ELSEVIER

Original article

I Should but I Can't: Controlled Motivation and Self-Efficacy Are Related to Disordered Eating Behaviors in Adolescents With Type 1 Diabetes

CrossMark

Miriam H. Eisenberg, Ph.D. [a,*], Leah M. Lipsky, Ph.D. [a], Katherine W. Dempster [a], Aiyi Liu, Ph.D. [b], and Tonja R. Nansel, Ph.D. [a]

[a] Health Behavior Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, Maryland
[b] Biostatistics and Bioinformatics Branch, Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, Maryland

A B S T R A C T

Purpose: Among adolescents with type 1 diabetes, disordered eating behaviors (DEBs) are more prevalent and have more serious health implications than in adolescents without diabetes, necessitating identification of modifiable correlates of DEB in this population. This study hypothesized that (1) autonomous motivation and (2) controlled motivation for healthy eating (i.e., eating healthfully because it is important to oneself vs. important to others, respectively) are associated with DEB among adolescents with type 1 diabetes. The third hypothesis was that baseline healthy eating self-efficacy moderates these associations.
Methods: Adolescents with type 1 diabetes (n = 90; 13–16 years) participating in a behavioral nutrition intervention efficacy trial reported DEB, controlled and autonomous motivation, and self-efficacy at baseline, 6, 12, and 18 months. Linear-mixed models estimated associations of controlled and autonomous motivation with DEB, adjusting for treatment group, body mass index, socioeconomic status, age, and gender. Separate models investigated the interaction of self-efficacy with each motivation type.
Results: Controlled motivation was positively associated with DEB (B = 2.18 ± .33, $p < .001$); the association was stronger for those with lower self-efficacy (B = 3.33 ± .55, $p < .001$) than those with higher self-efficacy (B = 1.36 ± .36, $p < .001$). Autonomous motivation was not associated with DEB (B = −.70 ± .43, $p = .11$).
Conclusions: Findings identify controlled motivation for healthy eating as a novel correlate of DEB among adolescents with type 1 diabetes and show that self-efficacy can modify this association. Motivation and self-efficacy for healthy eating represent potential intervention targets to reduce DEB in adolescents with type 1 diabetes.

Published by Elsevier Inc. on behalf of Society for Adolescent Health and Medicine.

IMPLICATIONS AND CONTRIBUTION

Disordered eating behaviors (DEBs) are more common yet also more dangerous when adolescents have type 1 diabetes. Findings demonstrate the longitudinal association of controlled but not autonomous motivation with DEB and the moderating role of self-efficacy, highlighting potential intervention targets to identify and reduce DEB in this population.

Adolescents with type 1 diabetes demonstrate higher prevalence of eating disorders and disordered eating behaviors (DEBs) than their peers without diabetes [1–3]. DEBs are unhealthy weight management behaviors such as skipping meals or intentional vomiting that may not be severe or frequent enough

to be classified as a diagnosable eating disorder [1,4]. In the context of type 1 diabetes, DEB may also include the use of insulin restriction or omission for weight loss, which can directly cause elevated blood glucose levels and hyperglycemic excursions [2]. Consequently, even at subclinical levels, DEB can lead to adverse short-term (e.g., ketoacidosis) and long-term (e.g., neuropathy, retinopathy, clinical eating disorders) [1,3,5] health outcomes. Research is needed to elucidate risk factors for DEB to reduce adverse health consequences in this population.

During adolescence, DEB risk increases partly due to greater perceived importance of appearance and social comparisons [1,6]. Body dissatisfaction often arises from a perceived inability to achieve others' standards of beauty; "others" could represent peers, family, or more abstract entities like societal expectations or media representations [7]. In adolescents with type 1 diabetes, intensive insulin therapy is associated with weight gain [8], thus increasing the risk of body dissatisfaction [9,10] and insulin restriction for weight control [11]. Daily disease management requires constant attention to diet and surveillance of the insulin-to-carbohydrate ratio, which may predispose adolescents to DEB and clinical eating disorders [12].

The influence of social comparisons and body dissatisfaction on DEB may be informed by Self-Determination Theory (SDT) [13], which posits that motivation to engage in a behavior ranges from highly external (controlled) to highly internal (autonomous). Controlled motivation is "other determined," based on real or perceived influence of others, and reflects stronger extrinsic (e.g., improved appearance) than intrinsic (e.g., improved health) goals [14]. Conversely, autonomous motivation is "self determined," based on enjoyment or personal endorsement of the behavior, and reflects stronger intrinsic than extrinsic goals. Three studies have examined the association of controlled motivation with eating disorders [15–17]. Among female college students, higher controlled motivation for food restriction was associated with more bulimic symptoms [15,16]. Among adolescents with clinical eating disorders, eating disorder psychopathology over a 12-week intervention was inversely associated with baseline autonomous motivation for treatment, but was not associated with controlled motivation. Controlled motivation has also been positively associated with dietary rigidity (e.g., cutting out entire food groups) and focusing on quantity over quality of foods [18,19]. However, the association of controlled motivation with DEB among youth with type 1 diabetes has not been examined.

While there is evidence suggestion a potential positive association of controlled with DEB, the degree to which it increases risk may depend on one's level of healthy eating self-efficacy. Self-efficacy, a core construct in multiple health behavior models referring to the belief that one has the ability to engage in the target behavior [20], is associated with more engagement in health behaviors including improved diet, better disease management, and improved diabetes self-care [20–23]. Self-efficacy and controlled motivation are independently predictive of both healthful and disordered eating among adolescents (e.g., [19,24]). However, if controlled motivation increases risk of DEB due to a perceived inability to meet "others" presumed standards of beauty food and thinness [15,16], then this association may be exacerbated in the presence of low healthy eating self-efficacy. Previous studies have not investigated whether healthy eating self-efficacy modifies the association of DEB with controlled motivation for healthy eating.

The purpose of this study was to examine associations of time-varying autonomous and controlled motivation with time-varying DEB among adolescents with type 1 diabetes in the context of an 18-month behavioral nutrition intervention and to investigate whether baseline self-efficacy moderates these associations. We hypothesized that over 18 months, DEB would be associated positively with controlled motivation and negatively with autonomous motivation. We also hypothesized that the positive association of controlled motivation with DEB would be stronger for those with lower versus higher baseline self-efficacy for healthful eating, and the inverse association of autonomous motivation with DEB would be stronger for those with higher versus lower baseline self-efficacy.

Methods

Participants

This study is a secondary data analysis of a randomized clinical trial of a family-based behavioral nutrition intervention among youth with type 1 diabetes (*Cultivating Healthy Environments in Families with Type 1 Diabetes*; n = 136). As detailed elsewhere [25], eligibility criteria for the main trial included: age 8.0–16.9 years, diagnosis of type 1 diabetes ≥1 year, daily insulin dose ≥.5 units per kilogram, most recent hemoglobin A1c ≥6.5% and ≤10.0%, insulin regimen of ≥3 injections daily or use of insulin pump, at least one clinic visit in the past year, and ability to communicate in English. Criteria were chosen to ensure that participants had no residual insulin production and to exclude participants with very poor glycemic control, who are unlikely to be ready for the additional effort required to change dietary intake. Exclusion criteria included daily use of premixed insulin, transition to insulin pump in the last 3 months, real-time continuous glucose monitoring use in the last 3 months, participation in another intervention study in the last 6 months, and presence of gastrointestinal disease such as celiac disease, multiple food allergies, use of medications that interfere significantly with diabetes management or glucose metabolism, or significant mental illness. Sample size for the larger study was based on power analyses for its main aims. This analysis includes only those participants who completed the DEB questionnaire, which was administered only to participants who were aged 13 years or older (n = 90) at some point in the study.

Design and procedure

The study was conducted in the context of a behavioral nutrition intervention grounded in Social Cognitive Theory [20] and further informed by SDT [13]. The intervention included nine sessions employing behavioral techniques and educational content to promote increased intake of whole plant foods (i.e., fruit, vegetables, whole grains, legumes, nuts, and seeds) [25]. The intervention did not target weight loss or disordered eating. The control condition was designed to provide equivalence on certain aspects of research contact unrelated to nutrition behavior, including an equal number of contacts with research staff and completion of identical assessments.

The study was conducted from August 2010 through May 2013 at an outpatient, free-standing, multidisciplinary tertiary diabetes center in Boston, Massachusetts. Assessments were conducted at baseline and 6 (near the end of the core intervention sessions), 12 (during booster sessions), and 18 months