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Power of Food Scale in association with weight outcomes and dieting in a nationally representative cohort of U.S. young adults

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Abstract

Food reward sensitivity may influence susceptibility to overeating in a permissive food environment, contributing to unintended weight gain and intentional weight loss behavior. This study examined associations of food reward sensitivity, assessed by the Power of Food Scale (PFS), with weight outcomes and dieting in a nationally representative cohort of U.S. emerging adults. Wave 5 (W5, 5th year of follow-up) respondents from the NEXT Generation Health Study were included (N=2202, W5 age=20.3±0.02 years). Baseline and W5 BMI, W5 weight status (normal weight=18.5≤BMI<25, overweight=25≤BMI<30, obese=BMI≥30), BMI change (W5-baseline BMI) and onset of overweight or obesity (OWOB) were calculated from self-reported height and weight. PFS (aggregate and 3 domain scores: food available, present, and tasted) and dieting for weight-loss were assessed at W5. Adjusted linear regressions estimated associations of PFS with W5 BMI and BMI change. Log-binomial regressions estimated associations of high W5 BMI (≥25), OWOB onset and dieting with PFS. Post hoc analyses estimated associations of PFS with W5 perceived weight status (overweight vs. about right or underweight). W5 BMI=25.73±0.32 kg/m^2, and OWOB

onset occurred in 27.7% of participants. The PFS-food available score was associated with BMI change, β ± SE=0.41±0.19. Other PFS scores were not associated with weight outcomes. Dieting prevalence was higher in participants with high versus low W5 BMI (61% versus 32%), and was positively associated with all PFS scores except the PFS-food tasted score, e.g., relative risk (RR) of dieting for PFS-aggregate=1.13, 95%CI [1.01–1.26]. Post-hoc analyses indicated perceived overweight was positively associated with PFS-food available, 1.12, [1.01–1.24], and PFS-food present, 1.13, [1.03–1.24]. PFS was positively related to dieting and perceived overweight, but not concurrent or change in weight status in a representative cohort of U.S. emerging adults.

Introduction

Young adulthood represents a critical period for obesity development. The prevalence of overweight and obesity increased by approximately 25%–75% over 10 years in participants aged 18–30 years at baseline in the CARDIA study (Lewis et al., 2000). Similarly, obesity prevalence doubled between the ages of 18 and 30 years in participants of the 1970 British Birth Cohort (Viner & Cole, 2006). Recent cross-sectional data indicate the prevalence of overweight and obesity among adults aged 20–39 years is nearly twice that of adolescents 12–19 years (Ogden, Carroll, Kit, & Flegal, 2014). Given the well-documented impact of obesity on multiple health indicators and outcomes (World Health Organization (WHO) (2000), research is urgently needed to better understand correlates of weight increases during the transition from adolescence to young adulthood (“emerging adulthood”).

Individual susceptibility to weight gain may be influenced by food reward sensitivity, the neurologic response to the rewarding properties of food stimuli (Davis, Strachan, & Berkson, 2004) leading to increased motivation to eat in the absence of metabolic need (Lowe & Butryn, 2007). Findings from functional magnetic resonance imaging (fMRI) studies have shown that greater sensitivity to food cues predicts increases in body weight (Stice et al., 2010, Sun et al., 2015, Yokum et al., 2011) and body fat (Stice, Burger, & Yokum, 2015), as well as reduced success from participating in a weight-loss program (Murdaugh, Cox, Cook, & Weller, 2012). Further, sensitivity to food stimuli was associated with greater food intake in the absence of hunger (Nolan-Poupart, Veldhuizen, Geha, & Small, 2013), supporting the hypothesis that increased food reward sensitivity may underlie both unintentional overeating and weight gain. However, the generalizability of these neuroimaging studies may be limited by the small sample sizes and the homogenous sample characteristics (e.g., primarily White, female young adults). Larger studies have investigated food reward sensitivity using the Power of Food Scale (PFS) (Cappelleri et al., 2009, Lowe et al., 2009), a psychometric assessment of motivation to consume palatable foods in the environment.

This measure has been positively associated with BMI over time in clinical weight-loss and bariatric-surgery patients (Carpenter et al., 2013, Schultes et al., 2010, Ullrich et al., 2013). However, studies in larger, non-clinical samples have yielded inconsistent findings regarding the association of PFS with BMI (Cappelleri et al., 2009, Lowe et al., 2009, Yoshikawa et al., 2012), and have not examined associations with BMI change. The association of PFS with BMI and BMI change in a large, representative sample of US emerging adults has not been investigated.

Dieting, the act of restricting intake in order to produce weight loss, is paradoxically a reliable predictor of long-term weight gain (Lowe et al., 2013, Neumark-Sztainer et al., 2012). Several explanations causally link dieting to weight gain through metabolic and/or behavioral mechanisms (Mann et al., 2007, Neumark-Sztainer et al., 2007, Rosenbaum et al., 2010, Stice et al., 2011). However, an alternative hypothesis is that dieting and weight gain are both influenced by factors underlying an individual's susceptibility to overeat (Hill, 2004, Pietilainen et al., 2012), such as heightened sensitivity to food cues (Ely et al., 2014, Lowe and Butryn, 2007). While the relationship of dieting with PFS has not been previously examined, dietary restraint was positively associated with PFS in a large sample of predominantly White college students (Lowe et al., 2009), and with activation of brain reward regions during food intake in a small sample of adolescent females (Burger & Stice, 2011). However, dietary restraint is conceptually distinct from dieting since restrained eaters do not consistently consume less than non-restrained eaters (Stice, Fisher, & Lowe, 2004), and only a subset of restrained eaters report dieting to lose weight (Goldstein, Katterman, & Lowe, 2013). Identifying the psychosocial risk factors for dieting may help identify young adults most susceptible to excess weight gain and who would benefit most from early intervention.

The purpose of this study was to investigate the association of PFS with weight outcomes and dieting in a nationally representative cohort of emerging adults. We examine several indicators of body weight including concurrent BMI and weight status as well as BMI change and risk of onset of overweight and obesity (OWOB) over 5 years.

Section snippets

Study setting

Data come from the NEXT Generation Health Study, an on-going, observational prospective cohort study of multiple health indicators and behaviors in a nationally-representative sample of U.S. emerging adults. School districts were the primary sampling units, stratified by the nine major U.S. census divisions. Of137 selected schools, 81 (59%) agreed to participate. Classrooms were randomly selected within schools for inclusion. Baseline data were collected during the 2009–2010 school year, when…

Sample characteristics

Approximately half the sample was female and non-Hispanic white, and 43.9% were overweight or obese at W5 (Table1). OWOB onset occurred in over one quarter of the participants. In W5, nearly half the sample reported going on a diet to reduce body weight at least once over the past year. The proportion of participants with high W5 BMI reporting dieting (61%) was nearly double that of participants with low W5 BMI (32%). BMI change from baseline, and OWOB onset were significantly higher in…

Discussion

The objective of this study was to examine associations of food reward sensitivity, assessed by the Power of Food Scale (PFS), with weight outcomes and dieting in a nationally representative cohort of U.S. 10th graders followed prospectively. Contrary to the hypothesis, PFS domain and aggregate scores were not associated with concurrent or longitudinal weight outcomes except for a positive association of the food available domain with BMI change from baseline to W5 (5 years after baseline).…

Conclusions

Overall, findings from this study indicate that PFS was not related to multiple measures of excess weight and weight gain in a general population of U.S. emerging adults, suggesting the need for additional research to examine whether alternative self-report or objective measures of food reward sensitivity can account for the variance in these outcomes in this population. Higher PFS scores were associated with more frequent dieting and greater risk of perceived overweight, indicating that PFS is …

Acknowledgments

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