



# Does short-term fasting promote pathological eating patterns?



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## ARTICLE INFO

### Article history:

Received 18 February 2015

Received in revised form 8 June 2015

Accepted 17 September 2015

Available online 24 September 2015

### Keywords:

Fasting

Binge eating

Eating disorders

Disinhibition

## ABSTRACT

Fasting, or going a significant amount of time without eating, has been identified as a risk factor for the development of pathological eating patterns. Findings from several studies examining the impact of fasting on subsequent eating behaviors have been mixed. The current study recruited college students to record food intake, episodes of binge eating, and use of compensatory behaviors before, throughout, and following a 24-hour fast. Participants attended an initial appointment in which they completed measures of dietary restraint and disinhibition and received instructions on self-monitoring and fasting. Participants ( $N = 122$ ) self-monitored their eating behaviors for 96 h, including a 24-hour fasting period. Participants did not demonstrate significant increases in disordered eating behaviors following the fast (e.g., objective binge episodes, self-defined excessive eating or compensatory behavior use). Baseline disinhibition predicted excessive eating as well as objective binge episodes both before and after fasting. Altogether, findings have implications for research seeking to further understand how fasting may contribute to the development of pathological eating patterns; specifically, it seems that the ED risk associated with fasting is derived from the behavior's interaction with other individual difference variables.

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## 1. Introduction

Theoretical models of eating disorders (EDs) traditionally posit that some forms of dietary restraint—the cognitive attempt to limit intake in order to lose or maintain weight (Lowe, Whitlow, & Bellwoar, 1991)—play a role in the development of ED psychopathology (Fairburn, 2008; Polivy & Herman, 1985). On the other hand, ample evidence also suggests that caloric restriction, which refers to the practice of limiting energy intake in order to maintain a negative balance of calories, is associated with health benefits, including healthy weight management. A large body of research shows positive health outcomes following caloric restriction in both animal (e.g. Anderson & Weindruch, 2012, Roth & Polotsky, 2012, Weindruch, Naylor, Goldstein, & Walford, 1988) and human subjects (e.g. Heilbronn et al., 2006, Lefevre et al., 2009, Redman et al., 2007). Thus, separate bodies of research have suggested both positive and negative effects of attempting to restrict calories. As obesity rates rise (Ogden, Carroll, Kit, & Flegal, 2012), there is an increasing need to identify effective options for increasing caloric restriction, while also minimizing the risk for the development of EDs. Examining benefits and drawbacks of the various types of caloric restriction, such as fasting, may assist in this endeavor.

### 1.1. Fasting

Fasting, or going for a specified amount of time without consumption of food or drink, represents one specific form of caloric restriction. One recent study found that almost a quarter of college students endorsed fasting as a weight management strategy (Kelly-Weeder, 2011). Fasting can be distinguished from dietary restraint in that restraint is a primarily cognitive construct and may not yield a true negative energy balance (Lowe et al., 1991), while fasting is primarily behavioral, and refers to the act of not eating for a period of time. Similar to general caloric restriction and dietary restraint, fasting has been examined within both the eating disorders and overweight/obesity literature, and has been heralded as a potentially useful weight management strategy (e.g., Harvie et al., 2011), as well as a risk factor for disordered eating (e.g., Stice, Davis, Miller, & Marti, 2008).

### 1.2. The negative impact of fasting

Literature on fasting suggests that prolonged food restriction has physiological and psychological effects that may predispose an individual to overeat or binge eat once food is made available (Polivy, 1996). Physiologically, acute dietary restraint (e.g., fasting) may deplete tryptophan, a precursor to serotonin, subsequently increasing the likelihood of binge eating in an attempt to restore tryptophan levels (Kaye, Gendall, & Strober, 1998). Additionally, research demonstrates that fasting has an impact on food-related attentional biases. For example, undergraduates who fasted during breakfast and lunch were more likely to show bias

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towards high-calorie, as compared to low-calorie foods (Placanica, Faunce, & Soames Job, 2002). Furthermore, two studies explicitly examining the impact of fasting on eating behaviors found that individuals with eating disorders significantly increased food intake following a 6-hour and a 14-hour fast (Agras & Telch, 1998; Telch & Agras, 1996). In a 5-year longitudinal study, Stice et al. (2008) also found self-reported fasting to be a significant predictor of eating pathology and recurrent binge eating.

### 1.3. The benefits of fasting

Some research suggests a link between fasting and disordered eating; however, another body of work suggests that fasting may not result in disordered eating and may even offer physiological benefits. Several studies using samples of individuals with eating disorders (Hetherington, Stoner, Andersen, & Rolls, 2000) as well as healthy men and/or women (Johnstone et al., 2002; Levitsky & DeRosimo, 2010) found no impact of prescribed fasting on subsequent eating patterns. In addition, a great deal of evidence suggests that intermittent fasting (periods of fasting alternating with non-fasting periods) has a beneficial impact on health outcomes. Evidence suggests that both intermittent fasting and moderate caloric restriction reduce risk for diabetes, cardiovascular disease and neurodegenerative diseases at similar rates (Martin, Mattson, & Maudsley, 2006; Varady & Hellerstein, 2007). Therefore, although clearly different in terms of the type of restriction, intermittent fasting and moderate caloric restriction approaches appear to yield positive health outcomes, suggesting that fasting may confer some physiological benefit.

### 1.4. Fasting and disordered eating: relevant third variables

Third variables may be the key to understanding the discrepancies in the existing literature on intermittent fasting. That is, one way to view fasting as possessing simultaneous risks and benefits is that fasting may be beneficial for individuals not at risk for developing EDs, but harmful for individuals who may be more vulnerable to developing ED behaviors. For example, because girls may be at higher risk for disordered eating behaviors, they may be more susceptible to the negative effects of fasting. Supporting this hypothesis, Stice et al. (2008) found that the incidence of fasting in middle school girls was a stronger predictor of recurrent binge eating and eating pathology onset than dietary restraint scales over the course of five years. It may be that this effect would function differently depending on the sample's developmental stage and associated ED-risk. Thus, it seems important to investigate potential individual difference variables that could interact with fasting behaviors in order to create increased risk for ED pathology.

Three variables that may make fasting more or less risky include motives for fasting, biological variables, and psychological variables. For instance, individuals with high levels of ED risk may be motivated to fast in order to improve body image (Schaumberg & Anderson, 2014). Alternatively, individuals who report other motivations for fasting, such as spiritual or religious motivations, may be less likely to develop problematic eating patterns. Furthermore, biological or psychological variables that predispose certain individuals to engage in fasting for weight management purposes may also account for the relationship between fasting and problematic eating patterns. Individuals who report high levels of other ED risk factors may be particularly sensitive to psychological effects of fasting. Two such factors may be dietary restraint and disinhibition. Dietary restraint refers to the degree to which individuals attempt to restrict intake to manage weight, and dietary disinhibition refers to the degree to which individuals are sensitive to episodes of overeating that are inconsistent with weight loss goals. Because dietary restraint and disinhibition both relate to risk for eating pathology, fasting may serve as a trigger for binge episodes for individuals who report high levels of these variables.

### 1.5. The current study

The five investigations that have examined eating behaviors following a fast to date have provided mixed results; this may be due to variation across study samples and variation in the length of fast, as well as a lack of consideration of third variables. Importantly, only two of the previous studies were conducted using non-overweight, healthy samples. Though the impact of fasting on individuals with eating disorders is of interest, examining effects of fasting on eating behaviors in a healthy sample provides a better assessment of the unique risk associated with fasting for the development of eating pathology. The present study sought to examine the effects of a short-term (24-hour) fast on subsequent eating behavior in a population of healthy young adults. Furthermore, we examined the degree to which baseline levels of self-reported dietary restraint and disinhibition moderated participants' responses to fasting. We expected that individuals with higher levels of dietary restraint and disinhibition would report more binge eating and purging episodes following the fast.

## 2. Materials and methods

### 2.1. Participants and procedure

Participants ( $N = 218$ ) in this study were recruited from a large Northeastern University. The majority of participants were female (57%) and Caucasian (59.0%), with a mean age of 18.79 ( $SD = 1.24$ ) and a mean body mass index within the non-obese range ( $M = 24.23$ ;  $SD = 4.87$ ). Recruitment occurred through the University's research pool; participants were asked not to enroll if they had ever had an ED, as fasting may have presented unnecessary risk for individuals with a history of eating pathology. Participants were also advised not to enroll in the study if they had any medical problems that would prevent them from being able to complete the fast successfully.

Participants attended an appointment 24 h before the fast; during this appointment, they provided informed consent for participation in the study and completed survey measures of body image and eating pathology. Participants self-monitored their food intake for 36 h prior to fasting, and recorded this information online once per day. After recording each eating episode, participants indicated whether or not they felt that what they ate was excessive ("Did you find this episode of eating excessive?"), and whether they engaged in a compensatory behavior (laxative use, diuretic use, vomiting, excessive exercise) after eating. Participants also reported whether their eating episode would be considered a large amount of food given the circumstance, along with the degree to which they felt a loss of control over eating. Participants then fasted for 24 h before which time they received detailed instructions on fasting. Individuals could drink water along with any zero calorie beverages (i.e., coffee and tea). Participants were asked to abstain from all food for 24 h; however, they were not penalized for failure to complete the fast successfully. Individuals attended an additional appointment at the end of their fast and continued to record their intake online for 36 h after the end of the fast, along with any experiences of binge eating or purging. Therefore, participants attended two in-lab sessions: one 24 h before the fast and one immediately following the fast. Additionally, they completed self-monitoring logs for a total of 96 h; they monitored 36 h previous to the fast, the 24-hour fasting period, and 36 h following the fast.

### 2.2. Measures

#### 2.2.1. Food records

Participants completed food records online during the week. All self-monitoring occurred on weekdays and all participants fasted at the same time during the week to minimize the potential impact of the day of the week on results (e.g., weekend vs. weekday). Undergraduate research assistants instructed participants on the utilization of the self-

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