher social support at baseline resulted in women with disordered eating being largely indistinguishable from women without disordered eating who had low social support. Lower levels of depression resulted in women with disordered eating having a significantly better QOL than women with high levels of depression, regardless of eating status. <u>Conclusions</u>: This is the first study to examine the long-term impact of subclinical levels of disordered eating on QOL, and it suggests that even apparently minor levels of symptomatology are associated with significant and far-reaching deficits in wellbeing.

Keywords: disordered eating, quality of life, young women, social support, depression

In order for a diagnosis to be made for many of the disorders in the *Diagnostic and statistical manual of mental disorders* (DSM-IV-TR; American Psychiatric Association, 2000), such as major depression and post traumatic stress disorder, it is required that "the symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning". While this is not required for the two eating disorders currently recognised in the DSM, anorexia nervosa (AN) and bulimia nervosa (BN), there has been an increased interest in better understanding the impairment that is associated with eating disorders and disordered eating, as evidenced by two recent reviews of quality of life (QOL) and eating disorders (Engel, Adair, Las Hayes, & Abraham, 2009; Jenkins, Hoste, Meyer, & Blissett, 2010). This interest is in part driven by an increasing awareness of how severely QOL is impacted by eating disorders. The interest is also driven in part by recognition that greater emphasis on QOL as a measure of outcome in eating disorders would bring this clinical area into parity with other mental disorders and areas of physical health care. The increasing interest in QOL is also fuelled by the emerging understanding that meaningful assessment of outcome in treatment cannot be limited to whether the diagnostic criteria for an eating disorder are absent or present, but also needs to assess the wider impact of treatment on QOL (Bohn, Doll, Cooper, O'Connor, Palmer, & Fairburn, 2008). This is of particular relevance for the atypical eating disorders, called Eating Disorder Not Otherwise Specified (EDNOS), thought to represent the majority of clinical presentations (Fairburn & Bohn, 2005). EDNOS typically involves the constellation of diagnostic criteria required for AN or BN, but either at a lower frequency, or with one or two criteria absent.

While QOL measures specific to eating disorders have been created more recently (Bohn et al., 2008; Engel et al., 2009), most of the QOL research in the area of eating disorders has used generic measures, with the most widely used being the Medical Outcome Studies (MOS) Short-Form Scales such as the SF-36 (Ware & Sherbourne, 1992). This body of research would suggest that the presence of an eating disorder is associated with impaired QOL, by comparison with healthy controls, the general population, primary care patients with medical disorders such as arthritis and hypertension, and people with other diagnoses of psychiatric illness (Jenkins et al., 2010). This

pervasive impact on QOL may be due to the fact that eating disorders exact a physical as well as mental toll on the sufferer (Johnson, Cohen, Kasen, & Brook, 2002a). While far less research exists on the EDNOS group, extant research suggests that those women have significantly worse QOL than healthy controls (Mond, Myers, Crosby, Hay, & Mitchell, 2010). This finding has been replicated in a longitudinal investigation of adolescent girls, amongst whom 12% had developed some form of EDNOS by the age of 20 years (Stice, Marti, Shaw, & Jaconis, 2009). Those girls with EDNOS had significantly higher levels of functional impairment, mental health service use and emotional distress than those without eating disorders.

Even less is known about the patterns of disordered eating that do not meet the EDNOS criteria, including those in which just one aspect of disordered eating may exist, or may exist for only a short period of time. One recent study investigated the relationship between health-related QOL and presence of any degree of disordered eating in adolescents (Herpertz-Dahlman, Wille, Holling, Vloet, & Ravens-Sieberer, 2008), using a 5-item screening instrument for disordered eating, the SCOFF (Morgan, Reid, & Lacey, 1999). A "yes" response on two or more items was used to indicate the presence of disordered eating, categorising one-third of the girls and 15% of the boys as having some level of disordered eating. After adjustment for body mass index (BMI), age and sex, it was shown that adolescents with disordered eating had significantly lower levels of QOL across all six domains measured, including physical, psychological, family, peers, school, and self-esteem.

While longitudinal investigations of QOL in young women exist with respect to eating disorders (Johnson et al., 2002a) and EDNOS (Stice et al., 2009), indicating a long-term impact of such eating disorders, there has been no examination of the longitudinal cost of the broader category of disordered eating. Such an investigation can inform us as to whether such behaviours are trivial, or whether the presence of any disordered eating behavior results in significant, long-term impairment of QOL. If this latter scenario is correct, then, given that a significant minority of the population is affected (Herpertz-Dahlman et al., 2008), this represents a major public health problem and suggests a need for community-wide prevention and education efforts.

A further area of investigation that could inform prevention approaches in this area is a better understanding of which variables might determine the strength of the relationship between disordered

eating and QOL. While this has been examined to some extent with eating disorders, it has been largely limited to investigations of whether QOL is worse in the presence or absence of specific types of disordered eating (e.g., binge eating, purging) or across different ranges of BMI (Jenkins et al., 2010). There has also been some investigation of the impact of psychiatric comorbidity, suggesting that the presence of both depressive and eating disorder symptoms more negatively impacts QOL than when comorbidity is absent (Jenkins et al., 2010). Also of interest to examine as potential moderators are variables related to resilience, such as social support. No research to date has examined social support as a moderator of the relationship between disordered eating and QOL. Rather the focus has been on social support as a risk factor for disordered eating, and low levels of social support from families (Ghaderi, 2003) and abusive parental relationships (Johnson, Cohen, Kasen, & Brook, 2002b) have been found to increase the risk for the development of disordered eating.

We use a large national sample of young women from the Australian Longitudinal Study of Women's Health (ALSWH) over four waves of data collection in order to examine the impact of the presence of disordered eating in the previous 12-month period at Survey 2 on QOL over Surveys 2, 3, 4 and 5, spanning a 9-year period. It is hypothesised that women who report some level of disordered eating at Survey 2 will have significantly worse QOL on both the mental and physical component domains of the SF-36, and that this will continue over all the surveys. Secondly, we examine and contrast two potential moderators of the longitudinal relationship between disordered eating and QOL: social support and depressive symptoms, measured at Survey 2. It is hypothesised that higher levels of social support, and lower levels of depression, will significantly reduce the impact of disordered eating on the longitudinal trajectory of QOL.

Methods

Participants

The ALSWH is a longitudinal survey of the health and well-being of three cohorts of Australian women and has been described in detail elsewhere (Lee et al., 2005). The project uses mailed surveys to collect self-report data at each time point on health and related variables from three age cohorts of Australian women, aged 18-23 years, 45-50 years and 70-75 years when the project

began in 1996. The project is designed to follow these women for at least twenty years, with the overall goal to conduct a series of interlocking data analyses in order to develop an understanding of factors that affect the health and well-being of women, in order to inform Australian government health policy (Lee et al., 2005).

Over 40,000 women across the three age groups were recruited on a random basis from the Australian population, with the Australian comprehensive national health insurance database (Medicare) as the sampling frame and with systematic over-sampling of women living in rural and remote areas. Privacy legislation meant that the initial approach to these women had to be undertaken by Medicare and the research team was not able to contact non-respondents. Initial response rate for the Younger cohort was 42%, and comparisons with national census data for the same year indicated that they were demographically representative of Australian women in that age group, with a slight non-significant bias towards married, educated, and Australian-born women (Lee et al., 2005). The research was approved by the institutional ethics committees of the University of Newcastle and the University of Queensland, the Australian Department of Health & Ageing, and the Australian Department of Veterans' Affairs.

Design

The focus of the current study was 9,688 women born between 1973 and 1978 (the Younger cohort), specifically Surveys 2 (S2: 2000), 3 (S3: 2003), 4 (S4: 2006), and 5 (S5: 2009). Participation over the different surveys and the age at assessment are depicted in **Figure 1**. The response rate was commensurate with other large community studies in Australia, which range from 47% to 70% (Wade, Bergin, Tiggemann, Bulik, & Fairburn, 2006; Hay, 2003). While data related to disordered eating were collected at S1, other variables of interest were not collected and thus our analysis begins at S2.

Measures

The self-report questionnaire included a variety of questions addressing a range of social and environmental aspects of the women's lives, as well as issues related to health and use of health services. Measures were selected in an effort to maximize both validity and brevity; where brief,

valid scales were not available, measures were developed for the purposes of the ALSWH research. The following measures were used in the current study.

Disordered eating. In order to map on to the DSM criteria which requires both behavioural and cognitive criteria to be met for diagnosis of an eating disorder, two criteria were used to categorise women has having "disordered eating" at Survey 2: the presence of at least one weight or behavioral indicator, and the presence of at least a moderate level of dissatisfaction with weight or shape. Five indicators of possible disordered eating were derived from a number of questions at S2. The first indicator was a body mass index (BMI), derived from self-reported height and weight, of ≤17.5 which equates to the cut-off most commonly used in diagnosing anorexia nervosa. The second was at least one episode of binge eating: this included participants who responded "yes" to "Have there been times when you felt that you have eaten what other people would regard as an unusually large amount of food GIVEN THE CIRCUMSTANCES?" and "yes" to "During these times of overeating did you have a sense of having lost control over your eating, that is, feeling that you couldn't stop eating once you had started?" Three indicators of weight control behaviors were examined using the question "Have you used any of the following to control your weight or shape: Vomited on purpose after eating; Used laxatives, diuretics or diet pills; Cut out meals (fasted)?". A response of "yes, in the last 12 months" to any of these 3 items was considered a positive indicator of disordered eating.

Dissatisfaction with weight or shape was assessed using two items from the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994): "In the past month, how dissatisfied have you felt about (a) your weight and (b) your shape?" and were measured on a 7-point Likert scale, ranging from "not at all" (1) to "markedly" (7). A mean response of 4 or greater to these 2 items was considered to be a clinical level of dissatisfaction, commensurate with guidelines used for the interview version of the EDE (Fairburn & Cooper, 1993).

Respondents who met both these criteria were classified as having "disordered eating" and those who met one or neither served as the comparison group.

Quality of life. The Mental and Physical Component Scales (MCS and PCS) of the SF-36 (Ware & Sherbourne, 1992) from S2, S3, S4 and S5 were used to indicate QOL relating to mental and

physical well-being, with higher scores indicating better QOL. Standardization of scores was achieved using Australian norms in order to obtain a mean of 50 (SD=10). A cut-off of 42 for the MCS is seen to be commensurate with the QOL expected for people with major depressive disorder and group mean scores below 47 can be interpreted as being below the average range for the general population (Ware, Snow, Kosinski, & Gandek, 1997).

Social support. Six items taken from the 19-item MOS Social support survey (SSS; Sherbourne & Stewart, 1991) were used to assess social support, with a stem question that asks "how often is each of the following kinds of support available to you if you need it?" Each item is answered on a scale from 1 ("none of the time"), to 5 ("all of the time"). The internal consistency of the measure was good as indicated by the Cronbach's alpha of 0.88. This variable was dichotomised for all analyses. Given it had a strong negative skew, high social support was defined as the mean item score being ≥4 (most or all of the time) and low <4 (none to some of the time).

Depression. Depression was assessed using a 10-item version (Andresen, Carter, Malmgren & Patrick, 1994) of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) scale. Participants rated how often they had experienced each of 10 items (e.g., "I felt that everything I did was an effort") over the last week, on a 4-point scale from 0 ("rarely or none of the time" to 3 ("most or all of the time"). Items were summed to form a total score, and higher scores indicated a greater level of depressive symptoms. The scores ranged from 0 to 30, with a mean score at S2 of 7.61 (*SD*=5.49). The internal consistency of the scale was good, with alpha of 0.86. Depression was also dichotomised for all analyses, this time using the mean score, with high levels indicated by scores ≥8 and low levels as <8.

Statistical analyses

Where data were analysed across multiple time points, linear mixed modelling (LMM), with random effect for subject, was fitted. This adjusts for correlation between repeated assessments and for statistical non-independence, and also enables inclusion of cases with missing data. When examining QOL as the outcome over S2 to S5, time was modelled as a fixed effect. The interaction between time and disordered eating status was also included as a fixed effect.

When examining moderation of the impact of disordered eating on QOL over S2 to S5, time, disordered eating status, the S2 moderator variable, and the three-way interaction term between time, disordered eating status and the moderator, were included as fixed effects. Given the large sample size, we used a more conservative significance value than a Bonferroni correction, where only interactions at the $p \leq 0.001$ level were considered to be significant. Where significant interactions were indicated, post-hoc group x time comparisons were conducted with the S2 and S5 data using a repeated measure ANOVA for two conditions at a time, a 2 (the two conditions being compared) by 2 (time) design.

Results

<u>Preliminary Analyses</u>

The mean age of the women at S2, based on the year of the survey and the year of birth, was 24 years (SD=1.49). In terms of socioeconomic indicators, 55% were classified as living in urban locations, 41% in rural locations, and 4% in remote locations. Only 11.3% had less than a completed high school education, and 40.3% had university degrees. With respect to employment, 15.6% were considered to be unemployed or not in the labour force, 80.7% had paid employment, and 3.7% were employed but not paid (generally working in family businesses). Overall, 28.4% were studying part- or full-time. At S2 the mean socioeconomic index for areas (SEIFA) relating to Education and Occupation in the area in which the person lived was 1000.83 (SD=79.64), ranging from 811 to 1260.

At S2, the mean body mass index (BMI) of the group was 23.83 (*SD*=4.96) ranging from 12 to 66. Overall, 2,223 women (23.0%) were classified as meeting both sets of criteria for disordered eating (DE). Of these, 46 (0.48%) reported a BMI≤17.5, 1378 (14.22%) binge eating, 371 (3.83%) self-induced vomiting, 510 (5.26%) use of laxatives, diuretics or diet pills, and 1094 (11.29%) fasting. Amongst these women, the number of disordered eating indicators had negligible to low associations with a poorer quality of life at S2 for both MCS (r=-0.28) and PCS (r=-0.04), justifying the decision to treat them as a single group. DE status at S2 predicted significantly lower participation rates at S3

(OR=1.25, 95% CI: 1.11-1.40, p<0.001), S4 (OR=1.29, 95% CI: 1.15-1.44, p<0.001), and S5 (OR=1.02, 95% CI: 1.01-1.04, p<0.001).

Longitudinal associations of disordered eating with QOL

As shown in **Table 1,** there were significant main effects for group and time. Women with DE at S2 scored significantly worse than those without, on both MCS and PCS, at each survey, and their scores reflected below average QOL compared to a general population. Indeed, at S2 and S3 the MCS scores were seen to be commensurate with those expected of major depressive disorder. Within each group, MCS increased significantly and PCS decreased significantly over time. There was also a significant interaction, for MCS only, such that women with DE showed a steeper improvement in MCS over time, while still having significantly lower scores than those without.

Moderation of the longitudinal relationship between disordered eating and QOL

For the purposes of each moderation analysis, women were categorised into 4 groups on the basis of their scores at S2. For social support (SS), groups were: high SS, no DE (51%, N=4,863); low SS, no DE (26%, N=2,435); high SS, DE (12%, N=1,144); low SS, DE (11%, N=1,040). For depression, groups were: low depression, no DE (50%, N=4,649); high depression, no DE (27%, N=2,520; low depression, DE (8%, N=789); high depression, DE (15%, N=1,372).

Social support and depressive symptoms each acted as a moderator of MCS, with no significant effects for PCS (see **Table 2**). The moderating effects of social support are shown in **Figure 2**, where those with high social support and no DE maintained the highest level of MCS over time, and those with low social support and DE the lowest. Each group had also experienced a significant improvement in their MCS scores over time. **Table 3** shows the results of post-hoc analyses for the interactions. Those with low social support and DE showed the steepest increase in MCS over time compared to each of the other three groups. There was no difference in increase over time between the low SS no DE group and the high SS DE group, but both increased more steeply over time than the high SS no DE group.

With respect to depressive symptoms a different pattern of moderation emerges, as shown in **Figure 3**. The two groups with high depression at S2 had significantly lower MCS scores than the non-depressed groups at S2, and this difference was maintained at S5. As shown in **Table 3**, the two

groups with high depression at S2 showed a significant increase in MCS over time compared to the two groups with low depression, with the DE group having the highest level of improvement, albeit still leaving them scoring significantly lower than the other three groups.

Discussion

A large, representative longitudinal survey of young Australian women shows that women whose responses were consistent with disordered eating had lower scores on both mental and physical-related QOL than did others, and that this difference persisted across four surveys, spanning nine years. This is the first study to examine the long-term impact of subclinical levels of disordered eating on quality of life, and it suggests that even apparently minor levels of symptomatology are associated with significant and far-reaching deficits in wellbeing. Mean differences in mental-health-related quality of life (MCS) decreased across surveys, but by Survey 5 the difference was still 5 points, a difference which is greater than that observed between Australians with and without major physical illness (Australian Bureau of Statistics, 1997). Differences in physical-related quality of life (PCS), while statistically significant, were only around 2 points on a 100-point scale, which is not a clinically significant difference. The moderation analyses suggested that high levels of social support can buffer the effects of disordered eating on mental health, while low levels of depressive symptoms can confer significant benefit to the mental health of women with disordered eating compared to women with high levels of depressive symptoms either in the absence or presence of disordered eating. Four key findings emerged and are discussed below.

First, 23% of respondents in this sample were categorised as having disordered eating. This suggests that disordered eating is potentially a major public mental health issue, which continues to be underestimated in many countries. These findings are consistent with a recent survey of over 50,000 young Australians (aged 11-24 years), in which body image was most frequently rated the issue of highest personal concern by both female and male respondents (Mission Australia, 2010). Within this survey, body image was ranked of highest personal concern by 40.3% of 20-24 year-olds, compared to 33.3% of 15-19 year-olds and 28.1% of 11-14 year-olds, suggesting that an increasing number of people experience these concerns as they enter young adulthood. It is also consistent with a recent

survey of German adolescents (Herpertz-Dahlman et al., 2008), in which one-third of the girls were found to have disordered eating. The current study suggests that both disordered eating, and associated deficits in mental health, continue well after adolescence. It also highlights a gap in service provision, particularly in the Australian context, where eating disorder prevention programs primarily target young adolescents in schools (e.g., Wilksch & Wade, 2009), with limited options available for women in young adulthood. This is in contrast to the North American context where a focus on development and evaluation of college-based programs has led to empirically-supported eating disorder prevention programs for young adult women (Stice, Shaw, & Marti, 2007).

Second, even subclinical levels of disordered eating are a concern, with significant long-term implications for QOL related to mental wellbeing, and should not be regarded as trivial. The findings confirm those of Herpertz-Dahlman et al. (2008) who found the presence of any disordered eating in adolescents was negatively associated with health-related QOL. Our findings add a valuable longitudinal perspective and suggest that subclinical disordered eating has a lasting negative impact on mental-health-related QOL. The prevalence of these behaviors and their long-term negative impact suggest that widespread public health initiatives tackling any disordered eating behaviors need to be a priority.

Third, the current study highlights the importance of social support. In particular, the finding that women with both disordered eating and high levels of social support did not differ significantly in MCS scores from women without disordered eating and with low social support, on three of the four assessment points, suggests that higher levels of social support can buffer against the effects of disordered eating. This is a striking finding and consistent with other research showing that low social support prospectively predicts the onset of clinical eating disorders two years later in young adult women (Ghaderi & Scott, 2001), and that perceived low levels of social support interact with negative life events to predict an increase in bulimic pathology over a 2-month period amongst young women at college (Bodell, Smith, Hom-Denoma, Gordon, & Joiner, in press). Our findings indicate that interventions that aim to build and support families and communities should be a priority, especially in the transition from school to adult life, when there are fewer structured opportunities to build and maintain social networks. Within the eating disorder prevention field, there has generally

been limited investigation of program effects on social support, with the exception of Stice, Marti, Spoor, Presnell, and Shaw (2008) who found their healthy weight program and dissonance program both significantly improved social adjustment, by comparison with assessment-only controls, in a sample of at-risk late adolescent girls (mean age of 17 years). Thus, future outcome research should focus on the impact of interventions to improve social support and their impact on disordered eating.

Fourth, the current study highlights the harmful role of depression; the level of depressive symptoms was found to moderate the relationship between disordered eating and MCS scores. As expected, those participants with disordered eating and high depression had significantly lower MCS scores than the other three groups. However, those without disordered eating but with high depressive symptoms had significantly worse MCS scores than those with disordered eating with low depressive symptoms. Thus, depression leads to worse outcomes even in the absence of disordered eating. While depression has long been regarded as a risk factor for the development of eating disorders (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004), and appears in multivariate models of eating pathology (Stice & Agras, 1998), this is the first study to show that the combination of depressive symptoms and subclinical disordered eating has a negative impact on mental health-related QOL over a 9-year period, and indeed, that depressive symptoms in the absence of disordered eating also has a long-term effect.

The relationship between depression and social support also requires further investigation in older samples. Stice, Ragan, and Randall (2004), with adolescent girls (mean age of 13), found that low perceived social support from parents (but not peers) predicted increased depressive symptoms three years later, while conversely, high levels of baseline depressive symptoms predicted lower perceived social support from peers at 3-year follow-up. While this research was conducted with a younger sample than the current study, a relationship between social support and depressive symptoms appears likely, such that interventions that can successfully reduce depressive symptoms might also increase social support and *vice versa*. Additionally, some eating disorder prevention programs have also been found to significantly reduce depressive symptoms (e.g., Stice et al., 2008; Wilksch & Wade, 2009), although again, these have been implemented with younger participants than

the current study. Thus it is likely that effective interventions will simultaneously benefit all of depression, social support and disordered eating.

Despite the strengths of the current study, including the large sample size and long-term prospective design, it should be pointed out that there are some limitations. First, the nature of the survey meant that a full and comprehensive assessment of disordered eating was not possible. Second, again because of the constraints of the survey, it was not possible to distinguish participants with clinical eating disorders from those with sub-clinical levels of disordered eating. Our data suggest that increased levels of disordered eating had only a low association with poorer mental QOL, supporting the idea that clinical levels of disordered eating are not required before an adverse impact on QOL is observed. Third, this was a women-only survey; there is substantial evidence (e.g., Herpertz-Dahlman et al., 2008; Mission Australia, 2010) that men, too, experience disordered eating, but it is not clear whether these results would be replicated amongst men. Future research should investigate the impact of disordered eating on young men. Fourth, we were unable to ascertain from the survey whether women had sought treatment for their eating, which could impact on our results, since those who had received treatment might be expected to experience a better QOL. It would be of value to assess this variable in further longitudinal surveys, as it would be to use an eating-disorder-specific QOL measure. Fifth, disordered eating status predicted a significantly lower likelihood of participating in subsequent surveys, thus limiting our ability to make conclusions across the whole spectrum of disordered eating represented in the community. Sixth, our analyses are not a true test of longitudinal moderation as our moderator and independent variables were measured simultaneously at S2. We were unable to measure the moderator variables in a survey before our disordered eating variable as the depression and social support variables were not measured at S1 and disordered eating was not measured at S3.

Given the number of women affected, the seriousness of the consequences of disordered eating for QOL over a long period of time, and the suggestion that health professionals are poor at identifying eating problems, with just 4% of general practitioners use recommended guidelines in screening patients for disordered eating (Currin et al., 2007), the findings of this study suggest that public health interventions aimed at reducing the risk of disordered eating in young women are

required. Clinicians, researchers, and policy makers alike need to turn their attention towards

developing and evaluating appropriate population-based strategies to target disordered eating, social

support and depressive symptoms.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th ed.) – Text Revision*. American Psychiatric Publishing, Inc: Washington, DC.

Andresen, E.M., Carter, W.B., Malmgren, J.A., & Patrick, D.L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D. *American Journal of Preventative Medicine*, *10(2)*, 77-82.

Australian Bureau of Statistics. (1997). *National Health Survey: SF-36 population norms, Australia*. Cat no. 4399.0. http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4399.01995?OpenDocument . Accessed 29th November 2010.

Bodell, Smith, Hom-Denoma, Gordon, & Joiner, (in press). The impact of perceived social support and negative life events on bulimic symptoms. *Eating Behaviours.*

Bohn, K., Doll, H.A., Cooper, Z., O'Connor, M., Palmer, R.L., & Fairburn, C.G. (2008). The measurement of impairment due to eating disorder psychopathology. *Behavior Research and Therapy, 46,* 1105-1110.

Currin, L., Waller, G., Treasure, J., Nodder, J., Stone, C., Teomans, M., & Schmidt, U. (2007). The use of guidelines for dissemination of "best practice" in primary care of patients with eating disorders. *International Journal of Eating Disorders, 40*, 476-479.

Engel, S.G., Adair, C.E., Las Hayes, C., & Abraham, S. (2009). Health-related quality of life and eating disorders: A review and update. *International Journal of Eating Disorders, 42,* 179-187.

Fairburn, C.G., & Beglin, S.J. (1994). Assessment of eating disorders: Interview or self-report questionnaire*? International Journal of Eating Disorders, 16,* 363-370.

Fairburn, C.G., & Bohn, K. (2005). Eating disorder NOS (EDNOS): An example of the troublesome "not otherwise specified" (NOS) category in DSM-IV. *Behavior Research and Therapy, 43,* 691-701.

Fairburn, C.G., & Cooper, Z. (1993). The Eating Disorder Examination (12th ed.). In C.G. Fairburn & G.T. Wilson (Eds.), *Binge Eating: Nature, assessment and treatment* (pp. 317-360). New York: Guilford Press.

Ghaderi, A. (2003). Structural modeling analysis of prospective risk factors for eating disorder. *Eating Behaviors, 3,* 387-396.

Ghaderi, A., & Scott, B. (2000). Coping in dieting and eating disorders. *Journal of Nervous and Mental Disease, 188,* 273-279.

Ghaderi, A., & Scott, B. (2001). Prevalence, incidence and prospective risk factors for eating disorders. *Acta Psychiatrica Scandinavica, 104*(2), 122-130.

Hay, P. (2003). Quality of life and bulimic eating disorder behaviours: Findings from a community-based sample. *International Journal of Eating Disorders*, *33*, 434-442.

Herpertz-Dahlman, B., Wille, N., Holling, H., Vloet, T.D., & Ravens-Sieberer, U. (2008). Disordered eating behaviour and attitudes, associated psychopathology and health-related quality of life: Results of the BELLA study. *European Child & Adolescent Psychiatry, 17(Suppl 1)*, 82-91.

Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C. & Agras, W. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin*, *130*, 19-65.

Jenkins, P.E., Hoste, R.R., Meyer, C., & Blissett, J.M. (2010). Eating disorders and quality of life: A review of the literature. *Clinical Psychology Review*, doi:10.1016/j.cpr.2010.08.003.

Johnson, J.G., Cohen, P., Kasen, S., & Brook, J.S. (2002a). Eating disorders during adolescence and the risk for physical and mental disorders in early adulthood. *Archives of General Psychiatry, 59*, 545-552.

Johnson, J.G., Cohen, P., Kasen, S., & Brook, J.S. (2002b). Childhood adversities associated with risk for eating disorders or weight problems during adolescence or early adulthood. *American Journal of Psychiatry, 159,* 394-400.

Lee, C., Dobson, A.J., Brown, W.J., Bryson, L., Byles, J., Warner-Smith, P., & Young, A.F. (2005). Cohort Profile: The Australian Longitudinal Study on Women's Health. *International Journal of Epidemiology, 34,* 1093-1098.

Mission Australia. (2010). *National Survey of Young Australians*. Sydney: Author.

Mond, J.M., Myers, T.C., Crosby, R.D., Hay, P.J., & Mitchell, J.E. (2010). Bulimic eating disorders in primary care: Hidden morbidity still? *Journal of Clinical Psychology in Medical Settings, 17,* 56-63.

Morgan, J. F., Reid, F., & Lacey, J. H. (1999). The SCOFF questionnaire: assessment of a new screening tool for eating disorders. *British Medical Journal, 319*, 1467-1468.

Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 383-401.

Sherbourne, C.D., & Stewart, A.L. (1991). The MOS social support survey. *Social Science and Medicine*, *32(6)*, 705-714.

Stice, E., & Agras, W.S. (1998). Predicting onset and cessation bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy, 29(2),* 257-276.

Stice, E., Marti, C.N., Shaw, H., & Jaconis, M. (2009). An 8-year longitudinal study of the natural history of threshold, sub-threshold, and partial eating disorders from a community sample of adolescents. *Journal of Abnormal Psychology, 118,* 587-597.

Stice, E., Marti, C., Spoor, S., Presnell, K., & Shaw, H. (2008). Dissonance and healthy weight eating disorder prevention programs: Long-term effects from a randomized efficacy trial. *Journal of Consulting and Clinical Psychology, 76*, 329-340.

Stice, E., Ragan, J., & Randall, P. (2004). Prospective relations between social support and depression: Differential direction of effects for parent and peer support? *Journal of Abnormal Psychology, 113*(1), 155-159.

Stice, E., Shaw, H., & Marti, C. N. (2007). A meta-analytic review of eating disorder prevention programs: Encouraging findings. *Annual Review of Clinical Psychology, 3*(1), 207-231.

Wade, T.D., Bergin, J.L., Tiggemann, M., Bulik, C.M., & Fairburn, C.G. (2006). Prevalence and long-term course of lifetime eating disorders in an adult Australian twin cohort. *Australian and New Zealand Journal of Psychiatry*, *40*, 121-128.

Ware, J.E., & Sherbourne, C.D. (1992). The MOS 36-Item Short-Form Health Survey (SF-36). Conceptual framework and item selection. *Medical Care*, *30*(6), 473-483.

Ware, J.E., Snow, K.K., Kosinski, M., & Gandek, B. (1997). SF-36 Health Survey Manual and Interpretation Guide. Boston, MA, The Health Institute, New England Medical Center.

Wilksch, S. M., & Wade, T. D. (2009). School-based eating disorder prevention. In S. J. Paxton & P. J. Hay (Eds.), *Treatment approaches for body dissatisfaction and eating disorders: Evidence and practice* (pp. 7-22). Melbourne: IP Communications.

Figure 1

Flowchart depicting the study design using data from women born over 1973-1978 (younger cohort)

of the Australian Longitudinal Study of Women's Health
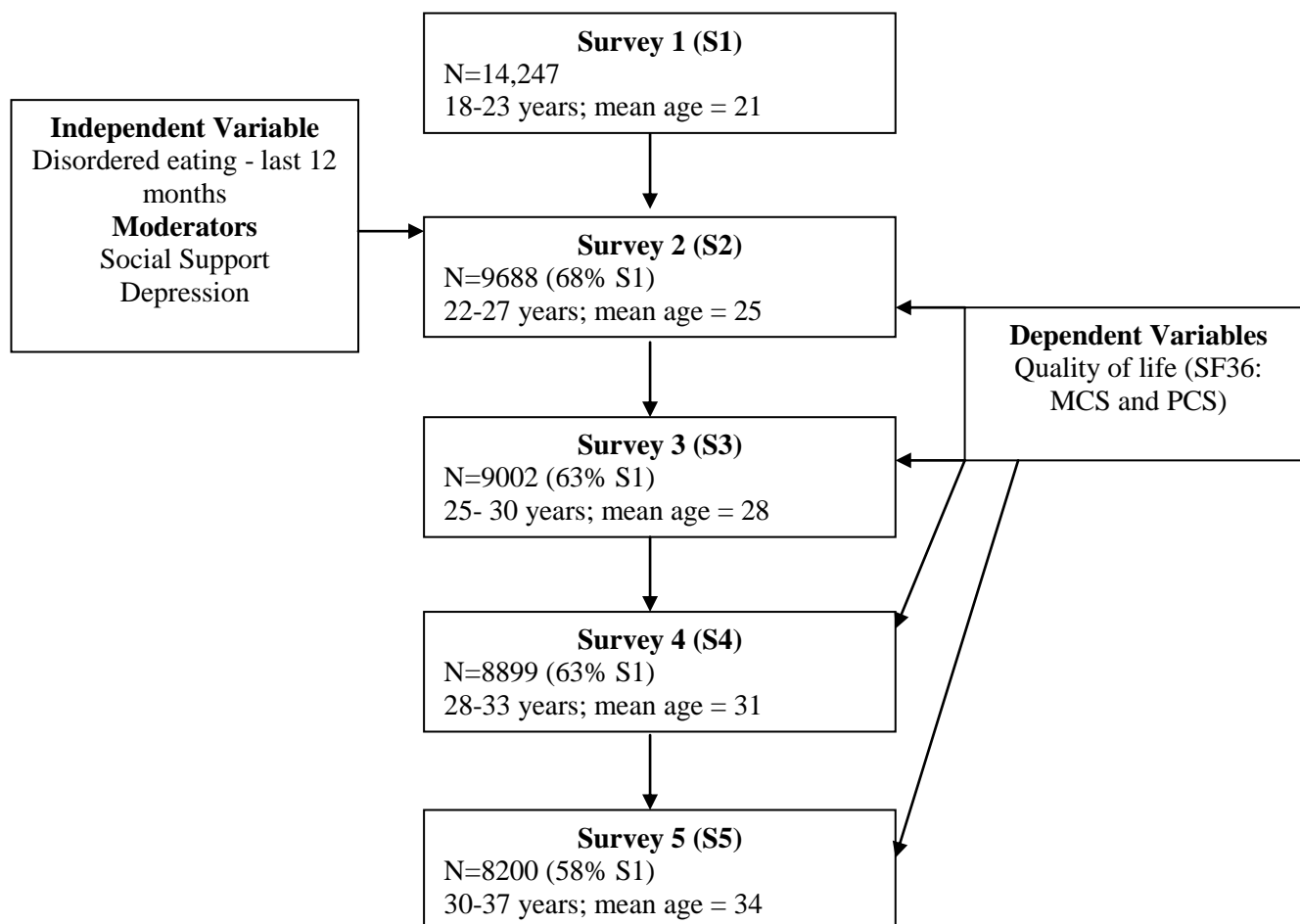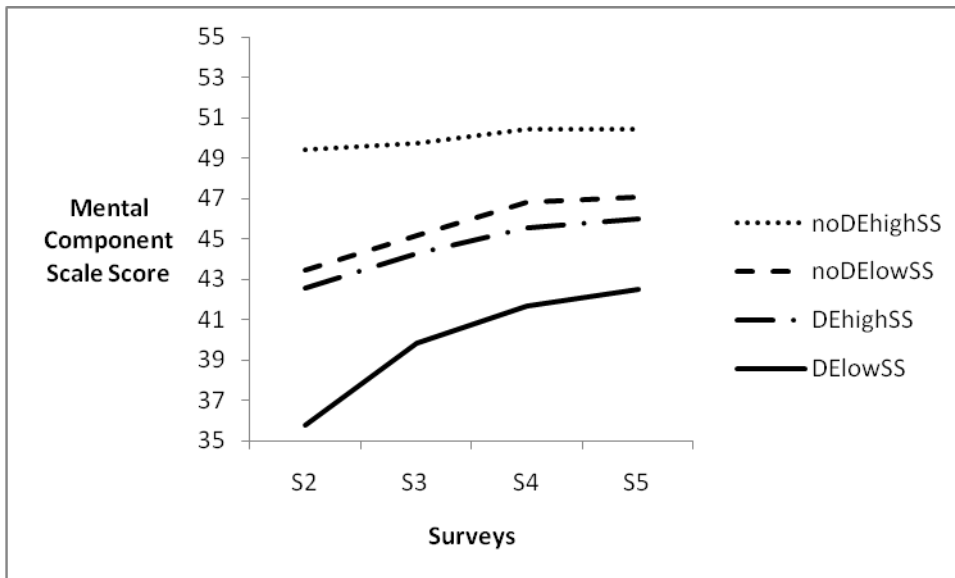
Figure 2

Mental Component Scale (MCS) score over time with respect to social support (SS) and disordered eating

(DE) status

Post hoc analyses: Within each survey, all the groups were significantly different ($p<0.05$, Bonferroni

adjusted) except at S2, S3, and S5, where there was no difference between the noDElowSS and DEhighSS

groups; between S2 and S5 the MCS score for each of the groups had increased significantly ($p<0.05$)

Figure 3

Mental Component Scale (MCS) score over time with respect to depressive symptoms (dep) and disordered

eating (DE) status
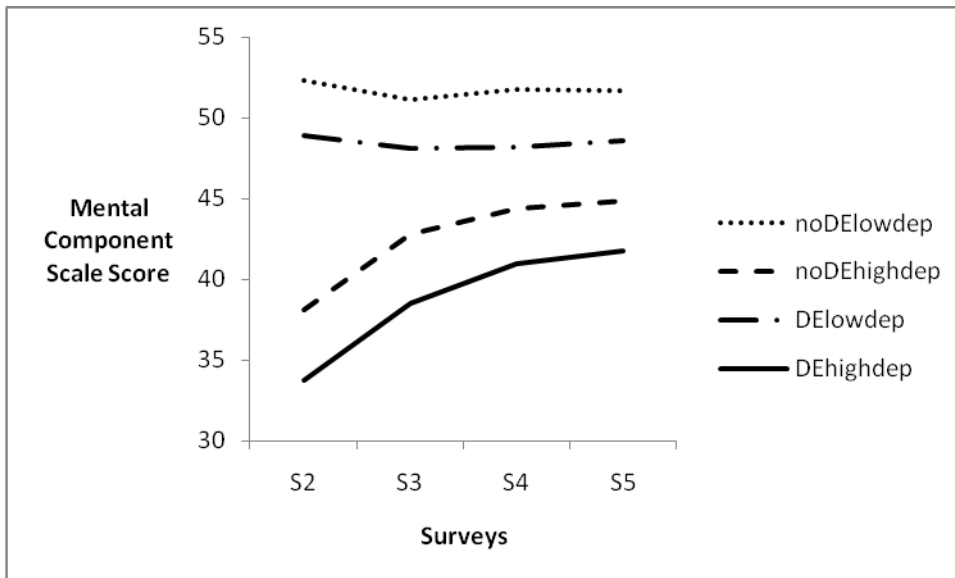
Post hoc analyses: Within each survey, all the groups were significantly different ($p<0.05$, Bonferroni

adjusted); between S2 and S5 the MCS score for each of the groups had changed significantly ($p\leq0.001$)

except for the DElowdep group ($p=0.82$), where the noDElowdep group decreased over time and the other

two groups increased over time.

Table 1

Longitudinal examination of MCS and PCS amongst women with and without disordered eating at S2

Variable	Disordered eating (N=2223)				No disordered eating (N=7465)			
	Survey 2 Mean (SE)	Survey 3 Mean (SE)	Survey 4 Mean (SE)	Survey 5 Mean (SE)	Survey 2 Mean (SE)	Survey 3 Mean (SE)	Survey 4 Mean (SE)	Survey 5 Mean (SE)
SF36: Mental component #*+	39.35 (0.25) [a1]	42.20 (0.28) [b1]	43.75 (0.28) [c1]	44.40 (0.30) [c1]	47.46 (0.14) [a2]	48.24 (0.15) [b2]	49.29 (0.15) [c2]	49.36 (0.16) [c2]
SF36: Physical component#*	48.11 (0.20) [a1]	47.89 (0.22) [a1]	46.07 (0.23) [b1]	46.83 (0.24) [b1]	49.38 (0.11) [a2]	49.26 (0.12) [a2]	48.88 (0.12) [b2]	48.67 (0.13) [b2]

Significant main effect of time ($p \leq 0.001$); * Significant main effect of group ($p \leq 0.001$); + Significant time x group interaction ($p \leq 0.001$)

Note: Post-hoc analyses, denoted by alphabetical superscripts (significant within group differences across surveys) and numerical superscripts (differences between groups at each survey) were significant at the p<0.001 level.

Table 2

Main effects of time, disordered eating, moderator, and interaction

Main effects	MENTAL COMPONENT SCORE	PHYSICAL COMPONENT SCORE
	F (*p*)	F (*p*)
Social Support (error df=30940)		
Time	124.14 (<0.001)	15.17 (<0.001)
Disordered eating	1239.12 (<0.001)	140.52 (<0.001)
Social support	824.16 (<0.001)	27.15 (0.006)
Time x eating x social support	13.89 (<0.001)	1.53 (0.12)
Depressive symptoms (error df=30478)		
Time	115.43 (<0.001)	13.71 (<0.001)
Disordered eating	562.02 (<0.001)	73.00 (<0.001)
Depressive symptoms	4016.95 (<0.001)	183.79 (<0.001)
Time x eating x depressive symptoms	72.55 (<0.001)	1.71 (0.07)

Table 3

Repeated measures ANOVA: group x time post-hoc contrasts and effect sizes of S2 QOL to S5QOL

Groups	F (p) d	F (p) d	F (p) d
	Disordered eating high social support	No disordered eating low social support	No disordered eating high social support
Disordered eating, low social support	**10.44 (0.001) 0.17**	**17.01 (<0.001) 0.17**	**103.59 (<0.001) 0.32**
Disordered eating, high social support		0.13 (0.72) 0.02	**36.30 (<0.001) 0.19**
No disordered eating, low social support			**52.86 (<0.001) 0.20**
	Disordered eating Low depression	No disordered eating High depression	No disordered eating Low depression
Disordered eating, high depression	**116.79 (<0.001) 0.58**	**77.31 (<0.001) 0.37**	**130.42 (<0.001) 0.36**
Disordered eating, low depression		**78.54 (<0.001) 0.37**	**114.65 (<0.001) 0.33**
No disordered eating, high depression			**476.14 (<0.001) 0.62**

Note: Only *p*≤0.001 was considered to be significant (in bold)

Note: *d*= effect size (Cohen's *d*), where 0.3 is small, 0.5 is medium, and ≥ 0.8 is large, derived from the formula: $[2\sqrt{F}]/\sqrt{df}$ (error)