

# Emotional Eating and Diet-related Self-efficacy, Motivation, and Norms in Adolescents

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## Abstract

The objective of this study was to examine associations between emotional eating and self-efficacy, motivation, and social norms for consumption of fruits and vegetables (F/V) and energy-dense, nutrient-poor (EDNP) foods and beverages, as well as interactions with body mass index-z score (BMI-z). Adolescents completed self-report measures of demographics, emotional eating, and dietary health behavior theory constructs. Emotional eating was associated with lower self-efficacy for consumption of F/V and for limiting EDNP foods/beverages, greater motivation for limiting of EDNP foods/beverages, lower social norms for consumption of F/V, and greater social norms for consumption of EDNP foods/beverages. There were no interactions with BMI-z. Evidence-based nutrition programs that leverage health behavior theories should be tailored to adolescents' emotional eating.

**Keywords:** emotional eating, diet, health behavior theory, self-efficacy, norms

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## Introduction

Studies consistently show that adolescents do not meet dietary recommendations, in that many overconsume foods high in saturated fat and added sugars and do not eat enough fruits and vegetables (Banfield et al., 2016; Pearson et al., 2009; Story et al., 2002). This is an important public health issue given that adolescents who consume higher quality diets have better well-being and mental health and are less likely to develop obesity and associated comorbidities (An et al., 2017; Jacka et al., 2011; Nansel et al., 2017). Dietary interventions have been tested to improve

diet quality in children and adolescents, but the success of such interventions has been mixed (Salam et al., 2016). A key individual difference factor that may impede dietary interventions is emotional eating i.e., a tendency to start or continue to eat in response to emotions (Kontinen et al., 2019). Several health behavior theories attempt to explain dietary change processes (Cerin et al., 2009; Shaikh et al., 2008), but little research examines the role of emotional eating applied to these theories. Thus, furthering the understanding of the role of emotional eating in health behavior theories

has the potential to inform dietary interventions.

### **Self-efficacy, Motivation, and Subjective Norms Pertaining to Diet**

The Health Belief Model (HBM), Social Cognitive Theory (SCT), and the Theory of Planned Behavior (TPB) are prominent theoretical frameworks in research and interventions for dietary behavior and behavior change (Fitzgerald et al., 2013; Keshani et al., 2019; McDermott et al., 2015). In particular, these theoretical frameworks highlight the importance of self-efficacy, motivation, and subjective norms.

#### **Self-efficacy and diet**

Self-efficacy, an individual's belief in the ability to perform a specific behavior to produce certain outcomes (Bouwmann et al., 2020), is a key determinant of behavior in both the HBM and SCT (Bouwman et al., 2020). Perceived self-efficacy is posited to have a direct effect on an individual's commitment to a behavior, as one is more likely to engage in behaviors that they consider themselves to be capable of and avoid behaviors they do not consider themselves able to do (Guertin et al., 2018). Of note, self-efficacy has been studied in relation to eating- and weight-related behaviors and with interventions designed to improve dietary intake (Fitzgerald et al., 2013; Nezami et al., 2017). For example, studies show that greater self-efficacy for healthy eating is associated with greater healthy eating and lower unhealthy eating (Anderson et al., 2007; Fitzgerald et al., 2013), and that increasing eating self-efficacy is predictive of increased fruit and vegetable intake, reduced caloric intake, and weight loss (Fernández et al., 2015; Nezami et al., 2017).

### **Motivation and diet**

Similarly, the HBM and SCT have been used in previous research as frameworks to understand the relationship between individual motivation and diet (Guertin et al., 2015; Jeihooni et al., 2016). According to the HBM, an individual's motivation to change or engage in healthy eating behaviors is determined by (1) their perceived susceptibility and severity of adverse health consequences related to consuming a poor diet, (2) their perceived benefits of and barriers to changing unhealthy dietary intake, and (3) cues to action and self-efficacy (Kim et al., 2012; Rahmati-Najarkolaei et al., 2015). Previous research has used the HBM to show that individuals are more motivated to eat healthy foods if the perceived benefit of taking preventive action is believed to be greater than the threat of disease associated with unhealthy dietary intake (Kim et al., 2012). The SCT highlights the importance of personal control over actions, social support, and individual expectations of outcomes as key factors underlying motivation for healthy eating (Guertin et al., 2015; Hansen et al., 2018).

#### **Norms and diet**

The subjective norm is one of the constructs that comprises the TPB and refers to the perception of how important a behavior is viewed among others and one's motivation to comply with those views (Fila & Smith, 2006; McDermott et al., 2015). A study of adolescents found that subjective norms were similarly predictive of eating behavior in girls and boys (Fila & Smith, 2006). More specifically, norms that encourage healthy eating displayed by family members, particularly parents and caretakers, were related to adolescents' healthy eating

intentions and behaviors (Fila & Smith, 2006). Similarly, norms related to healthy eating among peers is important to consider among adolescents given that individuals become increasingly independent from caregivers during this developmental stage. For instance, one study found that adolescents' healthy eating intentions and intake of both healthy and unhealthy foods were associated with peer norms, specifically encouragement to eat healthy, and higher encouragement for healthy eating was associated with increased intake of healthy food and decreased intake of unhealthy food (Stok et al., 2015).

### **The Role of Emotional Eating**

Emotional eating occurs when individuals eat based on their emotional state rather than internal hunger and satiety cues (Turton et al., 2017). Both adolescent boys and girls report engaging in emotional eating, with some studies showing elevated emotional eating in girls compared to boys (De Lauzon-Guillain et al., 2009; Mason, 2020; Tanofsky-Kraff et al., 2007) but others showing no differences (Nguyen-Rodriguez et al., 2009). Emotional eating is an important risk factor associated with adverse health outcomes such as weight gain and obesity, as well as increased likelihood of disordered eating among adolescents (Reents et al., 2020; Stojek et al., 2017). For some individuals, particularly those who have difficulty regulating emotions, eating may become a source of psychological support and a coping mechanism to avoid negative feelings, and in some cases, may result in uncontrolled eating or binge eating (Serin & Sanlier, 2018; Spoor et al., 2007).

There is strong evidence for associations between emotional eating and intake of high-

calorie foods, especially sweets, yet mixed evidence for associations between emotional eating and fruit and vegetable intake, with studies finding both null and positive associations (Elfhag et al., 2008; Jalo et al., 2019; Kontinen et al., 2010; Ling & Zahry, 2021; Nguyen-Michel et al., 2007). Although the pleasurable and rewarding aspects of high-calorie foods such as sweets may help explain, to some extent, why emotional eaters often turn to these foods for comfort, emotional eating also may impede self-efficacy and motivation for engaging in healthful dietary behaviors and correspond to less healthful norms surrounding these behaviors. Therefore, health behavior theories may be important frameworks for understanding associations between emotional eating and suboptimal dietary intake. Whereas some research shows associations between emotional eating and lower eating-related self-efficacy (Annesi et al., 2016a), there is an overall dearth of research on this topic. Because there is little research on how emotional eating fits within health behavior theories, an important preliminary step is to examine associations between emotional eating and dietary self-efficacy, motivation, and norms. Findings can be used to integrate emotional eating into health behavior theories.

### **Current Study**

Given the aforementioned gaps in the literature, we examined associations between emotional eating and diet-related self-efficacy, motivation, and perceived peer norms among adolescents from the Family Life, Activity, Sun, Health, and Eating (FLASHE) study. Furthermore, because emotional eating is positively correlated with weight (Banna et al., 2018; Gallant et al., 2010), it was our goal to understand the

independent contributions of emotional eating while controlling for BMI-z as well as possible interactions with emotional eating. We hypothesized that emotional eating would be associated with lower self-efficacy, lower motivation, and less healthful perceived peer norms for eating fruits and vegetables (F/V) and limiting intake of energy-dense, nutrient-poor (EDNP) foods and beverages. Given that interactions between emotional eating and BMI-z were exploratory, no specific hypotheses were generated.

## Methods

### Participants and Procedures

We completed a Web-based cross-sectional study in which participants completed online surveys sent via email. Reminders to complete the survey were sent every two weeks for up to six weeks. Participants were adolescents aged 12-17 years and their parents, who were recruited from the Ipsos' Consumer Opinion Panel (N = 1,620 child-parent dyads). Although this panel consisted of only adults who had children, demographics such as age, sex, household size, income, and region were all similar to the general population of the United States (U.S.) (Nebeling et al., 2017). Data are available at <https://cancercontrol.cancer.gov/brp/hbrb/flash-study>. The FLASHE survey was developed via identification of measures and items through a review of the literature and discussion by a group of 19 scientific advisors who were content experts in health behavior research (Nebeling et al., 2017). The scientific advisors reviewed items for congruence with existing measures and developed new items if existing measures were not available.

## Measures

**Self-efficacy for eating F/V and limiting EDNP foods/beverages.** Two items from the Annotated Teen Diet Survey developed from the FLASHE Study (National Cancer Institute, 2016) were used to assess self-efficacy. Participants responded to the following statements on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*): “I feel confident in my ability to eat fruits and vegetables every day” and “I feel confident in my ability to limit the amount of junk food and sugary drinks I eat and drink.”

**Motivation for eating F/V and limiting EDNP foods/beverages.** Six items from the Annotated Teen Diet Survey were used to assess motivation. A mean score was computed for participant responses to the following three statements, and responses to each statement were scored on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*): “I would eat fruits and vegetables every day because I would feel bad about myself if I didn't;” “I would eat fruits and vegetables every day because I have thought about it and decided that I want to eat fruits and vegetables every day;” and “I would eat fruits and vegetables every day because it's an important thing for me to do.” Similarly, a mean score was calculated for participant responses to the following three statements, and responses to each statement were scored on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*): “I would try to limit how much junk food and sugary drinks I have because I would feel bad about myself if I didn't;” “I would try to limit how much junk food and sugary drinks I have because I have thought about it and decided that I want to limit junk food and sugary drinks;” and “I would try to limit how much junk food and sugary drinks I have because it's an important

thing for me to do.” Cronbach’s alphas were .73 for motivation for F/V consumption and .75 for limiting EDNP foods/beverages.

**Social norms around eating F/V and limiting EDNP foods/beverages.** Two items from the Annotated Teen Diet Survey were used to assess social norms of eating fruit and vegetables and EDNP foods and beverages among friends. Participants responded to the following two statements on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*): “My friends eat fruits and vegetables most days of the week” and “My friends eat junk food or drink sugary drinks on most days of the week.”

**Emotional eating.** Two items from the Eating in the Absence of Hunger Questionnaire (EAH-C; Tanofksy-Kraff et al., 2008) were used to assess emotional eating. Participants responded to the following questions on a scale of 1 (*never*) to 5 (*always*): “How often do you start or continue to eat when you’re not hungry because...” a) “You feel sad and depressed?” and b) “You feel anxious or nervous?” The Spearman-Brown coefficient estimate for two-item scales (Eisinga et al., 2013), was .68.

**BMI-z.** Participant BMI ( $\text{kg}/\text{m}^2$ ) was calculated based on self-reported height and weight. Height, weight, age, and sex were used to calculate age- and sex-specific BMI-z scores using the Centers for Disease Control and Prevention’s (CDC) SAS Program (CDC, 2022).

## Data Analysis

We used SPSS version 24 (IBM; Armonk, NY) for statistical analyses. We calculated descriptive statistics and bivariate correlations for study variables. We

conducted analyses using generalized linear models (GLMs). GLMs are flexible approaches that allow for non-linear distributions of dependent variables; linear regressions represent a specific type of GLM (Dunn & Smyth, 2018). Within GLMs, various families and link functions are used depending on the distribution of the dependent variable. For continuous dependent variables that were normally distributed, we conducted GLMs with a normal distribution and identity link (i.e., corresponding to linear regression models). For continuous dependent variables that were not normally distributed, we conducted GLMs with a gamma distribution and log link.

Dependent variables included self-efficacy for increasing F/V intake, self-efficacy for limiting EDNP foods/beverages, motivation for increasing F/V intake, motivation for limiting EDNP food/beverages, social norms for F/V intake, and social norms for EDNP food/beverage consumption. Analyses included emotional eating as the primary independent variable and adjusted for covariates selected *a priori* (i.e., gender, age, race, and BMI-z). We also tested two-way interaction terms between BMI-z and emotional eating. Multiple imputation was used to impute data for missing independent variables (Schafer, 1999). Five imputed data sets were created, and pooled estimates were reported.

## Results

Our sample of adolescents was 50.4% female. The mean age of adolescents was  $14.48 \pm 1.61$  years, and the mean BMI-z was  $0.38 \pm 1.10$ . The racial breakdown of the sample was 9.7% Hispanic, 16.3% non-Hispanic black, 61.1% non-Hispanic white, 8.9% other, and 4.1% missing. Table 1

reports descriptive statistics of study variables. There were missing data for all independent and dependent variables. Missing data were low with 89.52% of adolescents having complete data for all variables and 95.43% of values being complete. Missing data were only imputed for independent variables (i.e., emotional eating, gender, age, race, and BMI-z). According to histograms, self-efficacy and norms variables were not normally distributed, and motivation variables were normally distributed.

### **Self-efficacy for Eating F/V and Limiting EDNP Foods/Beverages**

Table 2 displays the GLMs. There were no statistically significant interactions between emotional eating and BMI-z; thus, interaction terms were not included in the presented models. Males reported less self-efficacy for eating F/V and for limiting EDNP food/beverage intake compared to females. Non-Hispanic black adolescents reported greater self-efficacy for eating F/V compared to non-Hispanic white adolescents. Older adolescents had greater self-efficacy

for limiting EDNP food/beverage intake. Greater BMI-z and emotional eating were independently associated with less self-efficacy for eating F/V and for limiting EDNP food/beverage intake.

### **Motivation for Eating F/V and Limiting EDNP Foods/Beverages**

Males reported less motivation for eating F/V and for limiting EDNP food/beverage intake compared to females. Older adolescents had greater motivation for limiting EDNP food/beverage intake. Greater emotional eating was associated with greater motivation for limiting EDNP food/beverage intake. BMI-z was not significantly associated with motivation.

### **Social Norms around Eating F/V and Limiting EDNP Foods/Beverages**

Males reported less healthful social norms for eating F/V compared to females. Greater emotional eating was associated with less healthful social norms for eating F/V and more social norms for EDNP food/beverage consumption. BMI-z was not significantly associated with social norms.

Table 1

#### *Descriptive Statistics of Study Variables*

	M	SD	Range
Emotional eating	2.18	0.99	1.00-5.00
Self-efficacy for eating F/V	4.03	1.09	1.00-5.00
Self-efficacy for limiting EDNP foods/beverages	3.58	1.17	1.00-5.00
Motivation for eating F/V	3.60	0.88	1.00-5.00
Motivation for limiting EDNP foods/beverages	3.63	0.90	1.00-5.00
Norms around eating F/V	3.36	1.06	1.00-5.00
Norms around limiting EDNP foods/beverages	4.03	0.93	1.00-5.00

*Note.*

F/V = fruit/vegetables; EDNP = energy dense, nutrient poor

Table 2

*Generalized Linear Models of Emotional Eating and BMI-z in Relation to Dietary Health Behavior Constructs*

	Self-Efficacy				Motivation				Social Norms			
	For Eating F/V		For Limiting EDNP Foods/Beverages		For Eating F/V		For Limiting EDNP Foods/Beverages		Around F/V		Around EDNP Foods/Beverages	
	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>
Gender												
Female (ref)							--					
Male	-0.07 (0.02)	<.001	-0.04 (0.02)	.03	-0.23 (0.04)	<.001	-0.27 (0.05)	<.001	-0.18 (0.05)	.001	0.01 (0.01)	.32
Race/ethnicity												
Non-Hisp white (ref)							--					
Hispanic	0.03 (0.03)	.26	0.05 (0.03)	.12	0.03 (0.07)	.71	0.08 (0.08)	.28	0.03 (0.09)	.76	-0.03 (0.02)	.13
Non-Hisp black	0.05 (0.03)	.02	-0.03 (0.03)	.30	0.02 (0.06)	.79	-0.08 (0.06)	.27	0.03 (0.07)	.70	0.02 (0.02)	.42
Other	-0.03 (0.03)	.37	0.02 (0.03)	.50	0.1 (0.08)	.17	0.09 (0.08)	.26	0.06 (0.09)	.54	-0.02 (0.02)	.43
Age	0.00 (0.01)	.51	0.01 (0.01)	.02	0.01 (0.01)	.64	0.03 (0.01)	.03	-0.02 (0.02)	.33	0.01 (0.00)	.23
BMI-z	-0.02 (0.01)	.01	-0.02 (0.01)	.01	-0.01 (0.02)	.77	0.03 (0.02)	.12	-0.02 (0.03)	.51	0.00 (0.01)	.95
Emotional eating	-0.04 (0.01)	<.001	-0.06 (0.01)	<.001	0.02 (0.02)	.36	0.06 (0.02)	.01	-0.06 (0.03)	.03	0.03 (0.01)	<.001

*Note.*

Hisp = Hispanic

## Discussion

In the present study, we investigated the relationships between emotional eating and diet-related self-efficacy, motivation, and perceived social norms among adolescents. In support of the hypotheses, our results indicated that emotional eating was inversely associated with self-efficacy and healthfulness of perceived social norms for eating F/V and limiting EDNP food/beverage intake. However, in contrast to expectations, emotional eating was associated with greater motivation for limiting EDNP food/beverage intake. These associations did not differ by BMI-z. Thus, our findings suggest that across levels of weight status, emotional eating may interfere with self-efficacy and correspond to less healthful norms surrounding dietary behaviors, yet also relate to greater motivation to change eating behavior.

Our results may help explain the link between emotional eating and sub-optimal dietary intake that has been identified in prior studies (Elfhag et al., 2008; Kontinen et al., 2010; Nguyen-Michel et al., 2007; Jalo et al., 2019; Ling & Zahry, 2021). Although the directionality cannot be inferred from the present analyses, findings are consistent with the potential that health behavior theory constructs (i.e., self-efficacy, motivation, and perceived norms) are important factors by which emotional eating leads to EDNP food/beverage intake in youth. This expands upon prior research that has focused largely on emotional eating in relation to *actual* dietary intake. That is, our study sheds light on how emotional eating may shape behavioral *intentions* surrounding eating, which is a key component of many health behavior change theories (e.g., Sheeran et al., 2016).

Whereas further research is needed to clarify *why* emotional eating may hinder self-efficacy and norms for eating healthfully, prior literature on emotional eating offers some insights. Given that emotional eating is associated with poorer self-regulation for eating (Annesi et al., 2016b), recognition of impaired self-regulation may undermine self-efficacy for healthful eating behaviors. This partly aligns with earlier research demonstrating that self-worth was positively associated with vegetable consumption among boys, though this association was not statistically significant among girls (Elfhag et al., 2008). In addition, emotional eating appears to be facilitated to some extent by social norms (Kemp et al., 2011; Kemp et al., 2013); thus, individuals with a tendency toward emotional eating likely spend time around others with this tendency, which may engender less healthful eating norms. The positive associations between emotional eating and motivation are intriguing. Although findings of relevant prior studies have been mixed, some research suggests that eating-related guilt may motivate dietary change behaviors (e.g., Conradt et al., 2008; Giner-Sorolla, 2001). In other words, it is possible that eating less healthfully in response to emotions heightens one's awareness of discrepancies with dietary goals and/or perceived failures to meet dietary goals, which in turn increases motivation to eat more healthfully in the future. Therefore, it may be valuable to tap into such motivation among adolescents who engage in emotional eating in future dietary interventions.

It is important to acknowledge the limitations of our study. As noted, the cross-sectional design precludes inferences regarding directionality or causality, and therefore, highlights the need for future prospective research. All variables were based on self-report making subject to biases inherent in this approach, particularly retrospective recall. Also, measures were

short due to the wide range of constructs assessed in the FLASHE study and the need to limit the burden of completing the questionnaires (Nebeling et al., 2017). Of note, norms and self-efficacy were measured with single items. Single-item measures may have limited reliability and validity, and this has been discussed regarding the measurement of self-efficacy (Bandura, 2006). However, researchers have proposed that single-item assessments may be more valid than once thought, especially for measuring narrow constructs, such as the ones in this study (as they were focused on specific dietary behaviors) (Allen et al., 2022). Regardless, it is important to consider possible limitations of the measures we used, including both limited number of items and limited response range (scales from 1-5).

Moving forward it may be helpful to employ naturalistic assessment methods (i.e., ecological momentary assessment) to capture these constructs in real time, which also would help to elucidate relationships within and across individuals. Perceived norms in this study were specific to peers, though it would be important for future studies also to consider other social influences (e.g., caregivers and family). The sample also was limited to youth between 12 and 17 years of age, thereby preventing generalization to other age ranges. Longitudinal assessment across a wider time frame also would help to identify when the observed associations emerge and potentially elucidate key periods of risk. Prospective longitudinal research will be particularly valuable in developing meaningful intervention suggestions. Whereas we did not find associations between emotional eating and diet-related self-efficacy, motivation, or norms to differ by BMI-z, future research should examine whether associations differ by other factors

(e.g., gender, race). Finally, this study examined constructs from several different health behavior theories. As such, these results do not provide insight into whether drawing from any specific health behavior theory would be more efficacious than others in changing diet among adolescents with elevated emotional eating.

### **Implications for Health Behavior Theory**

Our study demonstrates the importance of integrating emotional eating tendencies into health behavior models of EDNP food/beverage and fruit/vegetable intake. Considering the associations we found and the plausible reasons underlying these associations, an important implication for future research is to investigate the potential of emotional eating as a target in dietary interventions for adolescents. Specifically, given findings of associations of emotional eating with dietary self-efficacy, motivation, and social norms, results suggest emotional eating should be considered when planning dietary change efforts informed by the HBM, SCT and the TPB. Research in adults has shown mindfulness-based interventions hold promise in reducing emotional eating (Katterman et al., 2014; Lattimore, 2020), which may be explained by increased awareness of internal experiences (e.g., emotions, hunger, and satiety) and cultivation of self-acceptance and cognitive flexibility. As such, moving forward it may be helpful to examine these types of prevention/intervention approaches in adolescents, as well as the extent to which they impact posited mechanisms (e.g., self-efficacy, motivation, and perceived norms) that lead to F/V and EDNP food/beverage intake.

## Discussion Questions

1. Emotional eating is important to integrate into dietary interventions informed by health behavior theories. How can practitioners enhance self-efficacy, motivation, and social norms in adolescents with elevated emotional eating tendencies?
2. Emotional eating was positively associated with unhealthy dietary social norms. What coping and resources can be provided to adolescents with elevated emotional eating to buffer social norms for unhealthy dietary social norms?

## Ethical Approval Statement

The FLASHE study procedures were approved by the National Institute of Health and Westat IRBs. All children provided verbal assent and their parent provided informed consent.

## Potential Author Conflicts

The authors have no conflicts of interest to disclose.

## Acknowledgements

This project was supported in part by grant K01DK124435 from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and grant T32MH082761 from the National Institute of Mental Health (NIMH).

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