

MASTER'S IN PSYCHOLOGY

CLINICAL AND HEALTH PSYCHOLOGY

**PRELIMINARY EFFECTIVENESS OF AN
EMOTION REGULATION-FOCUSED
INTERVENTION IN PREVENTING PROBLEMATIC
EATING BEHAVIORS IN ADOLESCENTS: A PILOT
STUDY**

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Universidade do Porto
Faculdade de Psicologia e de Ciências da Educação

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AVISOS LEGAIS

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Resumo

A adolescência é uma fase vulnerável do desenvolvimento, marcada por mudanças físicas, hormonais e psicológicas significativas, durante a qual podem surgir comportamentos alimentares problemáticos como mecanismos de regulação desadaptativos. As dificuldades na regulação emocional (RE) estão associadas a padrões de alimentação restritiva e excessiva, com uma relação mais forte para esta última em amostras comunitárias de adolescentes, aumentando o risco de problemas comportamentais persistentes e prejuízos na saúde e no desenvolvimento psicossocial. Reconhecer a RE como um fator transdiagnóstico é fundamental para a promoção precoce de estratégias funcionais para lidar com dificuldades emocionais. A Terapia Comportamental Dialética (TCD) revela potencial para reduzir défices na RE e comportamentos alimentares problemáticos. Este estudo avaliou a eficácia da BITE, uma intervenção escolar baseada na TCD com duração de quatro semanas, focada na RE para reduzir e prevenir comportamentos alimentares problemáticos, numa amostra de 48 adolescentes (grupo de intervenção, $n = 27$; grupo controlo, $n = 21$) entre os 15 e os 18 anos, utilizando um estudo controlado não randomizado. A RE e o comportamento alimentar foram avaliados através da Difficulties in Emotion Regulation Scale – Short Form (DERS-SF) e do Three-Factor Eating Questionnaire – Revised 21-item (TFEQ-R21), respetivamente. ANOVAs revelaram melhorias na RE e reduções nos comportamentos alimentares desadaptativos, especialmente na alimentação emocional, no grupo de intervenção comparativamente ao grupo controlo. Estes resultados evidenciam o potencial das intervenções focadas na RE para prevenir comportamentos alimentares problemáticos durante a adolescência e apoiam a viabilidade e eficácia da BITE. Recomenda-se que futuras investigações, com amostras maiores e estudos randomizados, sustentem conclusões mais robustas.

Palavras-chave: Estudo controlado; Terapia Comportamental Dialética; Regulação emocional; Comportamento alimentar problemático; Adolescência.

Abstract

Adolescence is a vulnerable developmental stage marked by significant physical, hormonal, and psychological changes, during which disordered eating may arise as a maladaptive coping mechanism. Difficulties in emotion regulation (ER) are linked to restrictive and overeating patterns, with stronger associations to the latter in community samples, increasing the risk of persistent behavioral problems and impairments in health and psychosocial development. Recognizing ER as a transdiagnostic factor is crucial for early promotion of functional coping behaviors. Dialectical Behavior Therapy (DBT) shows potential in addressing ER deficits and decreasing problematic eating behaviors. This study evaluated the effectiveness of BITE, a four-week DBT-based school intervention targeting ER to prevent problematic eating behaviors, in a sample of 48 adolescents (intervention group, $n = 27$; control group, $n = 21$) aged 15–18, using a non-randomized controlled trial design. ER and eating behaviors were measured by the Difficulties in Emotion Regulation Scale – Short Form (DERS-SF) and the Three-Factor Eating Questionnaire – Revised 21-item (TFEQ-R21), respectively. Repeated measures ANOVAs showed improvements in ER and reductions in maladaptive eating, particularly emotional eating, in the intervention group compared to controls. These findings highlight the potential of ER-focused interventions to prevent problematic eating during adolescence and support the feasibility and effectiveness of BITE. Future research with larger samples and randomized designs is recommended to support more robust conclusions.

Keywords: Controlled study; Dialectical Behavior Therapy; Emotional regulation; Problematic eating behavior; Adolescence.

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1.Introduction

1.1 Definition of Emotion Regulation

Emotion regulation (ER) is a remarkably broad and complex concept, which has been extensively discussed in both philosophical and psychological literature over time (Aristotle, 350 B.C.E.; William James, 1890). The modern models consider the interplay of biological, cognitive, and social factors in how emotions are experienced and controlled throughout one's life (Gross, 1998). Although a unanimous conceptualization is yet to be established, despite the increasing attention and substantial research devoted to the subject, ER is widely acknowledged in contemporary literature as a dynamic and multidimensional construct.

One prominent framework is the Extended Process Model, developed by Gross (2015) as an expansion of his earlier Emotion Regulation Process Model (1998). This model outlines four key stages in ER: recognizing the need to regulate, selecting an appropriate strategy, implementing it, and monitoring outcomes (Gross, 2015; Sheppes et al., 2015). Crucially, regulation can occur before, during, or after an emotional experience. The model also emphasizes the influence of contextual factors, such as culture and social environment, highlighting ER as a dynamic, context-sensitive process. However, Gratz and Roemer (2004) expand this view with an alternative conceptual framework, proposing that the ER process encompasses a spectrum of abilities, including awareness of emotional states, emotional clarity, acceptance of emotions, goal-directed responses to negative emotions, and impulse control, in addition to ER strategies. These conceptualizations, while differing in emphasis and scope, collectively offer complementary insights into the complexities ER. Together, they form a comprehensive framework highlighting ER as a multifaceted process essential for adaptive responses that promote emotional well-being, especially during critical developmental stages and periods of heightened emotional intensity and instability.

1.2 Emotion Regulation in Adolescence

Adolescence is a transitional period from childhood to adult life marked by significant changes across multiple domains, with emotional experience being a central aspect (Bailen et al., 2018). During this stage, emotional reactivity notably increases alongside profound

physical, hormonal, and psychological transformations characteristic of this critical developmental phase (Klump, 2013; Steinberg, 2005). Compared to childhood and adulthood, adolescents also experience more pronounced mood fluctuations, heightened sensitivity to emotionally significant stimuli, and elevated levels of negative affect (Klump, 2013; Spear, 2000; Steinberg, 2005).

Indeed, this is further supported by neuroimaging in demonstrating that adolescents experience an increased activation in the cerebral regions responsible for socioemotional processing, such as the limbic system (Konrad et al., 2013; Nelson et al., 2005; Pozzi et al., 2021). However, the ability to regulate is primarily governed by the prefrontal cortex, a brain region that undergoes continued maturation during adolescence (Spear, 2000). Insufficient development of this area can increase adolescents' vulnerability in emotionally charged situations (Ahmed et al., 2015), heightening the risk of inability to regulate, assert themselves, and make sound decisions (Brodbeck et al., 2013; Chein et al., 2011).

This critical period for growth is perceived as particularly vulnerable to challenges in functional ER, due not only to a turmoil in identity development and social roles (Branje, 2022; Erikson, 1968), but also to a combination of biological and psychological alterations. These factors position adolescence as a crucial development window for the emergence of emotional difficulties, especially in the absence of adequate attention.

1.3 Emotion Regulation and Problematic Eating Behaviors in Adolescence

Adolescents who possess adaptive ER strategies tend to demonstrate better interpersonal relationships, stronger social competence, and a greater propensity for engaging in prosocial behaviors (Collins & Steinberg, 2006). Conversely, difficulties in ER increase adolescents' vulnerability to engage in dysfunctional coping strategies, often manifested through problematic eating behaviors.

Literature suggests that maladaptive eating is notably prevalent among adolescents (Harrison et al., 2020; Neumark-Sztainer et al., 2011; Yoon et al., 2020; Klump, 2013; Zhou et al., 2025). Importantly, this association appears not to be limited to those formally diagnosed with eating disorders (Haynos et al., 2018). In this context, a growing body of empirical evidence highlights the critical role of ER in shaping a variability of dysfunctional eating behaviors across developmental stages and diverse samples from clinical and non-clinical contexts.

Firstly, the emotional eating theoretical model (Chawner & Filippetti, 2024) posits that deficits in ER may serve as key vulnerability factors for the development of maladaptive behaviors, such as emotional eating, which function as inadequate strategies to cope with negative emotional states. Moreover, emotional dysregulation is consistently linked to overeating in the general population (Casagrande et al, 2020; Pink, et al., 2018). In line with this, emotional dysregulation and diminished emotional intelligence have been identified as significant risk factors for the onset of maladaptive eating patterns (Racine & Wildes, 2013), particularly binge eating behaviors (Crockett et al., 2015; Zysberg & Rubanov, 2010). Indeed, deficits in ER have been found to be both prospectively and concurrently associated not only with binge eating, but also with loss of control (LOC) eating episodes (Goldschmidt et al., 2017). Similarly, restrictive eating has been shown to be associated with difficulties in ER (Haynos et al., 2018).

Extending this perspective to adolescent populations, effective ER is linked to healthier eating habits and reduced loss of control over food intake (Kerin et al., 2017). On the other hand, in adolescent girls, limited emotional awareness and maladaptive coping strategies partially mediate the relationship between body dissatisfaction and bulimia symptoms, underscoring the psychological pathways through which ER influences disordered eating outcomes (Berking & Wupperman, 2012). Similarly, Shriver et al. (2020) found that poorer ER is associated with increased emotional eating, suggesting that difficulties in adaptive regulation may predispose adolescents to emotionally driven eating behaviors.

In effort to clarify the underlying causes of engaging in such behaviors, negative affect typically intensifies prior and decreases after binge eating episodes (Berg et al., 2015; Schaefer et al., 2020), and the learned expectation that eating alleviates emotional distress raises the likelihood of bingeing (Fischer et al., 2013). This supports the affect regulation model of binge eating which views binge eating as a maladaptive regulating strategy used by those lacking adaptive coping skills (Haedt-Matt & Keel, 2011; Leehr et al., 2015).

Hence, such maladaptive eating behaviors, including, for instance, emotional eating, restriction and bingeing, often reflect deficits in ER, rather than merely dietary disturbances, especially during critical developmental periods (Martyn-Nemeth et al., 2009; Gratz & Roemer, 2004; Haynos & Fruzzetti, 2011).

1.4 Impacts of Problematic Eating Behaviors

Although difficulties in ER are generally linked to both restrictive and obesity-related patterns (Lavender et al., 2015), stronger associations appear with the latter in adolescents from community samples (Félix et al., 2025). This overeating-related behaviors contribute to excessive caloric intake over time, thereby increasing the likelihood of weight gain and the development of overweight or obesity, which may compromise health and psychosocial development (Shriver et al., 2020). Moreover, it is important not to overlook the substantial financial burden these conditions impose on both individuals and public health systems. As such, addressing these topics represents not only a clinical priority but also a public health imperative, given their broad and enduring implications for individual well-being and societal cost.

Literature emphasizes that childhood and adolescence are critical periods for developing eating habits (Birch & Fisher, 1998; Chawner & Filippetti, 2024), which often persist into adult life. To illustrate, obesity is common in adolescence, with 80% of adolescents living with obesity continuing to experience it as adults (Simmonds et al., 2016). According to the World Health Organization (2024), obesity is a growing global health concern, affecting about 16% of adults worldwide as of 2022). In this context, problematic eating patterns have been consistently associated with negative health outcomes (Braet et al., 2008; van Strien et al., 2018), contributing to chronic diseases such as cardiovascular conditions, diabetes, musculoskeletal disorders, and cancer (Reilly et al., 2003; Serdula et al., 1993; World Health Organization, 2013).

Overall, eating and weight-related issues during adolescence are a significant public health concern, as disordered eating behaviors are prevalent and linked to an increased risk of overweight and obesity (Yoon et al., 2020). Building on this perspective, this particular stage of life is especially vulnerable to the development of maladaptive eating patterns that may persist into adulthood (Serdula et al., 1993), particularly if left unaddressed. Considering that, understanding the interplay between adolescence challenges in ER and eating behaviors elucidates not only the risk of perpetuation, but also the serious physical and psychological impact on health. Recognizing the consequences of an underdeveloped capacity for self-regulation further underscores the relevance of fostering these emotional capabilities from an early age.

1.5 Emotion Regulation as a Transdiagnostic Mechanism

Although the association between ER deficits and eating-related problems is well-established, it is important to highlight that ER difficulties extend far beyond disordered eating. In fact, a substantial body of evidence demonstrates that impaired ER is also strongly associated with a wide range of psychological disorders, including depression, anxiety disorders, bipolar disorder, borderline personality disorder, post-traumatic stress disorder, substance use disorders, and somatoform disorders, as well as being associated with self-criticism and adverse childhood (Berking & Wupperman, 2012; Martyn-Nemeth et al., 2009; Mills et al., 2015). These findings underscore the transdiagnostic nature of ER, reinforcing its relevance across diverse clinical conditions.

Considering the robust associations, it is crucial to examine ER as a transdiagnostic construct within the psychopathology field, serving as a fundamental step towards developing targeted prevention and intervention strategies. For instance, interventions aimed at enhancing ER capacities have shown significant potential in attenuating dysfunctional eating behaviors (Aldao et al., 2010; Costa & Melnik, 2016; Chapman, 2006; Linardon et al., 2017), supporting the growing consensus that ER represents a central transdiagnostic mechanism across diverse psychological disorders (Aldao et al., 2010; Cludius et al., 2020; Sloan et al., 2017).

1.6 The Relevance of Interventions Targeting Emotion Regulation to Prevent and Reduce Problematic Eating Behaviors

For an extended period, research on ER primarily focused on adults or young children (Eisenberg et al., 2007). However, over the past decade, there has been a growing interest among researchers in exploring ER during adolescence (Silk et al., 2003), with an increasing recognition of its significance for adolescent health. Although interventions with this goal have already been developed, the majority tend to focus on fields embedding cognition, behaviors and circumstances, emphasizing the behavioral aspect (Costa & Melnik, 2016; Linardon et al., 2017). ER, however, is well-supported and extensively discussed in the literature, but tends to be undervalued. In this context, while ER-based interventions have shown promising results in decreasing disordered eating behaviors in adult populations (O'Reilly et al., 2014), existing

interventions specifically targeting ER in adolescents are less frequently explored or ER-focused (Moltrecht et al., 2021; Yeager et al., 2018), making it an important and promising area for further exploration.

In that sense, an adaptive adolescent growth encompasses the process of learning to adaptively regulate or interpret the connections between behavior, experience, and emotions (Wang et al., 2015). The capacity to regulate emotions effectively is widely recognized as a fundamental component of psychological well-being and adaptive functioning, as ER develops across the lifespan (Cole, 2014). Considering that, as well as the impact and prevalence of maladaptive eating behaviors from adolescence to adulthood, it is crucial to devote attention to ER-based interventions. These interventions can help prevent and identify disordered eating patterns at an early stage, thereby reducing the long-term consequences associated with these behaviors and hindering their establishment.

Dialectical Behavior Therapy (DBT), for instance, originally developed by Linehan (1993a, b) to treat borderline personality disorder, has since been adapted to address emotion dysregulation across various conditions (MacPherson et al., 2013). Integrating behavioral science, dialectical philosophy, and Zen practice, DBT uses a balance of change and acceptance techniques within a validating environment to reduce maladaptive behaviors and reinforce adaptive ones. Its goal is to help individuals build meaningful lives by addressing emotional and behavioral challenges.

Over the past decade, DBT has demonstrated promising results in treating adolescents with various psychological disorders and behaviors, including borderline personality disorder, externalizing disorders, suicidal and non-suicidal self-injury behaviors, and eating disorders (Groves et al., 2012). Additionally, DBT has proven effective for addressing emotion dysregulation (Linehan, 1993b), making it a viable intervention for both clinical and community adolescent populations. Given that adolescents often experience difficulties in regulating emotions, exhibit problematic behaviors, and since emotion dysregulation has been linked to the development of various psychopathologies in this age group (McLaughlin et al., 2011), extending the use of DBT to a broader adolescent population may be beneficial. The rationale for this application is based on the shared ER dysfunction across age groups, diagnoses, and behavioral issues (McMain et al., 2009; MacPherson et al., 2013; Miller et al., 2012). Consequently, DBT provides a promising framework to improve emotional and behavioral functioning in adolescents beyond specific diagnostic categories.

2. Research Objectives

This study aims to preliminarily evaluate the effectiveness of BITE (Brief Intervention for Teenagers Emotional Regulation): a four-session program focused on enhancing ER skills, through a DBT approach. The program's goal is to reduce difficulties in ER and problematic eating behaviors among adolescents in community-based settings.

It is anticipated that, by the end of the intervention, the intervention group will exhibit a significant reduction in ER difficulties, as well as significantly lower levels of dysfunctional eating behaviors, compared to the control group.

3. Method

3.1 Study Design

A non-randomized controlled trial was conducted, comparing two groups: an intervention group ($n = 27$) and a control group ($n = 21$).

Assessments were conducted at two predetermined time points for all participants: baseline (prior to the intervention) and post-test (immediately after the conclusion of the intervention).

3.2 Participants

The sample consisted of 48 adolescents from both sexes aged between 15 and 18 years and currently enrolled in the 10th grade of high school, recruited from a public school in the northern region of Portugal. This age range has been specifically selected as it is considered essential for meeting the objectives of the study.

The exclusion criteria were as follows: (1) the presence of active psychiatric conditions that could interfere with the individual's participation in the study (e.g., attention-deficit/hyperactivity disorder [ADHD]); and (2) inability to understand Portuguese, both

written and spoken. Additionally, of the original 60 participants, 12 were excluded due to incomplete questionnaires, resulting in a final sample of 48 individuals.

3.3 Procedures

This research was conducted within the scope of an ongoing longitudinal project aimed at characterizing the interplay between ER and disordered eating behaviours in adolescence, as well as improving interventions for this population. Specifically, the present study involves the development and administration of an ER- focused intervention (the BITE program), as well as the piloting of its preliminary efficacy.

3.3.1 Recruitment

The research team contacted high schools in the North of Portugal, explained the goals and procedures of the study to members of the schools' executive councils, and invited them to participate. Recruitment for the intervention group took place between February and March 2024, while recruitment for the control group was conducted between February and March 2025. The principal investigator visited the school that agreed to participate, met with potential participants in their classrooms, and presented the study. A letter outlining the study's goals and procedures was also sent to parents/legal guardians via the class-head teacher.

3.3.2 Ethical Considerations

Given the inclusion of individuals under 18 years of age, special ethical considerations were addressed. Both adolescents and their parents or legal guardians were clearly informed that participation was entirely voluntary and that declining to participate would entail no adverse consequences. Informed assent was obtained from all adolescent participants, alongside informed consent from their respective parents or legal guardians.

Approval was obtained from the Ethics Committee for Research in Social and Human Sciences (CEICSH), part of the Ethics Council of the University of Minho (reference: CEICSH 059/2021). Confidentiality and anonymity were ensured throughout the study, and participants were informed of their right to withdraw at any time without penalty.

To overcome ethical concerns associated with the control group all program materials

were made available to them upon completion of the study.

There are no conflicts of interest to declare. There was no compensation or costs associated with participating in the study.

3.3.3 Intervention and Control Conditions

Participants assigned to the intervention group engaged in 4 structured sessions aimed at enhancing ER skills, whereas participants in the control group were placed on a waiting list.

The intervention was delivered over four weekly 60-minute sessions, on pre-scheduled dates within the school environment. The short-format program was implemented in group settings without separating classes, ensuring feasibility in a community school context. The research team was responsible for implementing the intervention and overseeing all data collection procedures, ensuring fidelity to the intervention protocol and consistency across sessions. Data collection was facilitated through the use of QR codes, with questionnaires completed by participants during class sessions: before the first session, and again four weeks later, at the conclusion of the program.

3.3.4 BITE

The BITE program was based on the *DBT® Skills Manual for Adolescents* (Rathus & Miller, 2007), which served as the foundational framework for the BITE development. This manual offers five core skill sets to support emotional and behavioral regulation in adolescents: (1) mindfulness skills, aimed at enhancing self-awareness and control; (2) distress tolerance skills, to manage impulsivity and promote acceptance; (3) emotion regulation skills, focused on cultivating and sustaining adaptive emotional responses; (4) interpersonal effectiveness skills, to improve relationships and reinforce self-respect; and (5) walking the middle path skills, to address family conflicts through validation and dialectical strategies.

Based on the comprehensive 20-session manual, four key sessions were developed (Table 1), each centered on one of the following topics: Mindfulness, Distress Tolerance, Emotion Regulation, and Interpersonal Effectiveness. These sessions collectively constituted the BITE framework, designed to provide adolescents with concise, practical tools for navigating emotional challenges in their daily lives.

Table 1.*Brief Intervention for Teenagers Emotion Regulation (BITE)*

Session	Topic	Activities	Homework
1	Mindfulness	Diaphragmatic breathing; 3 States of Mind; "Why Mindfulness Matters" debate	Practice Mindfulness; Observe mind states
2	Distress Tolerance	Accepting reality; "Importance of Tolerating Painful Feelings" debate; Crisis Survival Kit creation	Mindfulness; Reality acceptance; Finish crisis kit
3	Emotion Regulation	ER goals; PLEASE skills; Food & Mood exercise; "Taking Charge of Emotions" debate	Mindfulness; Track mood & food situations
4	Interpersonal Effectiveness	DEAR MAN strategy; Role-play; Challenging Worry Thoughts exercise	Practice DEAR MAN; Thought awareness

Note. DEAR MAN refers to assertive communication techniques designed to help individuals effectively express their needs and set boundaries. PLEASE skills aim at taking care of the body to improve the mind, focusing on self-care behaviors that enhance ER.

3.5 Measures

For this study, the assessment protocol consisted of a battery of self-report questionnaires, including the Difficulties in Emotion Regulation Scale - Short Form (DERS-SF) and the Three-Factor Eating Questionnaire - Revised 21-item version (TFEQ-R21). Upon completion of the post-intervention phase, participants were invited to complete a satisfaction questionnaire aimed at gathering structured feedback on their overall experience, engagement, and perceived usefulness of the intervention.

Difficulties in ER were assessed using the Difficulties in Emotion Regulation Scale – Short Form (DERS-SF), developed by Kaufman et al. (2016). This instrument is an 18-item self-report questionnaire derived from the original 36-item version proposed by Gratz and Roemer (2004), one of the most widely used tools for assessing ER difficulties. The DERS-SF retains the original six-factor structure, encompassing: (1) lack of emotional awareness, (2) lack of emotional clarity, (3) non-acceptance of emotional responses, (4) impulse control

difficulties, (5) difficulties engaging in goal-directed behavior, and (6) limited access to effective ER strategies. Each subscale is represented by three items, and responses are rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always), with higher scores indicating greater difficulties in regulating. The original version (Gratz & Roemer, 2004) was developed to assess clinically relevant ER difficulties and has been widely applied in both clinical and normative developmental contexts. While the DERS demonstrates strong psychometric properties, including high internal consistency and good test-retest reliability, its length can be limiting in research contexts where brief assessments are necessary. To address this limitation, DERS-SF was introduced as a more efficient alternative, and designed to reduce redundancy and minimize respondent burden, while maintaining the reliability and validity of the original measure.

In that sense, the DERS-SF has demonstrated strong psychometric properties across both adolescent and adult populations, including high internal consistency, strong item loadings (Kaufman et al., 2016), and satisfactory model fit in confirmatory factor analyses. Furthermore, the questionnaire has been validated for application in diverse research contexts, including studies involving adolescents in school settings, where time constraints often pose a significant consideration. Additionally, the DERS-SF has demonstrated robust reliability and validity across various populations, with notable findings from both adolescent and adult populations (Neumann et al., 2010; Sarıtaş-Atalar et al., 2015; Weinberg & Klonsky, 2009; Kökönyei et al., 2014; Orgeta, 2009; Staples & Mohlman, 2012; Pisetsky et al., 2017)). It has also been validated in international samples and translated into several languages (Fossati et al., 2014; Sarıtaş-Atalar et al., 2015). These results collectively affirm the DERS-SF's strong construct validity and reliability, while maintaining the factor structure of the original version. Therefore, it represents a valid and reliable self-report tool for evaluating ER difficulties in adolescents, irrespective of age or gender.

Eating behavior was assessed using the Three- Factor Eating Questionnaire - Revised 21-item version (TFEQ-R-21), developed by Cappelleri et al. (2009). This instrument evaluates three distinct dimensions of eating behavior: cognitive restraint (TFEQ-R-21-CR), uncontrolled eating (TFEQ-R-21- UE), and emotional eating (TFEQ-R-21-EE). Participants respond to 21 items on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree), with higher scores indicating greater expression of each behavior. The TFEQ-R21 has demonstrated reliable psychometric properties across diverse populations, including adolescent samples across various cultural contexts. Lin et al. (2020) validated the questionnaire among 445 Taiwanese adolescents (ages 13–15), reporting an acceptable model fit. Similarly, Martín-García et al.

(2016) validated the Spanish version with 192 adolescents (ages 8.8–16.8), demonstrating satisfactory internal consistency and supporting the three-factor structure. These findings support the robust psychometric properties of the questionnaire across different cultural contexts, making it an appropriate tool for assessing eating behaviors and ER in adolescents.

The satisfaction questionnaire consisted of 17 items designed to assess adolescents' satisfaction with the intervention. The items addressed various aspects of the program, including satisfaction with its overall structure, the relevance of the topics covered, the weekly assignments, and both the total duration and the length of individual sessions. Additionally, the questionnaire evaluated perceived effectiveness in developing specific skills, such as mindfulness, crisis management, ER, and interpersonal relationships. It also assessed the perceived applicability of the content to daily life, changes in dysfunctional behaviors, satisfaction with outcomes, willingness to participate again, and likelihood of recommending the program to a friend.

3.6 Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics (version 30). The significance level was set at $p < .05$.

Normality was tested prior to conducting the statistical analyses. Severe violations were identified when absolute skewness ($|sk|$) exceeded 3 and absolute kurtosis ($|ku|$) exceeded 7, following established criteria (Finney & DiStefano, 2013; Marôco, 2021). Additionally, normality was assessed using the Shapiro–Wilk test and assumed when $p > .05$ (Field, 2018).

Furthermore, a mixed-design repeated measures analysis of variance (ANOVA) was conducted for each one of the four variables assessed through the different questionnaires - DERS-SF, TFEQ-R-21-CR, TFEQ-R-21- UE and TFEQ-R-21-EE. Each analyses included a within-subjects factor (time: pre-intervention and post-intervention) and a between-subjects factor (group: control vs. intervention), aiming to examine the effect of the intervention over time and between groups. This approach allowed for separate evaluation of the intervention's impact on the outcomes measured by each questionnaire, considering both temporal changes within participants and differences between groups.

The effect sizes were estimated using partial eta squared (η_p^2). According to Cohen's (1988) guidelines, values of η_p^2 approximately 0.01, 0.06, and 0.14 correspond to small, medium, and large effect sizes, respectively. These standards were used to interpret the effects

observed in the analyses.

Descriptive analyses were conducted to summarize and organize the collected data, providing a clear and comprehensive overview of the sample's main characteristics.

4. Results

4.1 Sample Characteristics

Overall, the sample consisted of 48 participants, 43.8% girls ($n = 21$) and 56.2% boys ($n = 27$), with a mean age of 15.77 years ($SD = 0.93$), ranging from 15 to 18 years. The mean age of the intervention group ($n = 27$) was 16.04 years ($SD = 1.08$), while the control group ($n = 21$) had a mean age of 15.43 years ($SD = 0.21$). Regarding nationality, 79.2% of the participants ($n = 38$) identified as Portuguese, followed by 18.8% Santomean ($n = 9$) and 2.1% Argentinian ($n = 1$).

The mean age of participants' mothers was 43.64 years ($SD = 6.08$), and the mean age of fathers was 47.02 years ($SD = 7.28$). Regarding parental education, 29.2% ($n = 14$) of the participants reported that their fathers had completed the 9th grade, 18.8% ($n = 9$) reported 12th-grade education, and only 4.2% ($n = 2$) had a college degree. Among mothers, 37.5% of participants ($n = 18$) reported 12th-grade education, 20.8% ($n = 10$) reported 9th-grade education, and only 8.3% ($n = 4$) had attended college. With respect to parental marital status, 52.1% of participants reported that their parents were married to each other. Most parents were employed at the time of data collection, 85.4% of the mothers ($n = 41$) and 81.3% of the fathers ($n = 39$).

4.2 Analyses

4.2.1 Satisfaction Questionnaire

Table 2

Descriptive Statistics: Satisfaction Questionnaire

Item	N	M	SD
1 - I am satisfied with the group format of the program	27	4.33	.70
2 - I am satisfied with the topics covered	27	4.30	.54
3 - I am satisfied with the weekly tasks suggested	27	4.37	.63
4 - I am satisfied with the duration of each session	27	4.07	.78
5 - I am satisfied with the total duration of the program (4 sessions)	27	4.04	.90
6 - The program helped me to practice mindfulness in the present moment	27	4.15	.72
7 - The program helped me to deal with crisis situations	27	3.74	.90
8 - The program helped me to regulate my emotions	27	3.78	.89
9 - The program helped me in relationships with others	27	3.85	.86
10 - I applied the content of the sessions in my daily life	27	3.44	.89
11 - Throughout the program, I changed less positive behaviors I had	27	3.11	1.25
12 - I am satisfied with the results I achieved through participation in the program	27	3.96	.81
13 - I would participate again in the program	27	4.33	.68
14 - I would recommend the program to a friend	27	4.41	.69
15 - Overall, I am satisfied with the program	27	4.33	.73
16 - Which topic did you like the most?	26	2.73	1.08
17 - Which topic did you like the least?	24	2.13	1.04

Note. N = Number of respondents; M = Mean; SD = Standard Deviation.

In terms of participants' feedback (Table 2), responses to the satisfaction questionnaire regarding the quantitative evaluation of the program ranged from 3 to 5 ($M = 4.02$, $SD = 0.58$), indicating a generally positive evaluation of the program. Overall, this suggests that participants found the intervention both beneficial and engaging.

A more detailed analysis of individual items highlights particularly strong positive responses regarding items 14, 15, and 16, respectively corresponding to the likelihood of recommending the program to a friend ($M = 4.33$, $SD = 0.68$), willingness to participate again in the future ($M = 4.33$, $SD = 0.68$), and overall satisfaction with the program ($M = 4.33$, $SD = 0.73$).

These findings suggest that participants not only valued their experience and its contributions but also perceived the program as sufficiently worthwhile to consider engaging in the program again.

4.2.2 ANOVA Repeated Measures

Concerning the effects of the intervention, mean total scores indicated a trend of improvements in ER difficulties and eating behaviors in the intervention group over time (Table 3).

Table 3.

Descriptive Statistics for Control and Intervention Groups at Baseline and Post Intervention

	Control Group		Intervention Group	
	M (SD)		M (SD)	
	T _b	T _{end}	T _b	T _{end}
DER-SF Total Score	2.73 (.22)	2.56 (.17)	2.85 (.19)	2.51 (.17)
TFEQ-R21 Uncontrolled Eating	19.50 (1.40)	21.33 (1.30)	18.26 (1.11)	17.56 (1.12)
TFEQ-R21 Emotional Eating	12.33 (1.31)	13.61 (1.06)	12.85 (1.16)	10.85 (1.04)
TFEQ-R21 Cognitive Restraint	14.39 (.86)	13.89 (.57)	13.59 (.64)	14.04 (.79)

Note. N=48

T_b = Baseline Assessment; T_{end} = Post Intervention Assessment; M = Mean; SD = Standard Deviation

Four repeated measures ANOVAs were conducted to test the differences in each of the variables under study.

For the DERS-SF questionnaire, a significant main effect of time was found ($F(1, 42) = 5.18, p = .028, \eta^2_p = .110$), indicating that overall participants' scores changed significantly from pre- to post-intervention. This reflects a significant within-subjects difference over time, irrespective of group. In fact, there was no significant main effect of group ($F(1, 42) = 0.015, p = .904, \eta^2_p < .001$). The interaction between time and group was not significant ($F(1, 42) = 0.61, p = .438, \eta^2_p = .014$), suggesting that changes over time did not differ significantly between the intervention and control groups.

Bonferroni-adjusted post hoc tests revealed a significant improvement from pre- to post-intervention only in the intervention group ($F(1, 42) = 6.06, p = .018, \eta^2_p = .126$). In that sense, a significant main effect of time was found with a moderate to large effect size ($\eta^2_p = .110$), driven by the intervention group's significant improvement, which showed a similar effect size ($\eta^2_p = .126$).

Furthermore, the visual representation of the means scores (Figure 1) indicate that both the control and intervention groups experienced a decrease in scores from pre- to post-intervention, as also reflected in the descriptive statistics (Table 3). However, this reduction was more pronounced in the intervention group, which demonstrated a greater decrease in difficulties.

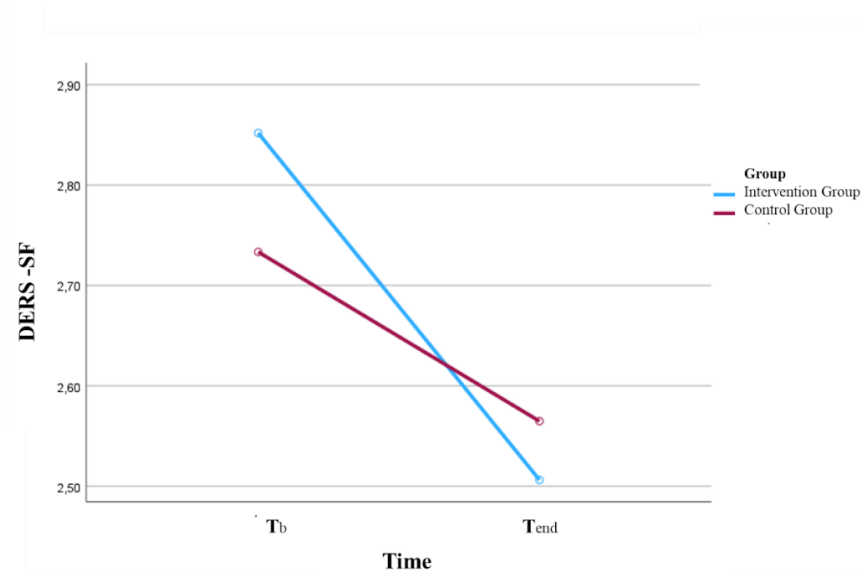


Figure 1

Mean scores on the DERS-SF for control and intervention groups at pre-test (Tb) and post-test (Tend).

For the TFEQ - Uncontrolled Eating, the analysis revealed no significant main effect of time ($F(1, 43) = 0.65, p = .426, \eta^2_p = .015$), indicating that overall participants' scores did not change significantly from pre- to post-intervention. Similarly, there was also no significant main effect of group, ($F(1, 43) = 2.57, p = .116, \eta^2_p = .056$), suggesting that on both time points, the groups did not differ significantly in their levels of uncontrolled eating. Furthermore, the interaction between time and group was also not significant, ($F(1, 43) = 3.26, p = .078, \eta^2_p = .071$), suggesting that the changes in scores over time did not differ between the intervention and control groups. However, the observed effect sizes (η^2_p) are small to moderate, indicating that a larger sample or an extended intervention duration could be required to capture significant changes.

Although the interaction effect was not statistically significant, visual inspection (Figure 2) and the mean scores (Table 3) suggests an opposite trend between groups over time. Specifically, participants in the intervention group exhibited a downward trajectory in uncontrolled eating scores from pre- to post-intervention. In contrast, those in the control group

showed an upward trend during the same period.

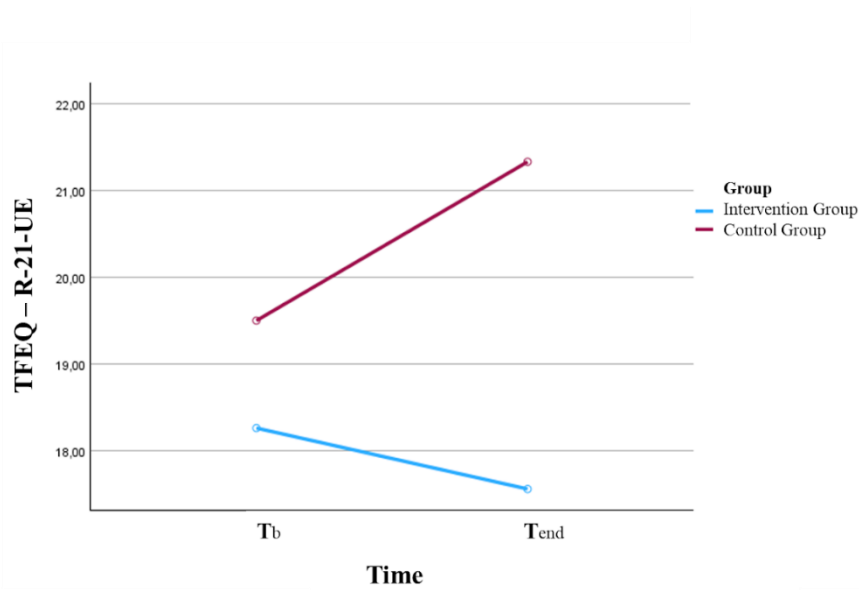


Figure 2

Mean scores on the TFEQ-R-21-UE for control and intervention groups at pre-test (T_b) and post-test (T_{end}).

For the TFEQ - Emotional Eating, there was no significant main effect of time ($F(1, 43) = 0.42, p = .523, \eta^2_p = .010$), indicating that overall participants' scores did not change significantly from pre- to post-intervention. Similarly, there was no significant main effect of group ($F(1, 43) = 0.51, p = .477, \eta^2_p = .012$). However, the interaction between time and group was significant ($F(1, 43) = 8.55, p = .005, \eta^2_p = .160$), suggesting that changes over time differed between the intervention and control groups. This interaction reflects a large effect size, indicating a substantial difference in the pattern of change between the groups. Examining the values presented in Table 3, the intervention group demonstrated a decreasing trend in emotional eating behavior, whereas the control group exhibited an increasing one.

Bonferroni-adjusted post hoc tests showed that only the intervention group experienced a significant improvement from pre- to post-intervention ($F(1, 43) = 7.96, p = .007, \eta^2_p = .156$), reflecting a large effect size. This suggests that the intervention had a meaningful impact on the participants.

Figure 3 presents a pattern of plotted means supporting the observed statistical interaction and suggesting a differential impact of the intervention over time. Specifically, it indicates the expected effect within the intervention group, confirming the analysis results. As shown in Table 3, mean scores decreased over time in the intervention group, whereas they

increased in the control group.

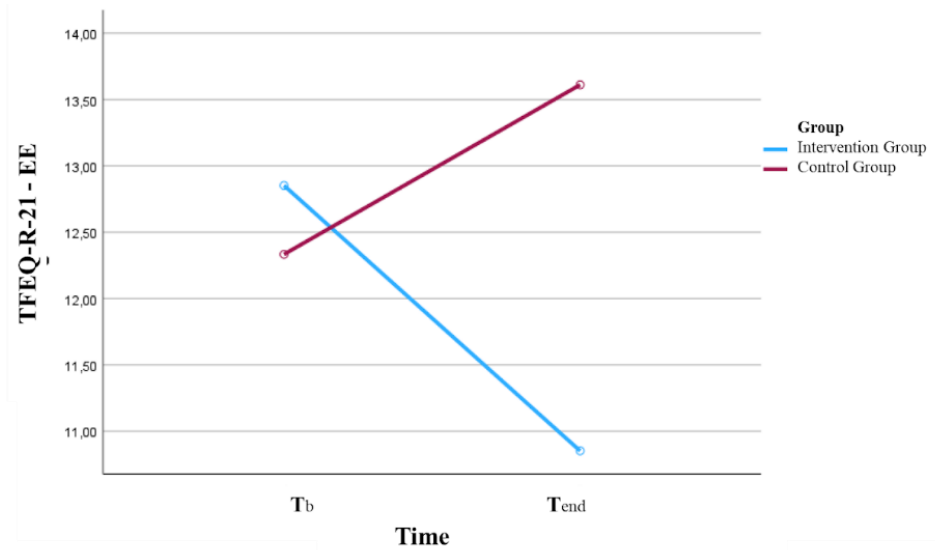


Figure 3

Mean scores on the TFEQ-R-21-EE for control and intervention groups at pre-test (T_b) and post-test (T_{end}).

For the TFEQ - Cognitive Restrain, there was no significant main effect of time, ($F(1, 43) = .07, p = .798, \eta^2_p = .002$), indicating that overall participants' scores did not change significantly from pre- to post-intervention. There was also no significant main effect of group, ($F(1, 43) = .18, p = .674, \eta^2_p = .004$). The interaction between time and group was also not significant, ($F(1, 43) = 1.13, p = .293, \eta^2_p = .026$), suggesting that the changes over time did not differ between the intervention and control groups.

Figure 4 revealed an intersection between the two groups, with cognitive restraint increasing in the intervention group and decreasing in the control group from pre- to post-intervention. Although the statistical analysis did not show a significant interaction effect, the pattern observed in the graph suggests a differential trend over time for the groups. Descriptive statistics supporting this observation are also presented in Table 3.

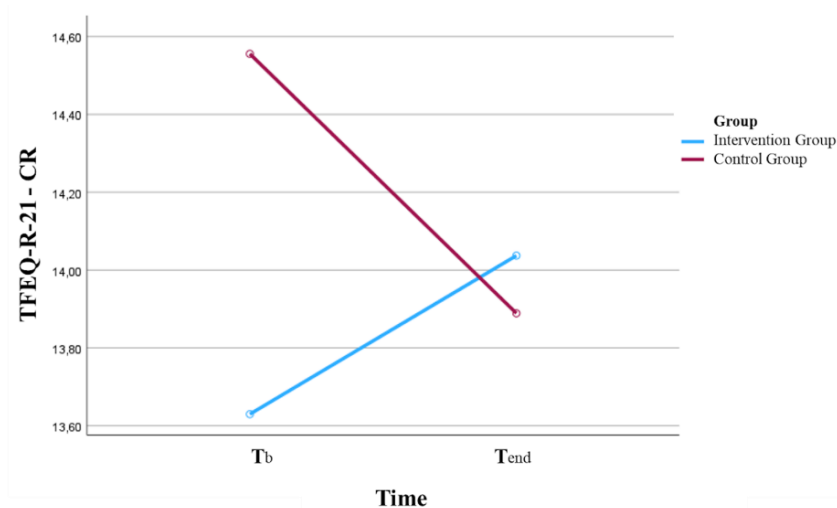


Figure 4

Mean scores on the TFEQ-R-21-CR for control and intervention groups at pre-test (Tb) and post-test (Tend).

5. Discussion

How we behave and navigate the world is always intertwined with emotions (Damasio, 1994), which highlights the significance of cultivating effective ER skills. These skills are essential not only for emotional well-being but also for healthy social functioning, mitigating the risk of relying on maladaptive coping strategies when facing emotional difficulties. In that sense, developing these competencies enables individuals to better manage their emotional experiences.

From that perspective, the present project is centered on an intervention that explores new avenues for addressing problematic eating behaviors, with a particular emphasis on ER as a key mechanism for meaningful change. The study aimed to evaluate the preliminary effectiveness of a school-based ER program for adolescents, with the goal of fostering more adaptive eating behaviors. It was expected that the intervention would lead to a reduction in problematic eating and difficulties in emotion regulation. Overall, the findings preliminary support the thesis objective.

The intervention proved to be both feasible and acceptable to the target population, who reported high levels of satisfaction. The particular items with higher scores reflect key indicators of program success and participant engagement, highlighting the effectiveness in

meeting participants' expectations and needs. It also suggests that the program not only delivered valuable content but also fostered a meaningful and enjoyable experience. These findings suggest that participants not only valued their experience and its contributions but also perceived the program as sufficiently worthwhile to consider engaging in it again. The willingness to recommend the program to others further underscores its perceived relevance. Ultimately, these favorable responses may contribute to increased adherence and motivation in future interventions.

In addition, it is essential to point out that participants in the intervention group reported decreasing trends in difficulties related to ER and eating behaviors, as measured by the DERS-SF and the TFEQ-R-21. Although statistically significant improvements were found only in DERS-SF scores and the Emotional Eating subscale (TFEQ-R-21-EE), visual inspection of the data revealed a diminishing trend of problematic behaviors among participants in the intervention group from pre- to post-intervention, in contrast to the controls, that exhibited a general exacerbation across most outcomes. An exception is portrayed in Figure 4, where both groups demonstrated improvements in DERS-SF scores over time. Nonetheless, the intervention group exhibited a more pronounced reduction in difficulties, which reinforces the potential effectiveness of the intervention, even though the observed changes involved slight increases and decreases.

It is also noteworthy that the effect sizes observed in the significant results were moderate to large, highlighting the practical relevance of the changes in the intervention group. Conversely, for the non-significant results, the effect sizes were small to moderate, suggesting that the intervention had a limited impact in these areas or that the sample size was insufficient to detect subtle effects, possibly due to low statistical power to identify real changes.

Emphasizing the established link between ER and disordered eating (Mills et al., 2015), the present findings offer promising preliminary evidence for the effectiveness of ER-focused interventions in community adolescent populations. Specifically, improvements in ER were associated with reductions in non-adaptive eating behaviors (Kerin et al., 2017; Mills et al., 2015).

The results support Gratz and Roemer's (2004) multidimensional conceptualization of ER difficulties and their strong association with maladaptive behavioral outcomes, consistent with prior research (Aldao et al., 2010; Svaldi et al., 2012). Within this theoretical framework,

the data suggest that disordered eating behaviors may serve as maladaptive strategies for managing emotional distress, maintained over time through mechanisms of negative reinforcement (Martyn-Nemeth et al., 2009). Notably, such associations were observed even within a non-clinical adolescent sample, reinforcing the idea that ER difficulties are relevant beyond clinical populations.

By targeting this core mechanism, interventions such as BITE can effectively reduce a broad spectrum of emotional and behavioral problems. These findings also align with the transdiagnostic perspective of ER (Aldao et al., 2010; Cludius et al., 2020), which posits ER difficulties as a common vulnerability underlying psychopathology. This approach is particularly valuable in community settings, where diagnostic clarity may be limited and access to specialized mental health care is often constrained. Focusing on emotional processes, rather than disorder-specific symptoms, allows for more inclusive and adaptable prevention and early intervention strategies.

Consistent with the notion of emotional dysregulation as a key contributor to overeating in adolescents (Casagrande et al., 2020), the current findings underscore the importance of equipping young people, especially during this developmentally sensitive period, with adaptive ER skills. These skills not only address immediate concerns such as problematic eating but also contribute to the development of long-term emotional resilience and improved coping mechanisms. In this sense, reductions in problematic eating may reflect broader improvements in emotional functioning, highlighting the wide-reaching mental health benefits of ER-focused interventions.

Moreover, the sociodemographic characteristics of the sample may reflect contextual factors relevant to understanding individual differences in ER. For instance, the nationality distribution of the participants suggests the potential influence of diverse cultural backgrounds on emotional development. The relatively low levels of parental education, particularly among fathers, may be indicative of limited access to emotional literacy and to effective parenting strategies that support the development of emotional competencies. While the majority of parents were employed and just over half were reported to be married to each other, the presence of diverse family structures and potentially complex relational dynamics may contribute to varying emotional climates within households. These factors can influence the emotional development of the participants (Morris et al., 2007), potentially resulting in differences in how they recognize, express, and regulate emotions. Therefore, these sociodemographic elements

should be considered when interpreting outcomes related to ER, as they may reflect specific vulnerabilities or protective factors within this particular sample.

That said, the results of the BITE should be interpreted with caution. Whereas findings suggest encouraging short-term benefits, considering the chronic nature and persistence of disordered eating in adolescents (Simone et al., 2020), it can be important to sustain long term interventions.

Taken together, these findings suggest that emotion-focused interventions may hold promise in reducing maladaptive eating among adolescents, but their long-term effectiveness remains uncertain.

5.1 Implications

The present study holds several theoretical, practical, and policy-related implications, particularly within the domains of developmental psychology, public health, and educational practice.

This thesis adds to the growing evidence highlighting the crucial role of ER in adolescents' well-being, especially regarding non-adaptive eating behaviors and their negative consequences. The findings further endorse the importance of developing emotional skills early to prevent maladaptive behaviors and have practical implications for school-based mental health promotion. Practically, BITE could be integrated into existing educational systems and community settings as a low-cost, scalable preventive strategy for dysfunctional eating and broader emotional challenges. Its cost-effectiveness and scalability, especially via digital or group formats, allow wide implementation without high costs. Educators, psychologists and policymakers should consider adopting emotion-focused curricula to foster resilience and healthier coping.

From a public health perspective, schools offer an equitable setting to reach diverse youth during a critical developmental period. Integrating ER programs into national policies can reduce adolescent mental health burdens, including disordered eating, and promote long-term benefits like improved emotional well-being, healthier eating, fostering a mindful relationship with food and reduced risk of eating disorders and related health issues.

5.2 Limitations and Future Directions

Several limitations must be considered when interpreting these results. Firstly, the non-randomized design may have introduced selection bias, reducing internal validity and complicating causal interpretations. Pre-existing differences between groups, such as motivation or sociodemographic context could have influenced outcomes, increasing the risk of uncontrolled confounding variables. In fact, the non-significant change observed may reflect said differences in sample characteristics (Lin et al., 2020). To address this, future studies should implement randomized controlled trials (RCTs) to improve internal validity and mitigate selection bias and confounding effects.

The small sample size substantially limited the statistical power of the analyses, increasing the risk of Type II errors and reducing the ability to detect meaningful effects. Larger samples are needed to enhance statistical power, allowing for more definitive conclusions regarding the intervention's effectiveness, both to validate significant findings and to further investigate the non-significant results.

Additionally, the uneven sex distribution across groups may have influenced outcomes, particularly in domains like ER and intervention engagement, where gender differences are well documented (Nolen-Hoeksema, 2012). Future research should also aim for greater demographic diversity, including a balanced representation of sex and age, to explore potential moderating effects.

Methodological concerns further include data collection from intervention and control groups occurring in different academic years, which may introduce cohort effects or contextual differences. Synchronizing data collection across groups would minimize such effects and strengthen the reliability of comparisons. The use of convenience sampling limits the generalizability of the findings, and potential contamination between groups, especially in shared social or institutional settings, cannot be ruled out. Moreover, the absence of medium- or long-term follow-up assessments restricts conclusions about the sustainability of intervention effects over time, highlighting the need for future studies to incorporate extended follow-ups.

The exclusive reliance on self-report instruments, although common and practical in psychological research with adolescents (Gullone & Taffe, 2012), introduces risks of social desirability bias and recall inaccuracies. Retrospective self-reports of ER are particularly susceptible to distortions influenced by current emotional states, warranting cautious interpretation of results (Lavender et al., 2015; Weinberg & Klonsky, 2009). Incorporating

mixed methods, including qualitative data, in future research could facilitate understanding of participants' experiences and mechanisms of change, shedding light on which intervention components are most effective or challenging.

Regarding statistical analyses, although repeated measures ANOVAs were conducted, assumption of normality was not fully met. The normality of the data distribution for each questionnaire subscale was assessed using the Shapiro-Wilk test for each group and time point. Results indicated that normality was fully met in DERS and TFEQ- CR ($p > .05$). However, for TFEQ - UE and TFEQ - EE, normality was not fully met, with violations observed ($p < .05$). Nonparametric alternatives such as Mann-Whitney and Wilcoxon signed-rank tests were performed and yielded results consistent and statistically equivalent with the parametric analyses, supporting the robustness of the findings. Given the greater statistical power and interpretability of parametric tests and the robustness of repeated measures ANOVA to slight deviations from normality (Field, 2018; Cohen, 1988), parametric analyses were prioritized. Nonetheless, caution is warranted when interpreting these findings due to the initial assumption violations. Importantly, this limitation was minimized because all variables fell within the acceptable range of skewness and kurtosis.

To enhance external validity and inform the scalability of the program, replication in diverse educational and cultural contexts is recommended. Future studies should also assess broader psychosocial outcomes such as anxiety, impulsivity, and academic performance to determine the wider impact of ER training. It is plausible that more intensive or longer-duration interventions could yield stronger effects.

Despite the outlined limitations, participants' engagement and satisfaction, along with statistical results across measures and groups and the alignment of observed patterns with existing literature, provide preliminary support for the intervention's potential. These findings offer valuable foundation for future research and support the continued exploration of ER as a key mechanism in promoting healthier psychological and behavioral outcomes in youth.

6. Conclusion

The findings suggest that enhancing emotion regulation in adolescents facilitates the development of more adaptive eating behaviors. Interventions such as BITE, which emphasize emotional literacy and regulation, hold considerable potential to address a wide spectrum of emotional and behavioral difficulties beyond problematic eating. Despite certain limitations, this study provides promising preliminary evidence regarding the feasibility and potential effectiveness of BITE, underscoring the importance of incorporating ER-focused interventions within preventive mental health frameworks for adolescents. To further substantiate these findings, future research should prioritize the implementation of randomized controlled trials (RCTs) to improve internal validity and minimize potential biases. Moreover, increasing sample sizes will be essential to enhance statistical power and enable more robust and generalizable conclusions.

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