



Risk factors for eating disorder symptoms at 12 years of age: A 6-year longitudinal cohort study



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ABSTRACT

Eating disorders pose risks to health and wellbeing in young adolescents, but prospective studies of risk factors are scarce and this has impeded prevention efforts. This longitudinal study aimed to examine risk factors for eating disorder symptoms in a population-based birth cohort of young adolescents at 12 years.

Participants from the Gateshead Millennium Study birth cohort ($n = 516$; 262 girls and 254 boys) completed self-report questionnaire measures of eating disorder symptoms and putative risk factors at age 7 years, 9 years and 12 years, including dietary restraint, depressive symptoms and body dissatisfaction. Body mass index (BMI) was also measured at each age.

Within-time correlates of eating disorder symptoms at 12 years of age were greater body dissatisfaction for both sexes and, for girls only, higher depressive symptoms. For both sexes, higher eating disorder symptoms at 9 years old significantly predicted higher eating disorder symptoms at 12 years old. Dietary restraint at 7 years old predicted boys' eating disorder symptoms at age 12, but not girls'. Factors that did not predict eating disorder symptoms at 12 years of age were BMI (any age), girls' dietary restraint at 7 years and body dissatisfaction at 7 and 9 years of age for both sexes.

In this population-based study, different patterns of predictors and correlates of eating disorder symptoms were found for girls and boys. Body dissatisfaction, a purported risk factor for eating disorder symptoms in young adolescents, developed concurrently with eating disorder symptoms rather than preceding them. However, restraint at age 7 and eating disorder symptoms at age 9 years did predict 12-year eating disorder symptoms. Overall, our findings suggest that efforts to prevent disordered eating might beneficially focus on preadolescent populations.

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1. Introduction

The incidence of eating disorders rises from childhood to early adolescence, defined as 10–13 years of age (Nicholls, Lynn, & Viner,

2011; Sawyer et al., 2012). Consequently, most previous research into the developmental psychopathology of eating disorders has begun at around 12 years old. By this age, eating disorder symptoms are already present in non-clinical populations at levels similar to those found in late adolescence (Wichstrøm, 2000), which suggests that the antecedent conditions for such disorders arise before adolescence. Eating disorder symptoms do not correspond, in severity or specificity, to full-syndrome eating disorders. Instead they encompass a broad array of dimensional maladaptive cognitions and behaviours relating to eating and weight. These cognitions and behaviours are found across the range of full-syndrome eating disorder diagnoses as well as in sub-syndromal variants (Walsh & Sysko, 2009). An understanding of causal risk factors for eating disorder symptoms is important because such symptoms increase children's risk of subsequent weight gain,

Abbreviations: BMI, body mass index; CBIS, Children's Body Image Scale; CDI-S, Child Depression Inventory-Short Form; ChEAT, Children's Eating Attitudes Test; DEBQ-C, Dutch Eating Behaviour Questionnaire child version; GMS, Gateshead Millennium Study; IWQOL-Kids, Impact of Weight on Quality of Life-Kids.

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depression, weight cycling and full-syndrome eating disorders in adolescence (Chamay-Weber, Narring, & Michaud, 2005; Combs, Pearson, Zapolski, & Smith, 2012; Field et al., 2003; Stice, Hayward, Cameron, Killen, & Taylor, 2000).

A recent comprehensive evidence synthesis highlighted a clear research need for prospective examinations of risk factors for disordered eating, including non-clinical samples of both boys and girls and commencing at a younger age than previous studies i.e. 6–10 years of age (Culbert, Racine, & Klump, 2015). In the current study, we prospectively examined potential risk factors, starting at age 7, to determine which variables contributed to the development of eating disorder symptoms at 12 years of age. These variables included body dissatisfaction, depression, dietary restraint, body mass index (BMI), and previous eating disorder symptoms. Given the absence of an established theoretical framework within which to situate the longitudinal development of eating disorder symptoms over preadolescence - mainly due to an absence of prospective data - these predictor variables were selected from intrapersonal risk factors for disordered eating in older adolescents and adults, broadly in line with the dual pathway model (Stice & Agras, 1998).

1.1. Putative predictors of eating disorder symptoms at 12 years of age

It is widely accepted that greater evaluative body dissatisfaction, also referred to as lower body esteem, contributes to the emergence and maintenance of eating disorder symptoms (Stice & Shaw, 2002; Stice, 2002). This consensus is based primarily upon findings with older, predominantly female samples. In contrast, findings with younger, mixed-sex groups are equivocal: some studies suggest that body dissatisfaction is directly correlated with, but does not predict, eating disorder symptoms over pre-adolescence, (Allen, Byrne, McLean, & Davis, 2008; Parkinson, Drewett, Le Couteur, & Adamson, 2012), instead emerging as a predictor at around 13 years old (Ferreiro, Seoane, & Senra, 2012). Conversely, other studies have found an effect in preadolescence, but only for boys (Keel, Fulkerson, & Leon, 1997) or only for girls (Gardner, Stark, Friedman, & Jackson, 2000). The effects and developmental dynamics of body dissatisfaction's relation to eating disorder symptoms may vary depending on age and gender (Culbert et al., 2015). In these terms, body dissatisfaction and eating disorder symptoms may co-emerge in pre-adolescence but the former may drive the latter during adolescence itself.

Body dissatisfaction is extremely common in preadolescence, affecting around 40% of children aged 6 to 11 (Truby & Paxton, 2008), whereas elevated eating disorder symptoms are less prevalent, (Erickson & Gerstle, 2007; Westerberg-Jacobson, Ghaderi, & Edlund, 2012). There is a degree of conceptual and statistical overlap between the two. However, the aforementioned prevalence data suggest that it is unlikely that the former should be considered an exclusive subcategory of the latter as opposed to a potential risk factor in its own right. Further investigation is needed regarding body dissatisfaction's role as a risk factor for eating disorder symptoms in younger mixed-sex groups.

In addition to a direct relationship, body dissatisfaction may lead to eating disorder symptoms via the mediating influences of elevated depressive symptoms and greater dietary restraint (Stice, Ng, & Shaw, 2010), as proposed in the dual pathway model of eating pathology (Stice & Agras, 1998). Limited evidence suggests that depressive symptoms predict eating disorder symptoms in early adolescence among girls (Rodgers, Paxton, & McLean, 2014), although a reciprocal relationship has also been reported (Ferreiro, Wichstrøm, Seoane, & Senra, 2014). Dietary restraint has been found to predict disordered eating in adolescents (Neumark-

Sztainer et al., 2006) and similarly, dietary restraint at 7 years of age was found to predict subsequent eating disorder symptoms at 9 years of age in a previous study with this cohort (Parkinson et al., 2012). It is possible that dietary restraint constitutes a precursor or subcomponent of eating disorder symptoms although, like body dissatisfaction, dietary restraint is highly prevalent (Shunk & Birch, 2004) whereas eating disorder symptoms are less so. A cross-sectional study recently demonstrated that depressive symptoms and dietary restraint fully mediated the relationship between body dissatisfaction and eating disorder symptoms in girls aged 7–11 years (Evans, Tovee, Boothroyd, & Drewett, 2013).

Higher body mass index (BMI) is another proposed risk factor for higher eating disorder symptoms, although previous studies have not found evidence of this relationship in childhood (e.g., Gardner et al., 2000; Parkinson et al., 2012) with rare exceptions (Jendrzyca & Warschburger, 2016). Research with adults and adolescents suggests that body dissatisfaction may fully mediate the inconsistently observed relationships between eating disorder symptoms and BMI (Lynch, Heil, Wagner, & Havens, 2008; Micali et al., 2015; Rohde, Stice, & Marti, 2015; Stice & Whitenton, 2002).

Continuity of eating disorder symptoms over time has been observed amongst children and young adolescents in most previous longitudinal studies (e.g., Ferreiro et al., 2014; Gardner et al., 2000; Keel et al., 1997), suggesting that eating disorder symptoms become at least partially established at an early age (Wichstrøm, 2000). This highlights the importance of controlling for initial levels of the outcome variable (Stice, 2002) when predicting an outcome across time, something that has not always been done in previous studies of eating disorder symptoms with preadolescents (e.g., Davison, Markey, & Birch, 2003).

1.2. Sex differences in eating disorder symptoms

Both eating disorder symptoms and depressive symptoms are overrepresented in girls from 12 to 13 years of age onwards (Ferreiro, Seoane, & Senra, 2011), and it has been proposed that these internalising symptoms constitute female-specific reciprocal risk factors whose mutual influence escalates with time (Beato-Fernández, Rodríguez-Cano, Pelayo-Delgado, & Calaf, 2007). However, other studies suggest that depressive symptoms also play a direct causal role in boys' eating disorder symptoms from around the age of 13 (Ferreiro et al., 2011). The influence of body dissatisfaction on eating disorder symptoms, too, may vary with sex: Ferreiro et al. (2012) found that body dissatisfaction and eating disorder symptoms were directly correlated in boys and girls at age 11 but that body dissatisfaction emerged as a causal risk factor for girls only, from age 13 onwards. However, none of these studies looked at preadolescent risk factors, and dietary restraint does not appear to have been examined as a predictor in this context. Questions remain regarding sex differences in the emergence of eating disorder symptoms, and further longitudinal studies of these phenomena in preadolescent girls and boys are clearly merited (Culbert et al., 2015).

1.3. Aims and hypotheses

The present study set out to examine risk factors by identifying earlier predictors and within-time correlates of eating disorder symptoms in a population-based birth cohort (Gateshead Millennium Study: GMS) of boys and girls at 12 years of age. The first aim was to identify *within-time* associations of eating disorder symptoms with measures of body dissatisfaction, depressive symptoms, and BMI all at 12 years of age. Associations were examined separately for boys and girls. The second aim was to identify *prospective predictors* of eating disorder symptoms at 12 years of age, again

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