



Episodic future thinking reduces eating in a food court



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ABSTRACT

Episodic future thinking (EFT) is the psychological process of vividly imagining a future event, and this process has been shown to reduce overeating in the laboratory. To assess the efficacy of EFT in the natural environment, twenty-nine overweight or obese women who wanted to improve their eating habits were randomly assigned to one of two smartphone-implemented interventions – EFT or control episodic recent thinking (ERT) – while they ate dinner in a public food court. Results showed a reduction in consumption of total calories, a reduction in percent calories from fat, and an increase in percent calories from protein for EFT versus ERT. These data suggest EFT may be used to modify eating habits in natural eating environments, and may show potential as a component of behavioral obesity interventions.

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1. Introduction

Eating involves a complex set of decisions that in part regulate body weight. One important decision is the extent to which someone resists the urge to overeat in a tempting eating environment. The choice to eat healthy may be more challenging for those who are overweight/obese. The ability to choose to eat healthy foods is complicated in overweight or obese persons by contextual factors of the eating environment. We are more likely to overeat when eating out, such as at a food court, compared to eating at home (de Castro et al., 2012). The presence of other people – friends or strangers alike – has also been shown to increase energy intake (Clendenen et al., 1994), which can make it more difficult to eat healthy when meals must be eaten outside of the home. Behaviors modeled by others influence perceived social norms around food, influencing eating behavior (Mollen et al., 2013). Furthermore, when a wide variety of foods are available in the natural environment, a person is more likely to overeat compared to when there is little or no variety (Epstein et al., 2013; Raynor and Epstein, 2001). To reduce overeating in a real world setting, the intervention must overpower contextual factors.

One method called episodic future thinking (EFT) has been shown to reduce overeating in tempting situations (Daniel et al., 2013b). EFT works by mentally projecting oneself into the future through vivid imagination of specific, personal and detailed future events. EFT

reframes the temporality of decision-making in the moment. During a meal, decisions are made constantly: how much to eat, which foods to eat and when to stop eating. EFT allows people to focus on future health goals rather than the pleasure associated with a decision that is highly gratifying in the moment (Atance and O'Neill, 2001; Benoit et al., 2011; Peters and Buchel, 2010). When obese and lean women vividly imagine the future through EFT, bias towards pleasure in the moment is replaced by decisions that align with long-term goals (Daniel et al., 2013a), and engaging in EFT during an ad libitum meal reduces calorie consumption compared to a control (Daniel et al., 2013b). Because overweight persons experience more difficulty delaying gratification (Jarmolowicz et al., 2014), EFT may be even more meaningful for this population.

Current research in EFT has trained individuals to envision the future, but the content has not been specific to eating. In the present study, all the participants were overweight and indicated that they wanted to improve their eating habits. To better target behavior change, we adapted EFT to focus on future events specific to the person's individual eating-related goals. Basic cognitive neuroscience research has shown brain regions normally involved in EFT show increased activation when compared to EFT that does not include personal goals, suggesting goal-oriented EFT may facilitate goal achievement by increasing the personal significance associated with prospection (D'Argembeau et al., 2010). EFT may help persons who are trying to eat less and lose weight amidst challenging eating situations (Sze et al., in press). To translate this laboratory research to the natural environment and test the effect of EFT on food intake and choices, we recruited overweight and obese women who were trying to eat healthier and randomized them to EFT or to an episodic recent thinking (ERT) control group. Then, while engaging in EFT/ERT, the women ate dinner in a public food court with a large variety of unhealthy options as well as healthier alternatives.

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An important component of translating EFT research to the field is to identify EFT delivery systems that are efficacious within the wide range of complex eating environments encountered in everyday life. In the laboratory, playing recordings of a person speaking their EFT events while eating has been shown to successfully reduce intake (Daniel et al., 2013b). In the present study, EFT and control conditions were implemented using smartphones to facilitate translation of this behavioral technique to eating in highly distracting environments outside the lab.

2. Methods

2.1. Participants

Twenty nine overweight or obese ($BMI \geq 25 \text{ kg/m}^2$) women (median $BMI = 31.14 \text{ kg/m}^2$, Interquartile range = 29.26–33.36; mean $BMI = 31.44 \pm 4.68 \text{ kg/m}^2$ (mean \pm SD); mean age = 36.77 ± 12.83 ; 24.14% minority; average years of education = 15.38 ± 2.72 (where 12 years = high school graduate, 16 years = bachelor's degree, 20 years = professional or graduate degree) participated in the study in exchange for a \$20 check and a \$10 dinner voucher. The sample size was determined based on the effect size from a previous study examining the effect of EFT on energy intake (Cohen's $d = 1.23$) (Daniel et al., 2013b). Based on this effect size, power of 0.8 and alpha of .05,

12 subjects per group are required. Recruitment eligibility criteria selected participants who indicated they wanted to improve their eating habits. This was important to ensure motivation to improve eating habits was present before implementing the intervention. Also, because health risks for different ethnicities accumulate at different BMI values, all participants were above their ethnicity-specific BMI threshold for moderate to severe health risks associated with an overweight BMI (Katzmarzyk et al., 2011). Fig. 1 details information related to recruitment and retention.

Participants were recruited from an existing database, Craigslist ads and flyers. Persons taking medications or living with conditions that affect appetite (e.g., ADHD medications, pregnancy) were not eligible for the study. All study procedures were approved by the University at Buffalo Social and Behavioral Sciences Institutional Review Board.

2.2. Experimental procedures

Participants attended a 90 min baseline session in the laboratory and a 60 min dinner session in a nearby food court the next day. At the baseline session an informed consent form was completed, BMI was measured, their smartphone was tested for compatibility with study audio delivery methods and a basic sociodemographic form adapted from MacArthur's sociodemographic questionnaire (Adler et al., 2000) was

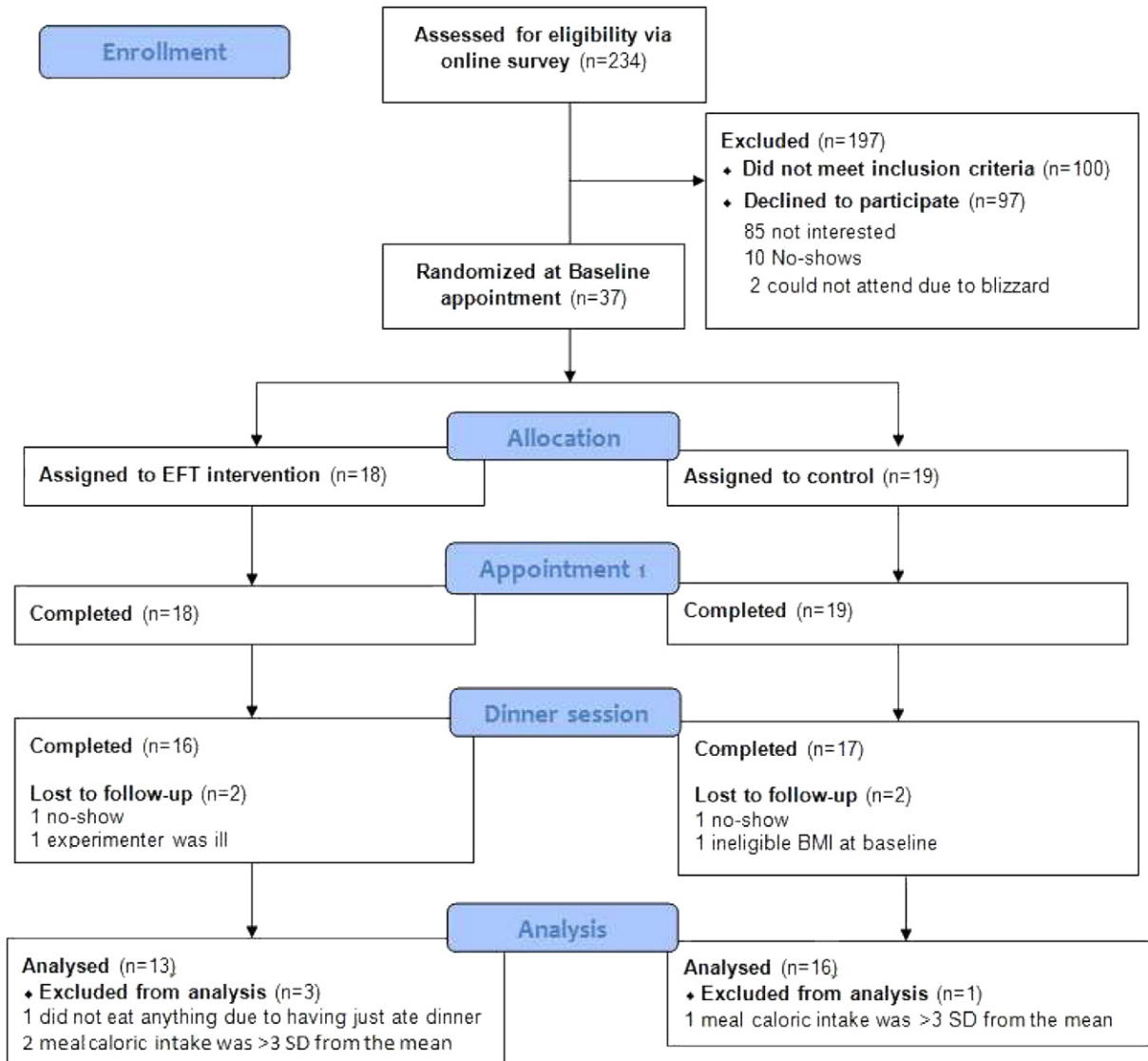


Fig. 1. CONSORT diagram displaying information about recruitment and retention.

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