Obesity Research & Clinical Practice (2016) xxx, xxx—xxx

ORIGINAL ARTICLE

Doing the counter-regulation shuffle: The importance of flexibility and hunger for predicting food consumption following a preload

Jaclyn Broadbent, Matthew Fuller-Tyszkiewicz*, Michelle Dennerstein, Jesse Greenwood, Naomi Hancock, Nithyyaa Thavapalan, Melissa White

School of Psychology, Deakin University, Victoria, Australia

Received 21 November 2015; received in revised form 20 April 2016; accepted 17 May 2016

KEYWORDS
Preload;
Restraint;
Food consumption;
Hunger level;
Counterregulation

Summary
Objectives: This study utilised the preload paradigm to evaluate whether trait-like dieting attitudes and behaviours (dietary restraint and flexibility in dieting rules) and context-specific factors (negative mood and hunger) predict food consumption among male and female participants.
Methods: Following a high calorie preload, 79 participants aged 18—40 completed a deceptive taste test in which they were encouraged to eat as much of the taste test foods as desired, and this *ad libitum* intake was measured.
Results: Although each predictor (except negative mood) predicted consumption when tested individually, regression analyses revealed that dieting flexibility and current hunger were the strongest unique predictors of intake. Mood failed to directly predict food consumption, nor did it moderate the relationship between restraint and food intake.
Conclusion: Collectively, findings suggest that emphasis on dietary restraint in preload studies may be misplaced, as other proximal and stable factors may better predict food consumption.

* Corresponding author at: School of Psychology, Deakin University, Geelong, Victoria 3220, Australia. Tel.: +61 3 9251 7344; fax: +61 3 9244 6858.
E-mail address: matthewf@deakin.edu.au (M. Fuller-Tyszkiewicz).

http://dx.doi.org/10.1016/j.orcp.2016.05.006

Please cite this article in press as: Broadbent J, et al. Doing the counter-regulation shuffle: The importance of flexibility and hunger for predicting food consumption following a preload. Obes Res Clin Pract (2016), http://dx.doi.org/10.1016/j.orcp.2016.05.006

Introduction

Despite the increasing availability of cheap, unhealthy foods in Western cultures [1,2], it is understood that individuals differ in the extent to which they engage in overconsumption eating practices [3]. Thus, researchers have sought to identify potential determinants of overconsumption. Included among these putative risk factors is the extent to which individuals engage in dietary restraint (*i.e.*, efforts to constraint the types and/or amount of food one consumes). A common research method used to evaluate the potential link between dietary restraint and food consumption practices is the preload paradigm.

In the preload paradigm, participants consume a preload meal (energy-dense food or liquid), and are then asked to consume additional foods under the pretence of a taste test exercise. Participants are encouraged to eat as much as they wish of this taste test food, and amount consumed is monitored [4,5]. Surprisingly, early studies showed amount consumed is higher among restrained eaters (*i.e.*, those who intend to restrict calories) than non-restrained eaters, both without [6] and with a preload [7], although subsequent studies provide mixed support for the effect of restraint on food consumption [8—10].

This inconsistency may be attributable to several limitations in these past studies. First, differences may be partially attributed to the dietary restraint measures used. Whereas the overconsumption effect post-preload has been commonly found in studies using the Restraint Scale (RS, [6,7,11,12]), restrained eaters — as identified by the Dutch Eating Behavior Questionnaire (DEBQ, [13]) and the Three Factor Eating Questionnaire (TFEQ, [14]) — have either consumed at post-preload less than or equivalently to non-restrained eaters [15—17]. These scales clearly tap into different aspects of overeating [18]: while the RS seems to conflate restriction, disinhibition, and guilty eating, the DEBQ and TFEQ restraint subscales may be preferable because they provide purer measures of restraint success [16,19].

Second, restrained eaters are unlikely to be a homogenous group. Some individuals hold a rigid view of their diet (such that, they must adhere at all times to their diet), whereas others are more accepting that they will occasionally eat forbidden foods. Those dieters who have a more flexible view of dieting may be better equipped to moderate food consumption after eating a personally prohibited food, and thus, may be less likely to overeat post-preload [20].

Third, restraint is typically operationalised as an enduring, stable set of attitudes and behaviours, neglecting more proximal, context-specific influences that may either potentiate or over-ride dieting efforts. Past research has shown that both negative mood states and hunger levels are key antecedents for food over-consumption among dieters [21,22]. Indeed, mood may exert influence on food consumption in a variety of ways [23], including a direct effect in which individuals engage in overconsumption to regulate negative emotions, or a moderating effect in which negative mood impairs cognitive restraint that the individual would otherwise impose when presented with self-prohibited food.

The present study sought to address the continued ambiguity in the role that restraint plays in promoting or preventing over-consumption, by incorporating a range of competing predictors of food consumption as identified above. In particular, we considered the influence of context-specific predictors (negative mood and hunger level) and flexibility in dieting beliefs. Based on prior findings, it is predicted that:

(1) each of the predictors will be significantly related to food consumption when tested individually, but
(2) flexibility in dieting beliefs will be a stronger predictor than restraint when considered jointly,
(3) contextual factors will be stronger predictors than trait measures (flexibility, restraint) for food consumption, and
(4) mood may also indirectly influence food consumption by moderating the association between dietary restraint and *ad libitum* intake.

Method

Participants

The sample comprised 79 normal weight participants aged 18—40 ($M = 24.65$, $SD = 6.08$), 53 female (age: $M = 25.62$ years, $SD = 6.72$) and 27 male (age: $M = 22.65$ years, $SD = 3.91$). Females were significantly older than males ($t_{(74.65)} = -2.47$, $p < .05$). None of the study variables differed significantly by gender (*p*s ranged from .09 to .44). Level of educational attainment varied across the sample: 34 participants (43%) completed high school, 11 completed a technical or vocational degree (13.9%), 30 (38%) completed an undergraduate degree at university, and 4 (5.1%) have completed a postgraduate

Please cite this article in press as: Broadbent J, et al. Doing the counter-regulation shuffle: The importance of flexibility and hunger for predicting food consumption following a preload. Obes Res Clin Pract (2016), http://dx.doi.org/10.1016/j.orcp.2016.05.006