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The role of depression, eating disorder symptoms, and exercise in young adults' quality of life☆

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ABSTRACT

Objective: Eating disorder (ED) symptoms are negatively associated with quality of life (QOL), while exercise is typically positively associated with QOL. Past studies have not examined the relative contribution of depression to this outcome. This study examined the influence of ED symptoms, exercise frequency, and exercise motivation on global QOL in undergraduates while accounting for the shared relationship between ED symptoms and depression.

Method: Students (N = 851) completed the EDE-Q, Reasons for Exercise Inventory, BDI-II, Quality of Life Inventory, and a 1-month exercise timeline followback calendar. Hierarchical regression analyses were conducted to examine the relative contributions of ED symptoms, depression, and exercise variables to QOL.

Results: Shape concern and BDI-II scores accounted for significant variance in QOL scores. Depressive symptoms, however, accounted for 9.55% of the unique variance in QOL, while shape concern accounted for only 0.77%. Exercise frequency did not explain significant variance in QOL. The motivations of exercising for mood improvement and for enjoyment explained significant variance in QOL. No interactions between exercise frequency and exercise motivations were significant. In the final model, identifying as a woman was associated with decreased QOL.

Discussion: Results suggest that studies examining the impact of disordered eating and exercise on QOL should account for depression due to depression's high comorbidity with EDs and its influence on exercise behavior and motivation. Additionally, results support findings that factors such as exercise motivation may better account for differences in QOL than exercise frequency.

1. Introduction

Depression, disordered eating, exercise, and exercise motivations differentially impact quality of life (QOL), or an "individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (World Health Organization, 1997, p. 1). Although the relationships among exercise, exercise attitudes, disordered eating, and QOL have been explored previously (Mond, Hay, Rodgers, & Owen, 2006a; Mond, Hay, Rodgers, Owen, & Beumont, 2004; Mond, Myers, Crosby, Hay, & Mitchell, 2008), these studies did not include depressive symptoms. Because depression is highly comorbid with eating disorders (EDs), affects physical activity and exercise motivation, and contributes to decreased QOL, studies examining disordered eating and exercise behavior and motivations should consider the role of depression (IsHak et al., 2011). Given that depression negatively impacts QOL and is highly comorbid with ED symptoms, it is possible that the variance accounted for in QOL measures by ED symptoms could be better explained by their comorbid relationship with depression.

1.1. The impact of exercise on quality of life

In addition to health benefits, such as improving cardiovascular fitness, promoting sleep, and reducing stress (Hassmén, Koivula, & Uutela, 2000; Kredlow, Capozzoli, Hearon, Calkins, & Otto, 2015; Penedo & Dahn, 2005; Warburton, Nicol, & Bredin, 2006), physical activity reduces depressed mood (Cooney et al., 2013; Craft & Perna, 2004; Paluska & Schwenk, 2000; Penedo & Dahn, 2005). Exercise may also relate positively to QOL. For example, a large (n = 17,246) cross-sectional, multinational study of college students found greater odds of reporting moderate to high life satisfaction among participants who engaged in physical activity over the previous two weeks compared to

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those who had not (Grant, Wardle, & Steptoe, 2009). Similarly, in university students, high-frequency and heavy-volume exercisers compared to low-frequency and low-volume exercisers reported higher global and health-specific QOL (Lustyk, Widman, Paschane, & Olson, 2004).

1.2. The impact of eating disorder symptoms on quality of life

Clinical samples of patients with EDs, as well as subclinical college samples, consistently report lower QOL than controls (de la Rie, Noordenbos, & van Furth, 2005; Padierna, Quintana, Arostegui, Gonzalez, & Horcajo, 2000; Doll, Petersen, & Stewart-brown, 2005; Jenkins, Hoste, Meyer, & Blissett, 2011). For example, in a longitudinal study of women with EDs, baseline psychological symptoms and lower BMI were significantly associated with poorer mental QOL at later assessments, and women remained highly symptomatic with low QOL over time (Hay et al., 2010). Additionally, estimates of EDs among college students range from 8 to 17%, which exceed lifetime prevalence rates (Eisenberg et al., 2011; Hudson, Hiripi, Pope Jr., & Kessler, 2007; Kirk, Singh, & Getz, 2001), and the negative relationship between ED symptoms and QOL appears consistent for college students (Duarte, Ferreira, Trindade, & Pinto-Gouveia, 2015). These students with disordered eating symptoms also often engage in detrimental excessive or compulsive exercise, which could affect QOL. Many of these studies, however, measured health-related QOL (HRQOL) or used ED-specific QOL measures (Ackard, Richter, Egan, Engel, & Cronemeyer, 2014; Padierna et al., 2000; Baiano et al., 2014; Engel, Adair, Hayas, & Abraham, 2009). Within university samples, where participants are generally free of major physical limitations, subjective measures of QOL and life satisfaction may be preferable indicators of well-being (Joseph, Royse, Benitez, & Pekmezi, 2014).

1.3. The impact of exercise on QOL when eating disorder symptoms are considered

Although exercise is generally considered adaptive, among women with EDs, compulsive exercise is associated with distress and lower HRQOL (Young et al., 2018). Furthermore, a study of community women found that estimated exercise frequency over the past month did not account for significant variance in a social and psychological QOL composite score when controlling for disordered eating (Mond, Hay, Rodgers, Owen, & Beumont, 2004). This finding suggests that eating pathology may account for the influence of exercise on QOL. In short, ED symptoms negatively impact QOL, and exercise does not appear to positively contribute to QOL when ED symptoms are considered.

Some exercise motivations related to ED pathology may also further decrease QOL. Frequency of exercise and exercise motivated by improving body tone and appearance may be associated with higher ED pathology (Mond, Hay, Rodgers, Owen, & Beumont, 2004), and exercising to control weight, body tone, and attractiveness correlate positively with eating disturbance and body image dissatisfaction in undergraduates (McDonald & Thompson, 1992). Vartanian and colleagues also found that appearance-based motives for exercising were positively associated with body image concerns (Vartanian, Wharton, & Green, 2012). In sum, appearance-related reasons for exercise are related to eating pathology and body dissatisfaction, but it is unknown how these motivations may interact with exercise frequency to impact college student QOL after accounting for disordered eating.

1.4. Depression may impact the relationship between exercise, ED symptoms, and QOL

EDs are also highly comorbid with depression (Blinder, Cumella, & Sanathara, 2006; Swanson, Crow, Grange, Swendsen, & Merikangas, 2011), which negatively impacts QOL (IsHak et al., 2011; Papakostas et al., 2004). Depression also affects motivation, and people with depression are generally less active than those without (Craft & Perna, 2004). This lack of motivation may significantly impact a depressed individual's motivation to exercise, despite its association with alleviating depressed mood. University students may especially benefit from regular exercise given that depression rates among university students may be as high as 30.6%, compared to 6–12% in the general population (Ibrahim, Kelly, Adams, & Glazebrook, 2013). We hypothesize that individual differences in depression may significantly contribute to self-reported QOL, over and above the impact of ED symptoms. Additionally, both depression and ED symptoms impact motivation to exercise and exercise frequency, which is generally an activity that improves QOL.

1.5. Current study

This study first explored whether the association between disordered eating and QOL is better explained by their common overlapping variance with depression. First, we examined the association between ED symptoms and QOL in a large undergraduate sample, statistically adjusting for age, gender, and race. We expected to replicate previous findings that ED symptoms are negatively associated with overall QOL. We then examined the contribution of depressive symptoms to this model, which has not been included in previous studies. Next, we examined the relative contributions of exercise frequency and reasons for exercise to QOL, after accounting for ED and depressive symptoms. Finally, we examined the interactions of exercise motivations and exercise frequency on QOL.

2. Materials and methods

2.1. Participants

Participants were 851 women (n = 676) and men (n = 170) from a large southeastern university enrolled in introductory psychology courses. A total of 99% of participants were between the ages of 17 and 22 years (M = 18.78, SD = 1.27). Of those surveyed, 63.7% were first-, 15.6% second-, 13.4% third-, and 6.5% fourth-year students. Participants identified as White (75.44%), African American (10.34%), Asian (6.81%), Hispanic (2.59%), Native American (0.47%), bi-racial (2.47%), or Other (1.06%).

2.2. Measures

2.2.1. Eating Disorder Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 1994)

The Eating Disorder Examination Questionnaire is a self-report measure that assesses ED symptoms over the past 28 days. Symptoms are grouped into four subscales. Restraint, eating concern, weight concern, and shape concern were examined. The subscales demonstrated fair to excellent internal consistency in this sample (restraint = 0.84, eating concern = 0.75, weight concern = 0.91, and shape concern = 0.89).

2.2.2. Beck Depression Inventory-II (BDI-II) (Beck, Steer, & Brown, 1996)

The BDI-II is a 21-item measure used to assess depressive symptoms, such as hopelessness, loss of pleasure in daily activities, weight changes, and sleep changes over the previous two weeks. Each item is rated on a four-point scale (0 to 3) and summed for a total score. Scores are categorized as minimal (0 − 13), mild (14–19), moderate (20–28), and severe (29–63) endorsement of depressive symptoms. The BDI-II factor structure and convergent validity has been established in multiple samples, including college students (Storch, Roberti, & Roth, 2004). Cronbach's alpha was excellent (α = 0.90) for this sample.