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Relationship of Dieting and Restrained Eating to Self-Reported Caloric Intake in Female College Freshmen

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Abstract

Evidence indicates that restrained eaters do not eat less than unrestrained eaters in the natural environment. However, no study has examined caloric intake in those who are currently dieting to lose, or avoid gaining, weight. The current study examined caloric intake using 24-hour food recalls among individuals dieting to lose weight, dieting to avoid weight gain, restrained nondieters, and unrestrained nondieters. Participants were 246 female college students participating in a weight gain prevention trial. The predicted significant difference in caloric intake across the four groups was found for beverage but not for food intake. Results reinforce past literature indicating that dieting/restraint status does not reflect hypo-caloric intake in naturalistic settings.

Keywords

dieting; restrained eating; caloric intake; obesity; weight loss; beverages

1.1 Introduction

The vast majority of research on intentional restriction of food intake has utilized measures of restrained eating (e.g. the Three-Factor Eating Questionnaire (TFEQ); Stunkard & Messick, 1985). Notably, research indicates that many self-reported restrained eaters are not dieting to lose weight (Lowe, 1993) and several laboratory-based studies suggest that the constructs of restrained eating and dieting are statistically related but functionally distinct (Giesen, Havermans, Nederkoorn, Strafaci, Jansen, 2009; Guerrieri, Nederkoorn, Schrooten, Martijn, & Jansen, 2009; Lowe, 1995; Lowe, Whitlow, & Bellwoar, 1991). Stice and

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Contributors

The first author, Stephanie Goldstein, assisted in developing the study protocol, conducted the statistical analyses and help draft the manuscript. Michael Lowe was the principal investigator of the parent grant and supervised Ms. Goldstein in her work on the manuscript. Shawn Katterman assisted in conducting statistical analyses and in drafting the manuscript. All authors have contributed to and approved the final manuscript.

Conflict of interest

All authors declare that they have no conflict of interest.

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colleagues have found that objectively measured caloric intake in the natural environment is not associated with measures of restrained eating among individuals ranging from lean to obese (Stice, Cooper, Schoeller, Tappe, & Lowe 2007; Stice, Fisher, & Lowe, 2004; Stice, Sysko, Roberto, & Allison, 2010). However, no study has examined how self-reported dieting status impacts caloric intake.

Another aspect of dieting that has not been studied is the possible difference between dieting to lose weight and dieting to avoid weight gain. In several unpublished data sets, we have found that about 20% of individuals who say they are currently dieting are doing so to prevent weight gain. Therefore in the current study current dieters are subdivided into those who are aiming to lose weight and those aiming to avoid gaining it.

Furthermore, no studies have examined differences in caloric intake from food and caloric intake from beverages. Studies have shown that self-reported dieters tend to consume less sugar-sweetened beverages than non-dieters (French, Jeffery, & Wing 1994). Consumption of sugar-sweetened beverages is also associated with weight gain (Swinburn, Caterson, Seidell, & James, 2004), however caloric beverage intake specifically has not been investigated in dieting/restraint groups.

In the current study, participants' dieting (i.e., dieting to lose weight, dieting to prevent gain, or not dieting) and restraint status (i.e., restrained or unrestrained using the TFEQ) was used to group individuals into 1) unrestrained non-dieters, who scored below the median score on TFEQ Cognitive Restraint scale ($Mdn = 9.0$) and were not currently dieting; 2) restrained non-dieters, who scored at or above the median on TFEQ restraint scale and were not currently dieting; 3) current dieters who were dieting to avoid weight gain; and 4) current weight loss dieters. TFEQ restraint scores were dichotomized because past research combining restrained eating and dieting has examined distinct groups (e.g., Guerrieri et al., 2009; Lowe, Whitlow, & Bellwoar, 1991). The restrained eating score of the latter two groups was not taken into consideration because work in this area assumes that dieting status "trumps" restraint status in terms of eating behavior (Lowe, 1993).

The purpose of the current study is to examine differences in reported caloric intake at baseline among the four dieting/restraint groups mentioned above in a sample with known risk factors for weight gain. The current study will also distinguish total caloric intake from caloric intake from beverages. It is hypothesized that the largest difference in intake will be between unrestrained non-dieters (with the highest intake) and current weight loss dieters (with the lowest intake).

1.2 Material and methods

1.2.1 Participants

Participants were 246 freshman females between the ages of 17 and 21 ($M = 18.24$, $SD = 0.46$) at two large private universities in Philadelphia who enrolled in a weight gain prevention study. Participants were recruited with flyers and emails. Enrollment began in 2006 and ended in 2009. The sample had one or more of the following characteristics that have predicted future weight gain: 1) being above the 50th percentile on a measure of body dissatisfaction, 2) reporting currently dieting or a history of weight loss dieting, 3) having a weight suppression level of greater than 4 lbs. Participants had to: 1) be in their freshman year of college, 2) not currently be pregnant, as determined by a pregnancy test, and 3) not have a self-reported history of eating disorder diagnosis or treatment.

Participants were offered \$175 for completing the study, in addition to chances to participate in raffles for small gifts (e.g., gift cards). The Institutional Review Boards of Drexel University and the University of Pennsylvania approved this study.

1.2.2 Procedures

The current study examined data from the baseline assessment before participants were randomized to an intervention condition. The outcome of the prevention trial will be reported in a separate publication. Assessments were conducted at the Clinical and Translational Research Center at Children's Hospital of Philadelphia. Measures included in our study were: anthropomorphic measures, 24-hour food recalls and self-report measures of restrained eating and dieting. Data were included for analyses if at least two food recalls and the entirety of baseline assessment measures were available. Participants were divided into dieting/restraint groups based on their restrained eating and dieting responses.

1.2.3 Measures

1.2.3.1 Anthropometry—Participants were weighed in light clothing using an electronic scale that measured to the nearest 0.01 kilograms. Height was measured to the nearest 0.01 centimeters with a stadiometer. Body mass index (BMI, kg/m^2) was calculated for each participant due to its relationship with measures of adiposity and correlation with health risks (Dietz, & Robinson, 1998; National Institutes of Health, 2000).

1.2.3.2 Dietary Restraint—Dietary restraint was measured using the Three Factor Eating Questionnaire, Cognitive Restraint scale (Stunkard & Messick, 1985), which is a valid and reliable measure that indicates the extent to which one attempts to engage in food restriction as a means of weight control (Stunkard & Messick, 1985; Westenhoefer, Stunkard, & Pudel, 1999).

1.2.3.3 Dieting Status—Dieting status was measured by asking participants “Are you currently on a diet?” and if they indicated yes, whether they were dieting to lose weight or to avoid gaining weight. Self-reported dieting status predicts food intake in laboratory studies (Lowe & Thomas, 2009).

1.2.3.4 Dietary Intake—Twenty-four hour food recalls were used to measure dietary intake at intake to the study. Recalls were collected by dietitians at Children's Hospital of Cincinnati Nutrition Center. CHCNC staff called each participant on three days (two weekdays and one weekend day, chosen at random) to record intake.

1.3 Statistical Analyses

The mean caloric intake was examined across dieting and restraint groups. For each category, an Analysis of Variance (ANOVA) and an Analysis of Covariance (ANCOVA) was used to assess for significant differences in caloric intake between dieting/restraint groups. The latter analyses controlled for BMI because past research has shown that BMI is related to self-reported differences in caloric intake (Conway, Ingwersen, Vinward, & Moshfegh, 2003). Significant omnibus findings were followed by Tukey HSD post-hoc tests to determine the locus of significant group differences.

1.4 Results

Participants' BMIs ranged from 19.36 to 35.31 and no differences were found between dieting/restraint groups ($M_{\text{BMI}} = 23.67$, $SD = 2.91$). Participants were 56.1% Caucasian, 11.3% African American, 19.1% Asian American, 6.1% Hispanic/Latino, and 7.4% multi-

racial. Fifty-one participants were dieting to lose weight (20.7%), 20 were dieting to prevent gain (8.1%), 82 were restrained non-dieters (33.3%), and 93 were unrestrained non-dieters (37.8%).

Consistent with past research, restraint status was not associated with caloric intake ($r = -0.20, p = .753$). There were no significant differences between dieting/restraint groups in total caloric intake, $F(3, 241) = 0.802, p = .494, \eta_p^2 = .010$, and calories from food, $F(3, 241) = 0.15, p = .93, \eta_p^2 = .002$ (See Table 1)^a.

There was a significant difference in caloric intake from beverages across dieting/restraint groups, $F(3, 241) = 3.57, p = .015, \eta_p^2 = .043$ (Table 2)^a. The covariate of BMI did not account for significant variation in caloric intake from beverages, $F(1, 241) = 1.12, p = .288, \eta_p^2 = .005$. Post hoc analyses revealed that those dieting to lose weight consumed significantly fewer calories from beverages than unrestrained non-dieters ($M_{\text{difference}} = -78.39, p = .025$). No other group differences were significant. The mean score for those dieting to prevent weight gain was numerically lower than those dieting to lose weight but did not differ significantly from unrestrained non-dieters, presumably because of the small size of former group.

1.5 Discussion

Average caloric intake of the four groups studied was in the predicted direction, but not statistically significant. Findings extend previous research indicating that restrained and unrestrained eaters do not differ in energy intake in natural settings (Stice, Sysko, Roberto, & Allison, 2010) by showing that those who say they are dieting to lose weight may not actually consume less energy than non-dieters (whether restrained or not; also see Knauper, Cheema, Rabiau, & Borten, 2005). However, when food and beverages were analyzed separately, a significant difference was found for beverage intake. Further research with a larger sample and more precise measures of intake should be done to examine the difference between current dieting to lose weight and current dieting to prevent weight gain.

It was unknown whether the eating behavior of current dieters was a reflection of reductions of naturalistic caloric intake or only of the motivation and intention to limit caloric intake (Lowe, 2003). While current results are based on self-reported intake, they do provide the first evidence that female college students who describe themselves as dieting to lose weight might be reducing energy intake, albeit only calories from beverages.

Although reducing the intake of sugar-sweetened beverages is often recommended, it is unknown how much weight loss can be achieved in restricting beverage intake alone (Aeberli et al., 2011; Stanhope et al., 2009; Welsh et al., 2010). Beverages may represent one of the easiest components of the habitual diet to change to reduce calories because of the wide availability of water and numerous low or no calorie diet beverages. Current findings suggest that young adult women interested in losing weight may already be making this behavior change.

A strength of the study was its relatively large sample size. Another strength was the use of a highly experienced nutritional assessment unit, as well as the use of multiple 24 hour food recalls with improved data recording and analysis as to minimize underreporting (Conway, Ingwesen, Vinyard, & Moshfegh, 2003; Jonnalagadda, Mitchell, Smiciklas-Wright, 2000). While the use of trained raters, retrospective recall and the multiple pass method of assessing caloric intake is the current preferred method of assessing naturalistic intake, it is

^aSee pages 15 and 16 for Tables

still based on self-report and is therefore still subject to considerable misreporting (Lichtman, Pisarska, Berman, Pestone, et al., 1992; Lara, Scott, & Lean, 2004). In our study the mean caloric intake of our sample ($M=1611.26$) is below the presumed energy requirements of individuals with our sample's average BMI ($M=23.67$). Thus, it is likely that a substantial amount of underreporting occurred. Though it is possible that our between-groups differences were affected by differential under-reporting, this would not explain why we found differences for beverages only. It would be desirable in future research to examine the naturalistic energy expenditure of these groups using doubly-labeled water, a more accurate technique not subject to the underreporting of self-reported intake.

Another limitation is that this sample only included college females with one or more risk factors for future weight gain. The current study also examined women who had just signed up to participate in a study of weight gain prevention. These women may have been more motivated than the general population to decrease their caloric intake, which could have accounted for the observed differences. Conversely, it is possible that participants increased intake in anticipation of beginning a dieting program in which they would be expected to restrict, thus affecting caloric intake at baseline.

1.5.1 Conclusion

The current study examined dietary intake among dieting/restraint groups. It was found that groups did not differ in total caloric intake; however, they did differ in intake from caloric beverages. Unrestrained non-dieters drank the most calories from caloric beverages, followed by restrained non-dieters, those dieting to lose weight, and those dieting to prevent weight gain. These findings are consistent with previous research, however, future investigation, with improved accuracy of dietary intake, is needed.

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Authors must identify who provided financial support for the conduct of the research and/or preparation of the manuscript and to briefly describe the role (if any) of the funding sponsor in study design, collection, analysis, or interpretation of data, writing the manuscript, and the decision to submit the manuscript for publication. If the funding source had no such involvement, the authors should so state.

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References

- Aeberli I, Gerber PA, Hochuli M, Kohler S, Haile SR, Gouni-Berthold I, Berthold HK, Spinass GA, Berneis K. Low to moderate sugar-sweetened beverage consumption impairs glucose and lipid metabolism and promotes inflammation in healthy young men: a randomized controlled trial. *The American Journal of Clinical Nutrition*. 2011; 94:479–485.10.3945/ajcn.111.013540 [PubMed: 21677052]
- Conway JM, Ingwersen LA, Vinyard BT, Moshfegh AJ. Effectiveness of the US Department of Agriculture 5-step multiple-pass method in assessing food intake in obese and nonobese women. *American Journal of Clinical Nutrition*. 2003; 77:1171–1178. [PubMed: 12716668]
- Dietz W, Robinson T. Use of body mass index (BMI) as a measure of overweight in children and adolescents. *Journal of Pediatrics*. 1998; 132:191–19.10.1016/S0022-3476(98)70426-3 [PubMed: 9506622]
- French SA, Jeffery RW, Wing RR. Food intake and physical activity: A comparison of three measures of dieting. *Addictive Behaviors*. 1994; 19:401–409.10.1016/0306-4603(94)90063-9 [PubMed: 7992675]

- Giesen JCAH, Havermans RC, Nederkoorn C, Strafaci S, Jansen A. Working harder to obtain more snack foods when wanting to eat less. *Behaviour Research and Therapy*. 2009; 47:13–17.10.1016/j.brat.2008.09.007 [PubMed: 19012877]
- Guerrieri R, Nederkoorn C, Schrooten M, Martijn C, Jansen A. Inducing impulsivity leads high and low restrained eaters into overeating, whereas current dieters stick to their diet. *Appetite*. 2009; 53:93–100.10.1016/j.appet.2009.05.013 [PubMed: 19467278]
- Jonnalagadda SS, Mitchell DC, Smiciklas-Wright H, et al. Accuracy of energy intake data estimated by amultiple-pass, 24-hour dietary recall technique. *Journal of the American Dietetic Association*. 2000; 100:303–11.10.1016/S0002-8223(00)00095-X [PubMed: 10719403]
- Knauper B, Cheema S, Rabiau M, Borten O. Self-set dieting rules: Adherence and prediction of weight loss success. *Appetite*. 2005; 44:283–288. [PubMed: 15896878]
- Lara JJ, Scott JA, Lean MEJ. Intentional mis-reporting of food consumption and its relationship with body mass index and psychological scores in women. *Journal of Human Nutrition and Dietetics*. 2004; 17:209–218.10.1111/j.1365-277X.2004.00520.x [PubMed: 15139892]
- Lichtman SW, Pisarska K, Berman ER, Pestone M, et al. Discrepancy between self-reported and actual caloric intake and exercise in obese subjects. *The New England Journal of Medicine*. 1992; 327:1893–1898.10.1056/NEJM199212313272701 [PubMed: 1454084]
- Lowe MR. The effects of dieting on eating behavior: A three-factor model. *Psychological Bulletin*. 1993; 114:100–121.10.1037/0033-2909.114.1.100 [PubMed: 8346324]
- Lowe MR. Restrained eating and dieting: Replication of their divergent effects on eating regulation. *Appetite*. 1995; 25:115–118.10.1006/appe.1995.0047 [PubMed: 8561483]
- Lowe MR. Self-regulation of energy intake in the prevention and treatment of obesity: Is it feasible? *Obesity Research*. 2003; 11(Suppl 1):44S–59S.10.1038/oby.2003.223 [PubMed: 14569037]
- Lowe, MR.; Thomas, JG. Measures of restrained eating: Conceptual evolution and psychometric update. In: Allison, D.; Baskin, ML., editors. *Handbook of assessment methods for obesity and eating behaviors*. New York: Sage; 2009. p. 137-185.
- Lowe MR, Whitlow JW, Bellwoar V. Eating regulation: The role of restraint, dieting, and weight. *International Journal of Eating Disorders*. 1991; 10:461–471.
- National Institutes of Health. *The Practical Guide to the Identification, Evaluation and Treatment of Overweight and Obesity in Adults*. U.S. National Institutes of Health; Bethesda, MD: 2000.
- Stanhope KL, Schwarz JM, Keim NL, Griffen SC, Bremer AA, Graham JL, Havel PJ. Consuming fructose-sweetened, not glucose-sweetened, beverages increases visceral adiposity and lipids and decreases insulin sensitivity in overweight/obese humans. *Journal of Clinical Investigation*. 2009; 119:1322–1334.10.1172/JCI37385 [PubMed: 19381015]
- Stice E, Cooper JA, Schoeller DA, Tappe K, Lowe MR. Are dietary restraint scales valid measures of moderate- to long-term dietary restriction? Objective biological and behavioral data suggest not. *Psychological Assessment*. 2007; 19:449–458.10.1037/1040-3590.19.4.449 [PubMed: 18085937]
- Stice E, Fisher M, Lowe MR. Are dietary restraint scales valid measures of acute dietary restriction? Unobtrusive observational data suggest not. *Psychological Assessment*. 2004; 16:51–59.10.1037/1040-3590.16.1.51 [PubMed: 15023092]
- Stice E, Sysko R, Roberto CA, Allison S. Are dietary restraint scales valid measures of dietary restriction? Additional objective behavioral and biological data suggest not. *Appetite*. 2010; 54:331–339.10.1016/j.appet.2009.12.009 [PubMed: 20006662]
- Stunkard AJ, Messick S. The three-factor eating questionnaire to measure dietary restraint, disinhibition, and hunger. *Journal of Psychosomatic Research*. 1985; 29:71–83.10.1016/0022-3999(85)90010-8 [PubMed: 3981480]
- Swinburn BA, Caterson I, Seidell JC, James WPT. Diet, nutrition, and the prevention of excess weight gain and obesity. *Public Health Nutrition*. 2004; 7:123–146.10.1079/PHN2003585 [PubMed: 14972057]
- Welsh JA, Sharma A, Abramson JL, Vaccarino V, Gillespie C, Vos MB. Caloric sweetener consumption and dyslipidemia among US adults. *Journal of the American Medical Association*. 2010; 303:1490–1497. [PubMed: 20407058]

Westenhoefer J, Stunkard AJ, Pudel V. Validation of the flexible and rigid control dimensions of dietary restraint. *International Journal of Eating Disorders*. 1999; 26:53–64.10.1002/(SICI)1098-108X(199907)26:1<53::AID-EAT7>3.0.CO;2-N [PubMed: 10349584]

Highlights

- We examine differences in dietary intake among different dieting/restraint groups.
- Dieting/restraint groups do not differ significantly in total caloric intake.
- Dieting/restraint groups differ significantly in caloric beverage intake.
- Dieting/restraint groups might be restricting beverage, but not food, consumption.

Table 1

Food Only Caloric Intake by Dieting and Restraint Groups, Mean and Std. Deviation

Group	Sample Size (n)	Food Only (kcal)	Std.Dev.
Dieting to Lose Weight	51	1409.37	394.11
Dieting to Prevent Weight Gain	20	1376.22	548.89
Restrained Eater	82	1431.89	429.69
Unrestrained Eater	93	1436.55	354.45

Table 2

Caloric Beverage Intake by Dieting and Restraint Groups, Mean and Std. Deviation

Group	Sample Size (n)	Caloric Beverages (kcal)	Std.Dev.
Dieting to Lose Weight	51	170.32	117.98
Dieting to Prevent Weight Gain	20	154.5	99.85
Restrained Eater	82	214.62	159.46
Unrestrained Eater	93	248.72*	184.89

note.

*
p<.05 relative to those dieting to dieting to lose weight