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Childhood risk factors for lifetime bulimic or compulsive eating by age 30 years in a British national birth cohort

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ABSTRACT

Objective: To examine whether previously identified childhood risk factors for bulimia or compulsive eating (BCE) predict self-reported lifetime BCE by age 30 years in a prospective birth cohort.
Method: Using data from the 1970 British Cohort Study at birth, 5, and 10 years, associations between 22 putative childhood risk factors and self-reported lifetime BCE at 30 years were examined, adjusting for sex and socioeconomic status.
Results: Only female sex (odds ratio (OR): 9.2; 95% confidence interval (CI): 1.9–43.7; $p = 0.005$), low self-esteem (OR:2.9; 95%CI: 1.1–7.5; $p = 0.03$) and high maternal education (OR:5.4; 95%CI: 2.0–14.8; $p = 0.001$) were significantly associated with higher risk of BCE, whereas high SES at 10 years was significantly protective (OR:0.2; 95%CI: 0.1–0.8; $p = 0.022$) of BCE in fully adjusted multivariable logistic regression analysis.
Discussion: Our findings do not support a strong role for childhood weight status and eating behaviours in the development of bulimia and compulsive eating pathology, rather suggesting a focus on self esteem may have greater relative importance. Findings in relation to maternal education and SES need further exploration.

1. Background

Identification of childhood risk factors that might predict later problem eating behaviours is important for understanding etiology and developing prevention and early intervention strategies to combat rising rates of obesity and eating disorders (Jacobi et al. 2011). Research has suggested that loss of control over eating is associated with increased general as well as eating related psychopathology, and for overweight and obesity (Kalarchian & Marcus, 2012). Bulimic, compulsive or binge eating, abbreviated hereafter as BCE (bulimic or compulsive eating) is defined as regularly consuming large quantities of food over a short period of time in the absence of hunger associated and with loss of control. It is a common feature of adolescent and adult onset eating disorders and is a risk factor for other mental health difficulties such as depression, as well as for obesity. The development of BCE is multifactorial, involving a combination of genetic, metabolic, environmental, and behavioural factors. Whilst research continues in both animal models (Di Segni, Patrono, Patella, Puglisi-Allegra & Ventura, 2014) and humans (Balodis, Grilo & Potenza, 2015) to understand the neuroscientific basis of the reward and reinforcing processes that underlie BCE (Kessler, Hutson, Herman & Potenza, 2016), there is a pressing need to identify potentially modifiable social and psychological aspects of risk in light of the physical and psychological morbidity associated with BCE. For example, several studies suggest a link between stress, access to highly palatable food, and BCE, as a pathway to the development of obesity (Sominsky & Spencer, 2014).

Risk factor research is fraught with methodological challenges however. Most studies of risk for eating disorders do not have sufficient power to distinguish risk factors for restrictive eating, as seen in anorexia nervosa (AN), from BCE, seen in patients with bulimia nervosa (BN) and binge eating disorder (BED) (Stice, Ng & Shaw, 2010). Risk factor research is also often limited by cross-sectional or retrospective design and small sample sizes. Kraemer et al. (Kraemer et al. 1997) emphasise precedence as an essential requirement for a risk factor (with the exception of fixed markers such as female status), thus requiring validation by longitudinal research. Data from national birth cohorts addresses many

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methodological weaknesses of childhood risk factor research. Samples are large, representative of the population and assess risk factors across the lifetime of the sample. Furthermore, cohort data lack systematic bias with regard to hypotheses, since data were not collected to investigate eating-related behaviours.

The current study tested hypotheses posed in the existing literature regarding possible psychological and social risk factors for BCE, using data from the British 1970 birth cohort (BCS70) cohort. Risk factors for BCE were identified from recently published authoritative reviews (Jacobi, 2005; Stice et al. 2010; Keel & Forney, 2013). We tested factors that had previously been confirmed from longitudinal research (replication); where longitudinal findings were inconclusive due to inadequate power (confirmation); or where risk factor status was based on retrospective or cross sectional data and had not been confirmed by longitudinal design (validation). We focussed on potentially modifiable risk factors typically found in cohort data such as perinatal factors, childhood behaviours (both eating and non eating related), parental factors including eating disorders and substance misuse, psychological factors such as low self esteem, and childhood or parental obesity. Previous findings regarding the role of prenatal and perinatal factors in risk for EDs have been mixed (Krug, Taborelli, Sallis, Treasure & Micali, 2013) and therefore positive findings require replication. Findings for BMI and childhood eating behaviour as risk factors for bulimic and binge eating disorders are inconsistent in the literature, most studies being retrospective in nature, meaning validation as risk factors for, rather than consequences of, disordered eating behaviour is required. Other childhood factors such as inattention may also play a role (Sonneville et al. 2015). The role of parental factors is also extremely important to clarify, since many early intervention treatment strategies involve parents. Our aim was to seek the most robust markers predicting BCE by age 30.

2. Methods

The BCS70 longitudinal study enrolled 16,567 babies from England, Scotland, Wales and Northern Ireland born in one week in April 1970, with follow-up at five years (n = 13,135: 21% attrition), 10 years (n = 14,875: 10% attrition) and 30 years (n = 11,261: 32% attrition). Datasets were obtained electronically from the UK Data Service (http://ukdataservice.ac.uk), who gave approval for analysis. As efforts were made to recruit 'difficult to reach' participants at 30 years, there was only 3.9% additional attrition from lower socioeconomic status participants (those who had fathers in manual employment) between birth and the 30 year follow-up. Ethics consent for participation and for future secondary analyses of anonymized data was obtained at each survey from parent and participant (when adult). Specific ethics approval was not necessary for these analyses.

2.1. Case definition

At age 30, participants were interviewed and completed a questionnaire asking if they had ever had or been told that they had: "*Anorexia Nervosa*", "*Bulimia or compulsive eating*", "*problems with swallowing*" or "*some other kind of eating problem?*". Those answering "no" to all eating problems formed the control group (n = 10,805). Participants who reported "*Bulimia or compulsive eating*" formed the BCE group. No definition of BCE was provided. Participants answering yes to an eating problem other than BCE (n = 299), and those answering yes to BCE plus AN (n = 16) were excluded from analyses. Participants were also asked "Have you had an eating disorder in the last 12 months?", "Have you seen a doctor in the past 12 months about your eating disorder?" and "How old were you when you first had an eating disorder?". Individuals reporting onset of BCE before age 10 were excluded to ensure risk factors preceded onset. The BCE group comprised 91 people, approximately 1% of the whole sample.

2.2. Risk factor variables

The most appropriate variables in the BCS70 dataset to represent risk factors identified from the literature were identified (Table 1). There were no variables from the five or 10-year data representative of the following hypothesised risk factors: thin body preoccupation, body dissatisfaction, interoceptive awareness, perfectionism, social support from family, sexual victimization, parental eating attitudes, parental perception of child's weight, negative comments about weight, and family history of depression and drug use.

Obstetric risk factors

Prematurity was defined as gestational age <37 weeks. Very low birth weight was defined as <1500 g. Data on anaemia during pregnancy, maternal diabetes, antenatal admissions into hospital, administration of oxygen to baby, abnormal foetal heart rate (<120 or >160 beats/minute) and eclampsia during labour were combined to give a six-factor obstetric risk score to indicate perinatal problems. Risk-scores were dichotomised into "none" and "≥1 risk factor" for analyses.

Child risk factors

Health problems before age five were assessed from maternal report (at five years) of 'biliousness', head and stomach aches more than monthly for the previous 12 months, dichotomised into "none" and "≥1 health problem". Sleep problems were by maternal report at five years to the question "Does your child have any sleeping difficulty?", dichotomised into "yes"/"no".

At 10 years, children were weighed and measured by a Medical Officer, school nurse or health visitor, and BMI z-scores (zBMI) for gender calculated using UK 1990 revised growth reference (Cole, Freeman and Preece, 1995) (contemporaneous BMI reference data were not available). Obesity at 10 years was defined as BMI>95th centile. Mean zBMI for the cohort at 10 years was −0.10 (standard deviation (SD) 1.00), reflecting the rightwards shift in mean BMI between 1980 and derivation of the growth reference. zBMI at age 10 was investigated as a continuous variable. Evidence of puberty at 10 years (yes/no) was identified by the school physician after physical assessment.

The Social Development Scale contained items from Conner's Teacher Rating Scale and Rutter Teaching Scale. A 14-item conduct problems/impulsivity/hyperactivity subscale and an eight-item attention deficit subscale has been previously identified by factor analysis (Irving, 2002). We defined high scorers as >1 SD from the sample mean in the direction of greater problems for all child behaviour scales. Self-esteem was assessed with the Lawrence Self-Esteem Questionnaire (Lawrence, 1981), and categorized into: "medium" for scores between −1 SD and +1 SD of the population mean, "low" for scores >1 SD below and "high" for scores >1 SD above the population mean (Hart, 1985). Childhood anxiety and negative affect/emotionality was investigated with reports of absence from school due to emotional reasons over the last 12 months (yes/no) and scores >1 SD above the sample mean on the Rutter scale of emotional problems at 10 years. Escape-avoidance coping or personal ineffectiveness were identified by an external locus of control score >1 SD below the sample mean on the Caraloc scale of ability to control destiny. Impulsivity was defined by teacher and mother reports of the child being 'impulsive/excitable' at 10 years (yes/no) in the Rutter scale. Adverse family experience