

Research report

Measurement of dietary restraint: Validity tests of four questionnaires

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Abstract

This study tested the validity of four measures of dietary restraint: Dutch Eating Behavior Questionnaire, Eating Inventory (EI), Revised Restraint Scale (RS), and the Current Dieting Questionnaire. Dietary restraint has been implicated as a determinant of overeating and binge eating. Conflicting findings have been attributed to different methods for measuring dietary restraint. The validity of four self-report measures of dietary restraint and dieting behavior was tested using: (1) factor analysis, (2) changes in dietary restraint in a randomized controlled trial of different methods to achieve calorie restriction, and (3) correlation of changes in dietary restraint with an objective measure of energy balance, calculated from the changes in fat mass and fat-free mass over a six-month dietary intervention. Scores from all four questionnaires, measured at baseline, formed a dietary restraint factor, but the RS also loaded on a binge eating factor. Based on change scores, the EI Restraint Scale was the only measure that correlated significantly with energy balance expressed as a percentage of energy required for weight maintenance. These findings suggest that, of the four questionnaires tested, the EI Restraint Scale was the most valid measure of the intent to diet and actual caloric restriction.

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Introduction

Dietary restraint is defined as the intention to restrict food intake in order to control body weight (Herman & Mack, 1975). During the past 30 years, the construct of dietary restraint has been theorized to be a psychological determinant of overeating (Ruderman & Wilson, 1979), binge eating (Ruderman, 1986), and bulimia nervosa (Polivy & Herman, 1985). The validity of the causal relationship between dietary restraint and overeating (often called the dietary restraint hypothesis) has been supported by a large number of laboratory studies that have established that overeating (counter-regulation) by participants defined as high in dietary restraint, often occurs as a response to a pre-load that disrupts dietary restraint (Heatherton, Herman, Polivy, King, & McGree, 1988; Lowe & Levine, 2005; Polivy, 1996; Ruderman, 1986). Over the past 30 years, a few studies have failed to support the hypothesized causal relationship between dietary

restraint and overeating/binge eating (Dritschel, Cooper, & Charnock, 1993; Jansen, Oosterlaan, Merckelbach, & van den Hout, 1988; Lawson et al., 1995; Lowe & Kleifield, 1988; Smith et al., 1998; Wardle & Beales, 1987). Several authors (e.g. Lowe & Levine, 2005; Ouwens, van Strien, & van der Staak, 2003; Stice, Fisher, & Lowe, 2004) have concluded that the mixed results of different studies are most likely due to different methods being used for measuring dietary restraint, i.e. the Restraint Scale versus several alternatives that are discussed below.

Most early studies of dietary restraint utilized either the Restraint Scale (Herman & Mack, 1975) or a later revision (Herman & Polivy, 1980). Both laboratory and cross-sectional studies that reported support for the dietary restraint hypothesis have used the Restraint Scale to measure dietary restraint (Heatherton et al., 1988; Lowe & Levine, 2005). Given the inconsistency of findings of studies using different scales, the measurement of the dietary restraint construct has become a source of controversy. Two other widely used questionnaires for measuring dietary restraint have been developed: the Three

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Factor Eating Questionnaire (Stunkard & Messick, 1985) and the Dutch Eating Behavior Questionnaire (Van Strien, Frijters, van Staveran, Defares, & Beurenberg, 1986). The studies that failed to support the dietary restraint hypothesis used these two alternative methods (Ouwens et al., 2003).

Lowe (1993) proposed a three factor theory of dieting which hypothesized that the dietary restraint construct is multi-dimensional and provided a three-factor model of dieting: (1) frequency of dieting/overeating, (2) current dieting, and (3) weight suppression. He noted that one explanation for the conflicting results of studies that tested the dietary restraint hypothesis was that measures of dietary restraint purport to assess the *intent* to diet, not actual dieting (caloric restriction). Based upon this reasoning, we believed that it was important to include a measure of current dieting in this study and we developed a Current Dieting Questionnaire for this purpose.

In the midst of this controversy that has spanned almost 30 years, concerns about the safety of dieting were raised due to the potential for weight cycling following a period of intentional food/calorie restriction (Brownell & Rodin, 1994). These concerns led to a substantial backlash against dieting that has been termed the anti-dieting movement (Hill, 2004; Lowe & Levine, 2005). Controlled trials of non-dieting treatments have yielded inconsistent weight loss across many studies of overweight/obese adults (Foster & McGuckin, 2001). Conversely, in 2000, a consensus panel of experts concluded that the potential benefits of dieting for weight loss substantially outweighed the potential adverse effects (National Task Force on the Treatment and Prevention of Obesity, 2000). Also, during the past decade, a series of randomized controlled trials of the effects of dieting and non-dieting approaches for weight loss (Goodrick, Poston, Kimball, Reeves, & Foreyt, 1998; Presnell & Stice, 2003; Reeves et al., 2001) and weight gain prevention (Klem, Wing, Simkin-Silverman, & Kuller, 1997) have investigated the changes in binge eating. All of these studies have reported decreased frequency of overeating or binge eating following dieting or non-dieting treatment. Interventions involving caloric restriction were associated with weight loss (Goodrick et al., 1998; Presnell & Stice, 2003), but these trials did not directly measure dietary restraint. In one of the few studies that compared measures of dietary restraint before and after treatment, Safer, Agras, Lowe, and Bryson (2004) concluded that the two measures of dietary restraint used in the study, i.e. Eating Disorder Evaluation (Fairburn & Cooper, 1993) and the Eating Inventory (Stunkard & Messick, 1988) assessed different constructs, i.e. dieting to *lose* weight versus dieting to *avoid* weight gain.

In summary, many research studies have questioned the validity of the dietary restraint hypothesis. Nevertheless, controversy about the psychosocial consequences of dieting persists (Polivy & Herman, 2002). Evidence from a variety of sources suggests that at the core of this controversy is the validity of the different methods used to measure

dietary restraint. The primary aim of this study was to test the validity of four different questionnaires that have been developed to measure dietary restraint. The study was conducted as an ancillary project to a six-month randomized controlled trial (RCT) that tested three approaches for inducing calorie restriction in overweight (BMI from 25.0 to 29.9) adult men and women who were screened for the absence of an eating disorder. The study utilized three strategies for testing the validity of the four different measures of dietary restraint: (1) inter-correlations among the measures using correlations and factor analysis, (2) changes in the measures of dietary restraint during the RCT of calorie restriction, and (3) correlations of changes in self-report measures of dietary restraint with changes in total energy balance, using changes in fat mass and fat-free mass measured by dual X-ray absorptiometry (Pullar & Webster, 1977).

Methods

Participants

A complete description of the recruitment and screening procedures and participant characteristics is provided elsewhere (Heilbronn et al., 2006). Participants were overweight at screening ($25 < \text{BMI} < 30 \text{ kg/m}^2$), non-smoking adult men ($n = 26$; 25–50 years of age) and women ($n = 20$, 25–45 years of age), 28 white, 16 African American, 2 Asian and 25 Latino. Besides being overweight, participants were otherwise healthy and not taking medications other than oral contraceptives. Potential participants were screened for mental health problems (American Psychiatric Association, 1994), e.g. depression, anxiety disorders, or psychotic disorders, using the Structured Clinical Interview for DSM-IV Axis I Disorders, Non-patient Edition (SCID-I/NP; First, Spitzer, Gibbon, & Williams, 2002). Participants were screened for the presence of eating disorders with the Interview for Diagnosis of Eating Disorders, version Four (IDED-IV; Kutlesic, Williamson, Gleaves, Barbin, & Murphy-Eberenz, 1998). The presence of a mental health problem or an eating disorder was an exclusion criterion.

Forty-eight participants completed a five-week baseline assessment period and were randomly assigned to one of four treatment arms for the six-month study: (1) calorie restriction (CR; 25% calorie restriction of baseline energy requirements), (2) CR plus exercise (CR + EX; 12.5% CR plus 12.5% increase in energy expenditure by structured exercise), (3) low-calorie diet (LCD; 890 kcal/day liquid diet until 15% of body weight was lost, followed by a weight maintenance diet), and (4) control (weight maintenance diet; Step 1 American Heart Association diet). For the purposes of this study, the CR, CR + EX, and LCD groups were defined as “dieting” conditions. We hypothesized that these “dieting” conditions would be associated with increased dietary restraint and greater weight loss in comparison to the control group and that “dieting” would

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