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Multiple Mediators Matter: Why Solely Linking Emotion Regulation Difficulties to Disturbed Eating Is Not Sufficient

**An Empirical Investigation in
Adolescents and Young Adults
from the General Population**



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Multiple Mediators Matter: Why Solely Linking Emotion Regulation Difficulties to Disturbed Eating Is Not Sufficient

**An Empirical Investigation in Adolescents and Young Adults
from the General Population**

Dissertation zur Erlangung der Doktorwürde an der Philosophischen Fakultät der Universität
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List of Abbreviations

ARS = Appearance-Based Rejection Sensitivity

ARS-D = Appearance-Based Rejection Sensitivity Scale

BD = Body Dissatisfaction

BDI-FS = Beck Depression Inventory, Fast Screening

BMI = Body Mass Index

BSQ-8C = Body Shape Questionnaire, Short Form

CBT-E Model = Transdiagnostic Model of Eating Disorders

DECB = Disturbed Eating and Compensatory Behaviors

DERS-SF = Difficulties in Emotion Regulation Scale, Short Form

DSM-5 = Diagnostic and Statistical Manual for Mental Disorders

EDE-Q8 = Eating Disorder Examination, Short Form

ERD = Emotion Regulation Difficulties

i-BEAT = Binge Eating Adolescent and Young Adults Treatment

M = Mean

MD = Muscle Dysmorphic Symptoms

MDDI = Muscle Dysmorphic Disorder Inventory

PHQ-4 = Patient Health Questionnaire, Short Form

SATAQ-G-Int = Sociocultural Attitudes Towards Appearance Questionnaire, Internalization

SD = Standard Deviation

SIAS-6 = Social Interaction Anxiety Scale, Short Form

T1 = First Wave, Screening

T2 = Second Wave, Follow-Up

TAS-20 = Toronto Alexithymia Scale, Short Form

TSF-B = Thought-Shape Fusion, Body

TSF-B-Con = Thought-Shape Fusion Body Questionnaire, Concept

Abstract

Young people often report pronounced negative perceptions and attitudes towards their own body or intense fear of being not muscular or lean enough. However, data on psychological mechanisms of body dissatisfaction such as emotion regulation difficulties and appearance-related rejection sensitivity is scarce. In the *first publication* of this dissertation, the aim was to investigate the associations between these psychological mechanisms of both body dissatisfaction (shape/weight concerns) and muscle dysmorphic symptoms. Our sample was recruited among adolescents and young adults from the general population. The first wave (T1) included 605 participants (80% female, 19.6 ± 2.5 years) who completed online-questionnaires and were reassessed in a second wave (T2), one year later. At both waves, emotion regulation difficulties and appearance-based rejection sensitivity were positively cross-sectionally associated with body dissatisfaction and muscle dysmorphic symptoms. We observed high absolute and relative level stabilities for all variables involved across the one-year study period. Our findings underline the relevance of these psychological mechanisms in the development of body dissatisfaction and to a lesser extent of muscle dysmorphic symptoms over the period of one year. Additional research is necessary to replicate these findings in other youth samples.

Furthermore, an increasing number of young females are reporting disturbed eating and compensatory behaviors (DECB), which tend to persist into early adulthood and also significantly contribute to the onset of subthreshold and threshold eating disorders. Emotion regulation difficulties have been identified as one of the most relevant transdiagnostic risk factors contributing to the development and maintenance of various DECB (e.g., restriction, binge eating, purging, excessive exercise). The aim of the *second publication* was to investigate the mediating mechanisms between emotion regulation difficulties and DECB within a newly developed path model. This path model integrates two sets of serially linked mediators: The first set includes cognitive mediators, such as the internalization of appearance-ideals and body-related cognitive distortions; physiological mediators like body mass index; and psychological mediators including negative mood and social anxiety symptoms. The second set focuses on body image-related mediators, specifically concerns about weight, shape, muscularity, and leanness. A total of 627 females (19.9 ± 2.5 years) from the general population participated in a cross-sectional online-questionnaire study. The results highlighted body-related cognitive distortions, either alone ($\beta = 0.160, p < 0.000$), or in conjunction with body dissatisfaction ($\beta = 0.124, p < 0.000$), as key mediators. Further cross-sectional and longitudinal research across *different genders* in both clinical and community samples is essential to refine models like the

Transdiagnostic Model of Eating Disorders (CBT-E Model), enhance therapeutic frameworks such as Integrative Cognitive-Affective Therapy, and develop tailored intervention programs.

Young males are notably underrepresented in research on eating disorder pathology, despite a significant number engaging in disturbed eating behaviors. Considering that gender significantly influences the persistence, etiology, and manifestation of DECB, greater attention for this group is warranted. The **third publication** investigated multiple mediating mechanisms by which emotion regulation difficulties influence DECB in a *mixed-gender sample* ($N = 803$, 17% male, 19.9 ± 2.5 years) to examine if these mechanisms differ between genders. This is of particular interest, due to previously found gender-specific differences in body-related cognitive distortions and body dissatisfaction and indicated that females are more likely to use DECB to lose weight, whereas males tend to engage in muscularity-enhancing DECB. Therefore, we refined the path model of disturbed eating, previously tested on young females in the second publication, to accommodate the lower participation rate of males. The original path model had to be simplified to effectively investigate gender differences. The refined path model of disturbed eating integrates two sets of serially linked mediators: The first set, covering cognitive (*body-related cognitive distortions*), physiological (*body mass index*), and psychological (*negative mood*) factors; and the second set, focusing on a body-image-related factor (*body dissatisfaction*). This study was the first to investigate whether these paths differ between young females and males. Across both genders we found body-related cognitive distortions, either alone ($\beta = 0.142, p < 0.000$), or in conjunction with body dissatisfaction ($\beta = 0.154, p < 0.000$), as key mediators. Notably, the pathway linking emotion regulation difficulties through body-related cognitive distortions and body dissatisfaction to DECB was much stronger in females than in males. The findings underscore the importance of tailoring prevention and intervention programs to the specific gender-related nuances in information processing. Therefore, it is crucial to further include young males in future research to enhance our understanding of the developmental and maintenance mechanisms of eating disorder pathology within this group, particularly concerning etiological differences from females.

List of empirical publications

This dissertation is based on the following three empirical publications:

Publication I

Mueller, V. M., Forrer, F., Meyer, A. H., & Munsch, S. (2024). Psychological correlates of body dissatisfaction in Swiss youth over a one-year study-period. *Frontiers in psychology, 14*, 1269364. <https://doi.org/10.3389/fpsyg.2023.1269364>

Publication II

Mueller, V. M., Meyer, A. H., Forrer, F., Rauen, A. C., & Munsch, S. (2025). A path model linking emotion regulation difficulties to disturbed eating and compensatory behavior in young females. *Journal of Eating Disorders, 13*(1), 265. <https://doi.org/10.1186/s40337-025-01445-1>

Publication III

Mueller, V. M., Meyer, A. H., Rauen, A. C., Forrer, F., & Munsch, S. (submitted). Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behaviors in Adolescents and Young Adults: A Path Model Analysis. Manuscript in review: *Journal of Eating Disorders*.

Introduction

Eating disorders are one of the most common mental health disorders among adolescents and young adults (Herpertz-Dahlmann, 2015; Mitchison et al., 2020; Nolan et al., 2023), characterized by disturbed eating behaviors and problematic weight control practices, often accompanied by profound body dissatisfaction and severe somatic consequences (American Psychiatric Association, 2013). Moreover, eating disorders are associated with considerable psychological distress, diminished quality of life, and significant health complications (Mitchison et al., 2015; Peebles & Sieke, 2019). The spectrum of threshold eating disorders includes binge eating disorder, as well as bulimia nervosa and anorexia nervosa (American Psychiatric Association, 2013; Herpertz et al., 2011). These threshold eating disorders typically follow a chronic course, marked by periods of recovery and relapse throughout the lifespan, especially if they are untreated or improperly treated (Raykos et al., 2014; Santomauro et al., 2021; Turner et al., 2015). Subthreshold eating disorders, which do not meet the full diagnostic criteria, are identified as the most prevalent forms of eating disorders among young people. They include a variety of disturbed eating behaviors (e.g., restricting food intake, binge eating, purging, excessive exercise), which often co-occur (Peschel, Sigrist, et al., 2024). If left untreated, subthreshold eating disorders can progress into full-blown threshold eating disorders (Ernst et al., 2017; Herpertz-Dahlmann, 2015; Mitchison et al., 2020; Nolan et al., 2023; Silén & Keski-Rahkonen, 2022). Therefore, early detection and treatment are crucially beneficial, as the likelihood of recovery from subthreshold/threshold eating disorders diminishes significantly the longer, they remain untreated (Treasure & Russell, 2011; Von Holle et al., 2008). Furthermore, while the peak age of onset for threshold eating disorders is 15.5 years in the general youth population (Hay et al., 2023; Herpertz-Dahlmann, 2015; Santomauro et al., 2021; Solmi et al., 2022), subthreshold forms may emerge even earlier (Peschel et al., 2024). Generally, epidemiological evidence points to an increase in the incidence of eating disorders, alongside a decline in the age of onset (Hay et al., 2023). Over the past two decades, significant changes in the understanding of subthreshold/threshold eating disorders across diverse populations have emerged (Hay et al., 2023). Research highlights that eating disorders are not limited to highly-educated young females from Western countries but are also common among people from lower-income backgrounds, various sexual orientations, and different ethnicities (e.g., Calzo et al., 2017; Hazzard et al., 2020). Moreover, recent studies have shown an increase in eating disorders among young males (Limbers et al., 2018; Murray et al., 2017; Rubo et al., 2020). However, the pathology of eating disorders and their epidemiological risk factors remain understudied in these groups as

well as in the general youth population (Hay et al., 2023). Disturbed eating behaviors often serve as an early indicator of eating disorders, frequently occurring among the general population, including children and especially adolescents and young adults (Cosh et al., 2023; Glazer et al., 2019; Hansson & Schmidt, 2025; Peschel et al., 2024; Schuck et al., 2018). Because they do not reach the severity or frequency of subthreshold or threshold eating disorders (American Psychiatric Association, 2013), they often remain unrecognized and untreated. This oversight can be detrimental as these disturbed eating behaviors can persist into early adulthood, leading to significant distress and the development of subthreshold/threshold eating disorders (Foster et al., 2024; Glazer et al., 2019; Herpertz-Dahlmann et al., 2015; Stice et al., 2017; Yamamiya & Stice, 2024). Additionally, they are linked to various physical and mental health impairments in young people, such as unhealthy body weight, low self-esteem, and depression, significantly impacting the development and quality of life of adolescents and young adults (Hansson et al., 2016; Loose et al., 2023; Loth et al., 2014; Rohde et al., 2015; Stice et al., 2013). This dissertation focuses particularly on the epidemiological risk factors for the development and maintenance of disturbed eating among adolescents and young adults (ages 14-24) in Switzerland. Special emphasis is placed on body dissatisfaction and emotion regulation difficulties, which have been found to be prevalent among young people and significantly impact their psychological well-being (Prefit et al., 2019; Stice & Van Ryzin, 2019; Trompeter et al., 2021; Yamamiya & Stice, 2024). These have also been identified as significant risk factors in the development and maintenance of subthreshold/threshold eating disorders in prior research, making their further examination crucial (Prefit & Szentagotai-Tătar, 2018; Yamamiya & Stice, 2024). The data for the three publications incorporated into this dissertation were obtained from the questionnaire study of the i-BEAT project (Binge Eating Adolescent and Young Adults Treatment), a comprehensive research project conducted in Switzerland from April 2021 to November 2024 (for the study protocol, see Munsch et al., 2021). The primary aim of the i-BEAT questionnaire study was to investigate the determinants of mental health (baseline and 12-month follow-up), with a particular focus on disturbed eating behaviors, thereby deepening the understanding of the etiological mechanisms underlying eating disorders (Munsch, Forrer, et al., 2021). Additionally, this dissertation developed a comprehensive path model to investigate the multiple mediating mechanisms between emotion regulation difficulties and disturbed eating behaviors, offering suggestions to refine models like the Transdiagnostic Model of Eating Disorders (Fairburn et al., 2003; Trompeter et al., 2021) and enhance therapeutic frameworks such as Integrative Cognitive-Affective Therapy (Peterson et al., 2020; Wonderlich et al., 2014).

Empirical background

Body dissatisfaction in adolescence and young adults

Body dissatisfaction can be defined as a person's negative subjective perceptions and feelings of their body, which often involves a discrepancy between one's actual body and one's idealized body (Grogan, 2021). Specifically, body dissatisfaction often manifests as distress over not achieving a culturally endorsed *thin-ideal*, characterized by concerns regarding body shape, feelings of being perceived as overweight, and fears of weight gain (McLean et al., 2022; Rohde et al., 2015; Schuck et al., 2018; White et al., 2023). Therefore, body dissatisfaction has emerged as an important *risk factor* in the development and maintenance of *subthreshold and threshold eating disorders* (Shagar et al., 2017; Stice, 2016; Stice et al., 2011; Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024). While body dissatisfaction has long been prevalent among young females and is increasingly observed among young males, current studies indicate that females still report higher levels of dissatisfaction with their body shape and weight compared to males (Dubois et al., 2016; Purton et al., 2019; Ruisoto et al., 2015). This may be attributed to the physiological changes during puberty, where especially girls often experience rapid increases in weight and body fat, particularly in areas such as the waist, hips, and thighs, moving them away from the culturally endorsed thin-ideal, heightening their perception of body dissatisfaction (Bucchianeri et al., 2013). Meanwhile, young males develop closer to the thin-ideal through puberty, primarily due to naturally increased muscle mass (Cash & Smolak, 2011; Ricciardelli & Yager, 2015). However, there is a significant *gender difference* in the direction of body dissatisfaction: while females often feel pressured to be thin, males' concerns tend to be two-dimensional, revolving around either increasing muscularity and/or achieving leanness, with less focus on weight loss (Hansson & Schmidt, 2025; Klimek et al., 2018; Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015).

Recent studies attribute the rise in the drive for muscularity and leanness among young people to cultural shifts in Western societies that increasingly promote leaner, toned, and more muscular body-ideals (Cunningham et al., 2019; Girard et al., 2018; Mitchison et al., 2022). This trend of aspiring to a *muscular-/athletic-ideal* is linked with ***muscle dysmorphic symptoms***, characterized by an obsessive focus on achieving muscularity and leanness. Such symptoms typically lead to feelings of being insufficiently athletic or muscular (e.g., "I think my body is too slender"), thereby heightening body dissatisfaction (Mitchison et al., 2022; Nagata

et al., 2022; Schuck et al., 2018). While muscle dysmorphic symptoms are predominantly observed in males (Cunningham, Rodgers, et al., 2020; Mitchison et al., 2022; Nagata et al., 2022), there is an emerging trend toward a highly toned athletic physique among young females as well (Bozsik et al., 2018; Cunningham et al., 2020; Marashi et al., 2024; Mitchison et al., 2022). Despite seeming contradictory, the internalization of both thin- and muscular-/athletic-ideals can coexist among young females, necessitating an expansion of the definition of body dissatisfaction for both genders (Wagner et al., 2022).

Nevertheless, little is known about mechanisms associated with muscle dysmorphic symptoms, as the most frequently used body dissatisfaction questionnaires primarily assess weight and shape concerns (Evans & Dolan, 1993; Pook et al., 2002) but do not capture dissatisfaction with and drive for muscularity and leanness. This oversight suggests that the prevalence of body dissatisfaction, especially among young males, may have been underestimated so far. Further, this underscores the need for future mixed-gender studies to include measures that evaluate concerns about weight, shape, and muscularity. Incorporating muscle dysmorphic symptoms into the concept of body dissatisfaction will offer more profound insights into its development and persistence throughout adolescence and early adulthood.

Body dissatisfaction can occur at any point in life, but most commonly begins in early adolescence and has been increasingly recognized as a significant *public health concern* over the past decade (McLean et al., 2022; Rohde et al., 2015; Tantleff-Dunn et al., 2011). It is particularly prevalent during adolescence and early adulthood (Bucchianeri et al., 2013; Reel et al., 2015; Wang et al., 2019), and therefore often described as *normative discontent* in this age group (McLean et al., 2022; Rohde et al., 2015; Schuck et al., 2018). This is underscored by a recent study in Switzerland, which found that only 35% of females and 56% of males aged between 13 and 17 were satisfied with their appearance. Moreover, approximately half of the young males and a third of the young females reported a desire to have more muscles (Widmer Howald et al., 2018). These numbers are comparable with previous research conducted in other Western youth samples (Hoffmann & Warschburger, 2018; Aanesen et al., 2017; McLean et al., 2022; Meschberger-Annweiler et al., 2024; Wang et al., 2019). During adolescence, young people face substantial physical, social, cognitive, and emotional changes, making it a time of heightened vulnerability (Reel et al., 2015; Sawyer et al., 2018). For instance, many adolescents place significant importance on their appearance, as attractiveness often brings higher social status in their peer groups. However, failing to meet appearance-ideals can significantly increase the risk of developing body dissatisfaction (Borch et al., 2011; Grosick et al., 2013; Ricciardelli & Yager, 2015). Similarly, early adulthood represents a distinctive developmental

stage, accompanied by major life transitions such as increasing autonomy and ongoing identity formation, as well as physical changes like weight gain and shifts in body proportions (Bucchianeri et al., 2013; Wang et al., 2019). These changes can similarly heighten the risk of body dissatisfaction as young adults navigate these critical transitions and face societal pressures related to appearance-ideals (Bucchianeri et al., 2013; Reel et al., 2015; Wang et al., 2019).

Research indicates that high body dissatisfaction can hinder a healthy transition from adolescence into adulthood (McLean et al., 2022) and serves not only as a critical risk factor for the development and maintenance of subthreshold and threshold eating disorders (Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024), but also manifests across a spectrum of other *mental health disorders*. These include depressive and social anxiety disorders (Bijsterbosch et al., 2020; Brechan & Kvalem, 2015; Gitimu et al., 2016; Liechty & Lee, 2013; Sander et al., 2021), as well as body dysmorphia (Arji et al., 2016). Furthermore, body dissatisfaction is also observed in young people without mental health disorders (Bucchianeri et al., 2013; Frisén et al., 2015; Mond et al., 2013). Additionally, the dissatisfaction with one's body drives disturbed eating, such as restrictive dieting, binge eating, purging and excessive exercising (Cosh et al., 2023; Glazer et al., 2019; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018). Body dissatisfaction significantly impacts overall quality of life (Griffiths et al., 2016) and is associated with low self-esteem (Wojtowicz & von Ranson, 2012), overweight/obesity (Loth et al., 2015), emotional and negative mood distress (Ferreiro et al., 2014; Sharpe et al., 2018).

Given the profound impact of body dissatisfaction on mental health, it is essential to comprehend the underlying mechanisms that drive the development and persistence of negative self-perceptions and attitudes toward one's own body, or the intense fear of not being muscular enough. According to the ***Biopsychosocial Model of Body Image Concerns*** (Rodgers et al., 2014, 2020) young people's dissatisfaction with their body shape, weight, and muscularity is shaped by a complex interplay of *biological, psychological, and sociocultural factors*. Previous studies have demonstrated that body dissatisfaction is influenced by biological factors such as age, gender, and body mass index (Frederick et al., 2022; Nelson et al., 2018; Vuong et al., 2021; Wyssen, Bryjova, et al., 2016), as well as sociocultural factors like appearance pressure from peers, family, and social media (Castellanos Silva & Steins, 2023; Rodgers et al., 2014, 2020). However, there remains a noticeable gap in the understanding of how psychological factors, contribute to the development of both body dissatisfaction and muscle dysmorphic symptoms in young people.

Psychological factors of body dissatisfaction

Considering this, it is essential to acknowledge *emotion regulation difficulties* as significant psychological contributors to body dissatisfaction, characterized by the inability to effectively employ emotion regulation strategies (Gratz & Roemer, 2004; Keenan, 2000; Thompson, 1994). In contrast, emotion regulation refers to the capacity to manage both positive and negative emotions using specific strategies (Gross, 1998; Thompson, 1994). Effective use of these strategies necessitates that young people first identify, recognize, and understand their emotional states (Thompson & Calkins, 1996). As such, the concept of emotion dysregulation goes beyond mere difficulties in using effective strategies, encompassing several interrelated dimensions: lack of emotional clarity and awareness, difficulties engaging in goal-directed behavior, non-acceptance of emotional responses, impulse control difficulties when experiencing negative emotions and limited access to emotion regulation strategies (Gratz & Roemer, 2004).

Difficulties in identifying, understanding and regulating one's emotions can arise at any point during development but are particularly prevalent in adolescence and early adulthood, a period when emotion regulation skills are still developing (Riediger & Luong, 2015). During early adolescence, emotional reactivity tends to increase rapidly, while the capacity to regulate emotions remains underdeveloped (McLaughlin et al., 2011; Rapee et al., 2019). The development of effective emotional control, involving the growth of specific brain areas, progresses slowly and continues into early adulthood (Rapee et al., 2019; Somerville et al., 2010). If emotion regulation abilities are underdeveloped or impaired, it can hinder normal emotional development and lead to psychological dysfunction. Indeed, prior research has established emotion regulation difficulties as a *transdiagnostic risk factor* impacting a wide range of psychopathologies in adolescents and young adults (McLaughlin et al., 2011; Rapee et al., 2019), including disturbed eating behaviors and eating disorders (Prefit et al., 2019; Trompeter et al., 2021). As previously discussed, body dissatisfaction represents a major risk factor in the development and maintenance of subthreshold/threshold eating disorders (Shagar et al., 2017; Stice, 2016; Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024). Given that adolescence and early adulthood represent the peak periods for the onset of subthreshold/threshold eating disorders (Hudson et al., 2007; Nagl et al., 2016), it becomes even more crucial to understand the role that emotion regulation difficulties play in fostering body dissatisfaction among young people.

A study involving adolescent girls identified emotion regulation difficulties, particularly poor emotional awareness, as a significant predictor for body dissatisfaction (Sim & Zeman, 2005). Further research has shown that young adult females with increased emotion

dysregulation exhibit a higher drive for muscularity (Cunningham et al., 2020). Among young males, emotion dysregulation is linked to heightened concerns about weight and shape (Lavender & Anderson, 2010; Racine & Wildes, 2015; Rufino et al., 2018), as well as dysmorphic appearance concerns (Cunningham et al., 2018) and muscle dysmorphic symptoms (Cunningham, Rodgers, et al., 2020; Morin & Meilleur, 2024). Additionally, emotion dysregulation has been found to amplify the association between body dissatisfaction and the desire for muscularity in young adult males (Dakanalis et al., 2015). Furthermore, males in the same age group with higher levels of alexithymia, meaning a diminished ability to identify and express emotions, were more likely to report muscle dysmorphic symptoms (Leone et al., 2015). Research on a mixed-gender sample of adolescents revealed that reliance on dysfunctional emotion regulation strategies correlates with increased body dissatisfaction (Hughes & Gullone, 2011), and that young people with heightened concerns about their body report greater emotion dysregulation (Hansson et al., 2016). In studies with high school and university students, higher levels of emotion regulation difficulties were associated with more pronounced body dysmorphic symptoms (Gardner et al., 2021), while young adults with elevated emotion regulation difficulties reported increased body dissatisfaction and decreased self-esteem (Cash et al., 2005). Conversely, employing effective emotion regulation strategies to manage body dissatisfaction has been associated with improved psychosocial functioning (Cash et al., 2005). These findings underscore the critical role of emotion regulation difficulties in the development and persistence of body dissatisfaction, while also highlighting that emotion dysregulation is closely associated with concerns about not meeting both thin- and muscular-/athletic-ideals.

Given the significance of peer status and interpersonal acceptance (Andrews et al., 2021; Anttila et al., 2017), young people are especially sensitive to signs of rejection, particularly when it comes to appearance-related feedback from their peers (Webb et al., 2014; Webb & Zimmer-Gembeck, 2015). *Appearance-based rejection sensitivity* is a relatively stable personality trait characterized by the tendency to anxiously expect, readily perceive, and overreact to signs of rejection related to one's appearance (Park, 2007; Park & Pinkus, 2009). This type of rejection sensitivity comprises both affective and cognitive dimensions: the affective component involves anxious concerns about being rejected based on appearance, while the cognitive component involves anticipating such rejections (Park, 2007). Young people with high appearance-based rejection sensitivity frequently associate physical imperfections with a heightened risk of rejection (Bowker et al., 2013; Schmidt & Martin, 2017). Moreover, they often interpret even ambiguous signs of rejection as confirmations of their fears, leading them to withdraw

from social interactions or display inappropriate social responses, which in turn increases the risk of actual rejection and associated distress (Park & Pinkus, 2009; Rosenbach & Renneberg, 2011). This, however, exacerbates their social isolation and intensifies their fear of rejection, creating a self-defeating cycle (Bowker et al., 2013; Park & Pinkus, 2009). Cross-sectional studies involving adolescents and young adults found that females tend to report higher levels of appearance-based rejection sensitivity compared to males (Park et al., 2009; Webb et al., 2014; Webb & Zimmer-Gembeck, 2015; Zimmer-Gembeck et al., 2022). Additionally, appearance-based rejection sensitivity has been associated with a range of psychological impairments, including low self-esteem, social anxiety, depressive symptoms, and body dysmorphia (Bowker et al., 2013; Hawes et al., 2020; Lavell et al., 2014; Park, 2007; Roberts et al., 2018; Webb & Zimmer-Gembeck, 2015). Moreover, young people with appearance-based rejection sensitivity exhibit a heightened risk for subthreshold/threshold eating disorders and disturbed eating behaviors, particularly emotional eating and binge eating (Cardi et al., 2013; Dahill et al., 2021; De Paoli et al., 2017; Pöttsch et al., 2018; Vandewalle et al., 2017; Webb et al., 2017, 2021).

In a study involving young adults, higher levels of appearance-based rejection sensitivity were positively correlated with more pronounced *body dissatisfaction* (e.g., "How worried are you about the way that you look?") and a greater acceptance of cosmetic surgery (Calogero et al., 2010; Park et al., 2009). Furthermore, both adolescents and young adults displayed heightened body dysmorphic symptoms when experiencing increased appearance-based rejection from their peers (Densham et al., 2017; Gardner et al., 2021; Lavell et al., 2014; Mastro et al., 2016; Webb et al., 2016; Zimmer-Gembeck et al., 2022). Although prior studies demonstrate that concerns about appearance rejection are widespread among adolescents and young adults in the general population (Schmidt & Martin, 2019; Webb & Zimmer-Gembeck, 2016), the majority of existing research has primarily focused on patients with eating disorders or body dysmorphic disorder (Cardi et al., 2013; De Paoli et al., 2017; Lavell et al., 2014; Mastro et al., 2016). Moreover, studies on appearance-based rejection sensitivity are scarce among youth in German-speaking regions, due to the lack of appropriate assessment tools (Schmidt & Martin, 2017, 2019). While the effects of appearance-based rejection sensitivity have been primarily studied in relation to body dysmorphic concerns (e.g., Densham et al., 2017; Gardner et al., 2021; Webb et al., 2016; Zimmer-Gembeck et al., 2022), its impact on body dissatisfaction, including concerns related to weight, shape, and muscularity, remain inadequately investigated.

Disturbed eating in adolescence and young adults

As previously mentioned, body dissatisfaction plays a crucial role in the development and maintenance of subthreshold/threshold eating disorders and is thus often recognized as a main risk factor (Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024). Consequently, research has focused on developing *etiological models* to define the *pathways of risk factors* for eating disorder pathology linked to dissatisfaction with one's appearance. One of them is the **Dual Pathway Model** (Stice, 1994), which suggests that several psychosocial risk factors interact in a *meditational sequence* to predict the future onset of eating disorders and *disturbed eating behaviors* (Stice, 2001; Stice & Van Ryzin, 2019). According to this theory, societal pressures to be thin and pursuit of the thin-ideal predict *body dissatisfaction*, which in turn directly leads to eating disorder pathology (e.g., disturbed eating behaviors like binge eating or purging) and indirectly mediates eating disorder pathology via two pathways: dieting and negative affect (Stice, 2001; Stice & Van Ryzin, 2019). The temporal sequencing of these risk factors was recently confirmed (Stice & Van Ryzin, 2019; Yamamiya et al., 2023).

In this regard, research has shown that **disturbed eating** (e.g., restricting food intake, binge eating) and **compensatory behaviors** (e.g., purging, excessive exercise) (DECB) represent a major *public health concern*, often developing during adolescence and continuing into early adulthood (Cosh et al., 2023; Glazer et al., 2019; Hansson & Schmidt, 2025; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018). DECB do not meet the criteria for an eating disorder diagnosis according to the Diagnostic and Statistical Manual for Mental Disorders (American Psychiatric Association, 2013), due to their insufficient frequency and severity. Nevertheless, high levels of DECB during adolescence not only persist into early adulthood but also lead to significant distress and contribute to the development of *subthreshold or threshold eating disorders* (Foster et al., 2024; Glazer et al., 2019; Herpertz-Dahlmann et al., 2015; Stice et al., 2017; Yamamiya et al., 2023; Yamamiya & Stice, 2024). Additionally, DECB are often associated with physical and mental health impairments in young people, including unhealthy body weight, low self-esteem, negative body image, depression, suicidal ideation, and anxiety (Hansson et al., 2016; Hansson & Schmidt, 2025; Loose et al., 2023; Loth et al., 2014; Rohde et al., 2015; Stice et al., 2013). Therefore, DECB significantly impact the development and quality of life of adolescents and young adults, reinforcing its status as a critical public health concern.

Recent data from Switzerland show that approximately 32% of females and 17% of males aged between 15 and 24 exhibit DECB (Peter et al., 2023). Other studies also found a greater incidence in females than in males, with gender differences becoming more pronounced during adolescence (Foster et al., 2024; Hansson et al., 2016; Herpertz-Dahlmann et al., 2015; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018). Amid the COVID-19 pandemic, the prevalence and severity of DECB increased due to heightened stress, social isolation, and changes in daily routines, especially among young people and those with subthreshold/threshold eating disorders (Baceviciene & Jankauskiene, 2021; McLean et al., 2022; Simone et al., 2021). Notably, young males are underrepresented in DECB research, despite a significant number engaging in pathological eating behaviors (Rubo et al., 2020; Schuck et al., 2018; Wyssen, Bryjova, et al., 2016). Given that gender plays a crucial role in the persistence, etiology, and manifestation of DECB (Hansson et al., 2016; Klimek et al., 2018; Lafrance Robinson et al., 2014; Mond et al., 2014; Nagata et al., 2020), greater attention for this group is warranted in future studies (Foster et al., 2024; Hansson & Schmidt, 2025; Klimek et al., 2018). Therefore, early detection and intervention of DECB in both genders, combined with a comprehensive understanding of its contributing factors, are crucial for reducing the negative long-term impact of subthreshold/threshold eating disorders (Trompeter, Bussey, Forbes, et al., 2022; Turel et al., 2018).

Transdiagnostic model of eating disorders

The original *Transdiagnostic Model of Eating Disorders* (CBT-E Model; Fairburn et al., 2003) identifies the overvaluation of weight, shape, and eating (commonly referred to as body dissatisfaction) as the central risk and underlying maintenance factor shared by all eating disorder psychopathologies, including various DECB. Moreover, this model includes additional maintaining factors, such as perfectionism, low self-esteem, and marked interpersonal difficulties. Another maintenance factor is *mood intolerance*, a key facet of emotion dysregulation characterized by the inability to cope appropriately with certain emotional states. According to the original CBT-E Model (Fairburn et al., 2003) mood intolerance bidirectionally leads to subsequent binge eating and purging behaviors, which in turn occur as attempts to regulate negative emotions (Dakanalis et al., 2014; Lampard et al., 2013; Lavender et al., 2015; Lee et al., 2019; Pisetsky et al., 2017). Over the past decades, the original CBT-E Model has received empirical support from studies conducted with adolescents and adults (Jones et al., 2020; Byrne et al., 2011; Fairburn et al., 2015; Hoiles et al., 2012). However, it focuses primarily on mood intolerance and does not encompass the broader spectrum of emotion dysregulation (Gratz & Roemer, 2004), associated with all facets of DECB, including dietary restraint, binge eating, purging, and excessive exercise (Prefit et al., 2019; Trompeter et al., 2021). As previously noted, emotion dysregulation includes a wide range of difficulties, such as recognizing emotions, engaging in goal-directed behaviors or using effective regulatory strategies (cf. Gratz & Roemer, 2004), which are not adequately captured in the original CBT-E Model (Fairburn et al., 2003).

To address these limitations and broaden the understanding of eating pathology within a psychological framework, Trompeter et al. (2021) *expanded* the original CBT-E Model (Fairburn et al., 2003) by including emotion regulation difficulties as core underlying mechanisms of eating disorders as well as a wide range of DECB. Supporting this expansion, recent studies have confirmed that emotion dysregulation is associated with the development and maintenance of various eating disorders at both *diagnostic* and *symptomatic* levels among adolescents and young adults (Aldao et al., 2016; Leppanen et al., 2022; Prefit et al., 2019; Trompeter et al., 2021). Research indicates that young people diagnosed with *anorexia nervosa* (Pila et al., 2019; Rowsell et al., 2016; Weinbach et al., 2020), *bulimia nervosa* (Lavender et al., 2015; Perthes et al., 2021; Van Durme et al., 2018), and *binge eating disorder* (Forrer et al., 2025; Goldschmidt et al., 2017; Van Malderen et al., 2019) exhibit more pronounced emotion regulation difficulties compared to normative youth samples (Anderson et al., 2018; McLaughlin et al., 2011; Weinbach et al., 2018).

Further substantiating the updated CBT-E Model (Trompeter et al., 2021), current cross-sectional and longitudinal research underscores *emotion regulation difficulties* as one of the most relevant *transdiagnostic risk factors* for the development and maintenance of various DECB in young people (Félix et al., 2025; Prefit et al., 2019; Warne et al., 2023). A recent meta-analysis revealed that young people who exhibit DECB experience more pronounced emotion regulation difficulties (e.g., lack of emotional awareness, clarity, acceptance) and greater use of maladaptive emotion regulation strategies (e.g., rumination, avoidance, suppression) compared to their peers without DECB (Prefit et al., 2019). Various community-based studies among adolescents and young adults highlight these associations (Hansson et al., 2017). For instance, cross-sectional research demonstrated a significant link between emotion dysregulation and DECB in adolescent girls, but not boys (Hansson et al., 2017). However, in another study, emotion dysregulation was significantly associated with binge eating in adolescents of both genders (Laghi et al., 2018). Longitudinal studies further reveal that emotion dysregulation in adolescent females was associated with both concurrent and subsequent binge eating (Goldschmidt et al., 2017). Moreover, young adult females exhibited increased likelihoods of same-day and next-day binge eating and purging when facing greater emotion regulation difficulties (Mikhail et al., 2024). Additionally, adolescents' difficulties with emotion regulation were associated with more binge eating or loss of control eating (Van Malderen et al., 2019). Among adolescents, maladaptive emotion regulation was linked to overeating but not dietary restraint (Félix et al., 2025). A longitudinal study discovered that maladaptive emotion regulation predicted increases in bulimic symptoms among adolescent females (Nolen-Hoeksema et al., 2007), while a cross-sectional study involving young adult males demonstrated a link with more frequent purging (Dakanalis et al., 2014). Furthermore, a longitudinal study found that emotion regulation difficulties predicted increases in compulsive exercise among both adolescent boys and girls (Goodwin et al., 2014). Research investigating the connection between emotion dysregulation and dietary restraint in young people consistently found that difficulties in regulating emotions are linked to restrictive eating (Burton & Abbott, 2019; Dakanalis et al., 2014; Dworschak et al., 2023). Specifically, limited access to functional emotion regulation strategies has been associated with increased food restriction in daily life among young adult females (Mikhail & Kring, 2019). In addition, a longitudinal study revealed that greater use of functional emotion regulation strategies at age 15 predicted lower dietary restraint at age 16 in adolescents (Shriver et al., 2019).

Body image-related factors of disturbed eating

Moreover, both cross-sectional and longitudinal studies consistently show that young people dissatisfied with their appearance frequently engage in DECB, particularly when they perceive themselves as not meeting societal thin- and muscular-/athletic-ideals (Cheng & Wei, 2022; Cunningham, Szabo, et al., 2020; Hughes & Gullone, 2011; Lucibello et al., 2024; Morin & Meilleur, 2024; Schuck et al., 2018; Stice et al., 2017). This includes *behaviors to reduce weight or enhance muscularity and leanness*, all with the aim of matching prescribed appearance-ideals (McLean et al., 2022; Nagata et al., 2022; Schuck et al., 2018). Driven by the desire to conform with a specific *thin-ideal*, young females may more frequently engage in weight-loss oriented DECB, such as restrictive dieting, skipping meals, purging or excessive exercise (Chu et al., 2021; Lafrance Robinson et al., 2014; McLean et al., 2022; Mohorić et al., 2023; Ruisoto et al., 2015; Sifre et al., 2024). Conversely, young males often focus on modifying their body composition to meet the *muscular-/athletic-ideal*, engaging in intense exercise and muscle-building routines and strict dietary practices. Specifically, they may pursue high-protein diets to increase muscle mass or fast to reduce body fat, and the use of muscle-enhancing substances (e.g., protein powders) or anabolic steroids is also common (Klimek et al., 2018; Morin & Meilleur, 2024; Nagata et al., 2022; Ruisoto et al., 2015; Wyssen, Bryjova, et al., 2016).

Expanding on these findings, it is crucial to acknowledge that young females, even those with a healthy weight or underweight, frequently engage in weight-loss oriented DECB (Lucibello et al., 2024; Nagata et al., 2022). Research suggests that such behaviors, when driven by dissatisfaction with one's own body, may expose young females to a heightened risk of developing eating disorders in the future (Machado et al., 2020; Stice et al., 2017). This highlights a significant gender difference in the vulnerability of eating disorder symptoms among young people (Santomauro et al., 2021). In addition, it should be noted that muscularity-oriented DECB may be as prevalent in males as eating disorders are in females (Compte et al., 2015; Klimek et al., 2018). However, most research on this topic targets males involved in bodybuilding and competitive sports, rather than the general youth population, even though compulsive muscularity-related behaviors are most likely to occur during late adolescence (Nagata et al., 2020). Additionally, there is scant research on young females who strive for the muscular-/athletic-ideal and engage in corresponding behaviors (Cunningham, Szabo, et al., 2020).

A cross-sectional study in Switzerland involving adolescents aged 13 to 16 comprehensively illustrated the connection between *body dissatisfaction* and DECB (Widmer Howald et al., 2018): 59% of females and 22% of males felt they were too fat. To address this, 35% of females and 22% of males planned to diet, while an overwhelming majority, 81% of females and 89% of males, intended to increase their physical activity. Furthermore, over half of the males (54%) and 36% of females expressed dissatisfaction with their body composition and a resulting desire to gain more muscle. Among these, adolescent males demonstrated a readiness to adopt various behaviors to enhance muscularity, including increasing muscle-building activities (89%), high caloric intake (24%), and the use of supplements (13%) or anabolic steroids (4%). Conversely, while 33% of females engaged in muscle-building activities, other muscularity-enhancing practices were less common among them (Widmer Howald et al., 2018). These observations are consistent with trends noted in other studies (Aanesen et al., 2017; Nagata et al., 2020).

Consistent with the CBT-E Model (Fairburn et al., 2003; Trompeter et al., 2021), *emotion regulation difficulties* have a significant association with both higher levels of *disturbed eating* and higher *body dissatisfaction*. In accordance, an earlier cross-sectional study found that poor emotional awareness, a dimension of emotion dysregulation, was associated with body dissatisfaction among adolescent girls in a community sample, and even more strongly with disturbed eating (Sim & Zeman, 2005). A recent cross-sectional study among young adults showed that emotion regulation difficulties related body dissatisfaction to binge eating over and above negative affect (Cheng & Wei, 2022). Similarly, a recent daily diary study demonstrated that higher levels of emotion dysregulation correlated with more frequent body dissatisfaction, such as weight concerns and restrictive eating in adolescents from the general population (Dworschak et al., 2023). Additional cross-sectional research among adolescents has shown that a greater reliance on dysfunctional emotion regulation strategies is linked to increased body dissatisfaction and DECB, including restrained eating and compensatory behaviors (Hughes & Gullone, 2011). Furthermore, emotion dysregulation intensifies the relationship between body dissatisfaction and the desire for muscularity, along with associated disturbed eating behaviors among both young females and males (Cunningham, Rodgers, et al., 2020; Cunningham, Szabo, et al., 2020; Dakanalis et al., 2015; Lavender & Anderson, 2010). Empirical evidence suggests that during and following the COVID-19 pandemic, emotion dysregulation intensified, and young people became increasingly confronted with appearance-ideals (e.g., on social media), expressed greater concerns about their weight, shape and muscularity, experienced

heightened body dissatisfaction, and engaged more frequently in various DECB (Schneider et al., 2023; Sifre et al., 2024; Simone et al., 2021).

Research reveals that in addition to *body dissatisfaction* (concerns about weight, shape, and muscularity; body image-related factors of disturbed eating), various *cognitive, physiological, and psychological mechanisms* also influence the frequency of different DECB and simultaneously impact young people's satisfaction with their appearance. The following section will briefly outline these factors.

Cognitive factors of disturbed eating

In recent years, image-based social media platforms like Instagram and TikTok have profoundly influenced young people's perceptions and attitudes, frequently showcasing unrealistic and unattainable appearance-ideals (Munsch, Messerli-Bürge, et al., 2021), which foster upward social comparisons from an early age (Castellanos Silva & Steins, 2023; Morin & Meilleur, 2024; Pedalino & Camerini, 2022). Research indicates that appearance-ideals only detrimentally affect psychological well-being when they are *cognitively internalized* (Griffiths & Stefanovski, 2019). Consequently, young people who strongly and rigidly internalize sociocultural appearance-ideals as personal aims may be at greater risk of developing body dissatisfaction (Morin & Meilleur, 2024; Thompson et al., 2012).

This aligns with the Dual Pathway Model (Stice, 1994, 2001), which posits that ***internalizing unrealistic and unattainable appearance-ideals*** leads to increased body dissatisfaction (Girard et al., 2018; Karazsia et al., 2013; Marashi et al., 2024; Munsch, Messerli-Bürge, et al., 2021; Paterna et al., 2021), which serves as a mediator, prompting DECB among young people striving to meet these internalized appearance-ideals (Stice & Van Ryzin, 2019). An eight-year longitudinal study tracking females from the general population throughout adolescence supported the Dual Pathway Model, finding that internalization of the thin-ideal and body dissatisfaction predicted the future onset of eating disorders (Yamamiya & Stice, 2024). A recent cross-sectional study among adolescent boys revealed that the internalization of appearance-ideals moderated the relationship between emotion regulation difficulties and body dissatisfaction (Morin & Meilleur, 2024). In young adults of both genders, emotion dysregulation was more strongly related to body dissatisfaction among those with higher levels of sociocultural appearance-ideal internalization (Hutchison et al., 2020). Conversely, a study focusing on the internalization of weight bias did not replicate these findings among young adults (Douglas

& Varnado-Sullivan, 2016). Overall, the interaction between internalizing sociocultural appearance-ideals and emotion regulation difficulties has rarely been studied in young people.

Thought-shape fusion (TSF-B; Shafran et al., 1999) represents another cognitive factor of DECB, describing body-related cognitive distortions that can severely impact psychological flexibility, body image and eating disorder pathology (Coelho et al., 2015; Dubois et al., 2016; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016; Wyssen et al., 2018). This can lead to beliefs in actual weight gain, feelings of fatness and the perception of moral wrongdoing, especially when failing to achieve one's own appearance-ideal (Mason et al., 2021; Munsch, Messerli-Bürge, et al., 2021; Wyssen, Coelho, et al., 2016). Research shows that people with eating disorders exhibit significantly higher levels of TSF-B, highlighting its critical role as a *cognitive factor* in the phenomenology and etiology of subthreshold/threshold eating disorders (Coelho et al., 2015; Mason et al., 2021; Munsch, Messerli-Bürge, et al., 2021; Ouellet-Courtois et al., 2015; Wyssen et al., 2018). Importantly, TSF-B is also observed in the general population, affecting both young females and males, although females typically report higher levels of these cognitive distortions (Dubois et al., 2016; Munsch, Messerli-Bürge, et al., 2021; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016; Wyssen et al., 2018, 2020). Moreover, body-related cognitive distortions seem not only to be more pronounced in females but also associated with a broader spectrum of eating disorder pathology than in males (Dubois et al., 2016). Nevertheless, comparative studies on TSF-B that encompass both young females and males are notably scarce.

Previous research has shown that body-related cognitive distortions (e.g., "I want to limit my eating after imagining slim people"), heighten young people's vulnerability to body dissatisfaction (Munsch, Messerli-Bürge, et al., 2021; Wyssen, Bryjova, et al., 2016; Wyssen et al., 2020). This, in turn, significantly increases the probability of engaging in disturbed eating behaviors (Dubois et al., 2016; Munsch, Messerli-Bürge, et al., 2021; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016; Wyssen et al., 2020). Despite this, TSF-B remains under-researched within the context of eating disorder pathology, particularly among young males, resulting in a lack of studies analyzing its influence on the development and maintenance of DECB (Peschel, Sigrist, et al., 2024; Wyssen, Bryjova, et al., 2016; Yamamiya & Stice, 2024). Considering the frequent exposure of young people to unrealistic appearance-ideals, particularly through image-based social media platforms (Munsch, Messerli-Bürge, et al., 2021), it is crucial to further investigate the role of TSF-B and its potential adverse effects on eating behaviors in non-clinical samples. Additionally, there is a significant gap in research examining

how body-related cognitive distortions, emotion regulation difficulties, body dissatisfaction, and disturbed eating behaviors interact in young people. Addressing this gap could enhance our understanding of the development and maintenance of subthreshold/threshold eating disorders.

Physiological factors of disturbed eating

Numerous cross-sectional and longitudinal studies have demonstrated a strong association between both high and low *body mass index* (BMI) with increased body dissatisfaction and DECB among young people (Blundell et al., 2024; Chu et al., 2021; Frederick et al., 2022; Meschberger-Annweiler et al., 2024; Morin & Meilleur, 2024; Pedalino & Camerini, 2022; Rosenqvist et al., 2024; Sarrar et al., 2020). Research also highlights significant gender differences regarding BMI. For example, females with obesity tend to be more dissatisfied with their bodies compared to their healthy-weight peers or obese males (Weinberger et al., 2016). Females consistently report higher levels of body dissatisfaction even when their BMIs are lower than those of males (Weinberger et al., 2016). This is often driven by societal pressures to conform to a specific thin-ideal and exacerbated by physiological changes during puberty, such as rapid increases in weight and body fat, which deviate from the culturally endorsed thin-ideal (Bucchianeri et al., 2013). In contrast, young male's bodies typically develop closer to this thin-ideal and muscle-ideal during puberty and early adulthood, primarily due to naturally increased muscle mass (Cash & Smolak, 2011; Ricciardelli & Yager, 2015). Meanwhile, a 10-year longitudinal study among young females observed that body dissatisfaction escalated from middle to high school and intensified further into early adulthood, paralleling increases in BMI (Bucchianeri et al., 2013). Conversely, those experiencing a reduction in BMI during this period reported decreased body dissatisfaction (Bucchianeri et al., 2013). Additional research investigated the interplay between emotion dysregulation, BMI, and DECB (Casagrande et al., 2020; Lafrance Robinson et al., 2014). For example, a study on a non-clinical undergraduate sample found that higher BMI and specific emotion regulation difficulties were positively correlated with DECB (Lafrance Robinson et al., 2014).

Psychological factors of disturbed eating

Adolescents and young adults are particularly vulnerable to developing depression and social anxiety, which are not only the most common comorbidities in subthreshold/threshold ED but also are associated with more severe DECB (American Psychiatric Association, 2013; Brechan & Kvalem, 2015; Sander et al., 2021; Swanson et al., 2011). People diagnosed with lifetime major depression or anxiety disorders are four times more likely to develop eating disorder pathology (Garcia et al., 2020). Additionally, multiple studies have documented that negative mood significantly influences DECB, especially among young people experiencing emotion regulation difficulties (Hansson et al., 2016; Prefit & Szentagotai-Tătar, 2018; Sander et al., 2021; Wonderlich et al., 2022). Moreover, negative mood has been linked to increased body dissatisfaction in young people (Brechan & Kvalem, 2015; Ferreira et al., 2012; Gitimu et al., 2016; Hansson et al., 2016; Liechty & Lee, 2013; Sander et al., 2021). Different research indicates that symptoms of social anxiety are more closely associated with DECB (Alcaraz-Ibáñez et al., 2023; Spettigue et al., 2020) than other subtypes of anxiety (Garipey et al., 2010). This is primarily because young people with heightened social anxiety are more likely to experience negative feelings due to perceived criticism and face difficulties in regulating these emotions, which can exacerbate DECB (McLean et al., 2007). Despite these insights, much of the existing research has been conducted on clinical populations, leaving a gap in community-based youth studies. Additionally, comparative analyses between young females and males on these dynamics remain notably scarce.

Path model of disturbed eating

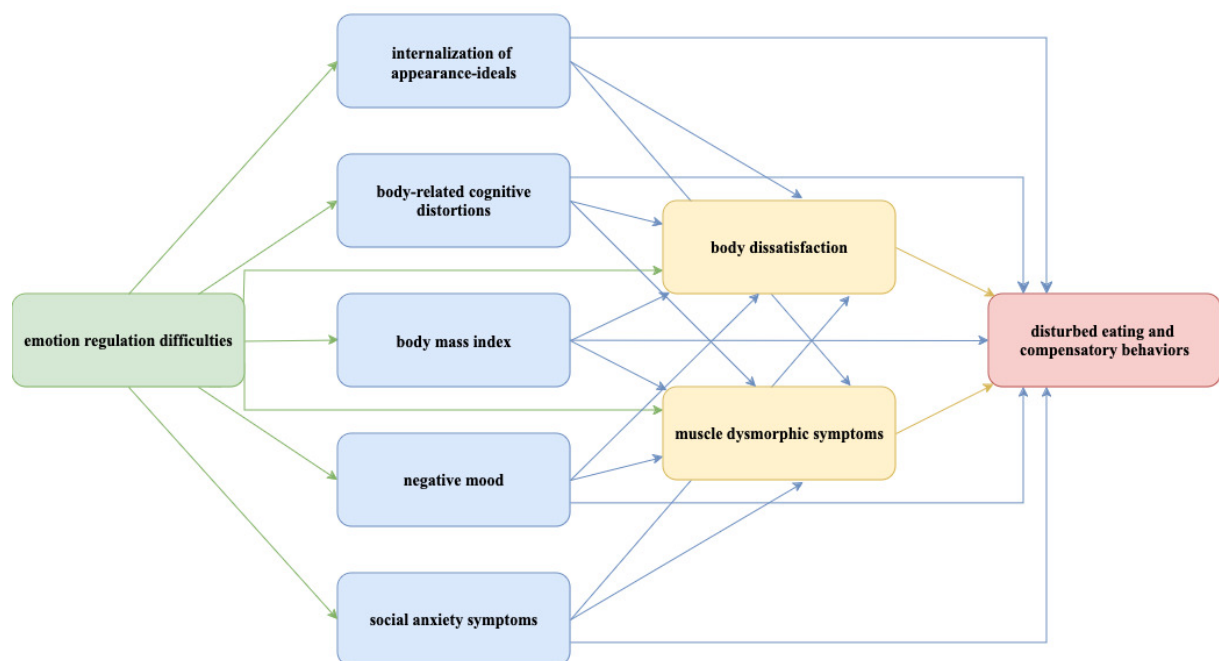
Drawing on the enhancements Trompeter et al. (2021) introduced to the original *CBT-E Model* (Fairburn et al., 2003), specifically by including emotion regulation difficulties as core underlying mechanisms of eating disorders, this dissertation aims to further delineate the *mediating pathways* linking *emotion regulation difficulties* and *disturbed eating* within a comprehensive *path model* (see figure 1).

According to the *Dual Pathway Model* (Stice, 1994), various risk factors associated with eating disorder pathology are thought to interact in a *temporal sequence*, with one emerging after another (Stice & Van Ryzin, 2019). Body dissatisfaction, in particular, is identified as a primary driver not only for disturbed eating behaviors but also for the potential onset of sub-threshold/threshold eating disorders (Stice, 2001). For instance, body dissatisfaction directly leads to eating disorder pathology and indirectly mediates eating disorder pathology via two pathways: dieting and negative affect (Stice, 2001; Stice & Van Ryzin, 2019). Current research highlights the critical need for further studies that *evaluate existing mediational etiological models*, such as the Dual Pathway Model, with an emphasis on *including multiple mediators* (Yamamiya & Stice, 2024). Given the rising prevalence of DECB and eating disorders among young people over the past decade (Santomauro et al., 2021), alongside extensive research highlighting emotion regulation difficulties as a significant predictor (Félix et al., 2025; Prefit et al., 2019; Warne et al., 2023), it is essential to examine the impact and complex interplay of multiple mediators through a *comprehensive path model*.

Building on the foundations established by previous theoretical models (Trompeter et al., 2021; Stice & Van Ryzin, 2019; Yamamiya et al., 2023) and informed by studies linking various factors to DECB (as detailed in previous sections; e.g., Morin & Meilleur, 2024; Munsch, Messerli-Bürge, et al., 2021; Weinberger et al., 2016; Sander et al., 2021; Spettigue et al., 2020; McLean et al., 2022; Nagata et al., 2022), the mediating *path model of disturbed eating* (see figure 1) incorporates two sets of serial key mediators. The *first set* encompasses *cognitive mediators* such as the internalization of appearance-ideals and body-related cognitive distortions, *physiological mediators* like body mass index, and *psychological mediators* including negative mood and symptoms of social anxiety. The *second set*, concentrates on *body image-related mediators*, including concerns about weight, shape, muscularity and leanness (referred to as body dissatisfaction). The deliberate ordering of these mediators is crucial, as it establishes body dissatisfaction as a mediator whose vulnerability is heightened by the preceding cognitive, physiological, and psychological mediators.

With the inclusion of these multiple mediators arranged both *serially* and in *parallel*, this path model further allows for the examination of various pathways, highlighting how these multiple mediators play a critical role in linking emotion regulation difficulties to DECB. Therefore, the path model of disturbed eating addresses a notable *research gap*, as previous studies have not investigated such a comprehensive path model within a mixed-gender sample of adolescents and young adults from the general population. In addition, this path model facilitates the recommended specification of existing etiological modes (cf. Yamamiya & Stice, 2024) and offers the potential to develop targeted, effective prevention strategies and interventions that could reduce the future onset of subthreshold/threshold eating disorders. Given that most current treatment methods are primarily derived from studies involving female participants (Murray et al., 2017), including young males in research is crucial to enhance the understanding of how eating disorder pathology develops and maintains in this group, and to consider potential differences in etiological mechanisms compared to females.

FIGURE 1 | Path model of disturbed eating



Note. predictor = emotion regulation difficulties, outcome = disturbed eating and compensatory behaviors, cognitive mediators = internalization of appearance-ideals, body-related cognitive distortions, physiological mediator = body mass index, psychological mediators = negative mood, symptoms of social anxiety, body image-related mediators = body dissatisfaction, muscle dysmorphic symptoms.

Study aims

In the following section, the aims of the three empirical publications included in this cumulative dissertation are briefly summarized, building upon the current state of research. For a more comprehensive overview, please refer to the respective publications.

Publication I: Psychological correlates of body dissatisfaction in Swiss youth over a one-year study-period

As previously described, young people often express pronounced negative perceptions and attitudes towards their own weight and shape, coupled with an intense fear of not being muscular or lean enough (referred to as body dissatisfaction; McLean et al., 2022; Nagata et al., 2022). While *body dissatisfaction* has long been prevalent among young females, it is increasingly observed among young males (Purton et al., 2019). This has led to body dissatisfaction being identified as a critical public health concern (McLean et al., 2022). Research underscores that high levels of body dissatisfaction can hinder a healthy transition from adolescence into adulthood (Bucchianeri et al., 2013; McLean et al., 2022), posing substantial risks for both sub-threshold and threshold eating disorders (Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024), as well as a spectrum of other mental health disorders (Sander et al., 2021). Considering the detrimental impact of body dissatisfaction, it is essential to investigate the mechanisms that foster its development and persistence. The perception and satisfaction of young people with their body shape, size, and muscularity are influenced by a variety of biopsychosocial factors (Cafri et al., 2005; Rodgers et al., 2014, 2020). Despite this, there is a significant gap in understanding how *psychological factors* such as *emotion regulation difficulties* and *appearance-based rejection sensitivity* specifically contribute to body dissatisfaction.

The *first publication* aims to address this gap by investigating the impact of emotion regulation difficulties and appearance-based rejection sensitivity on body dissatisfaction and muscle dysmorphic symptoms, assessed cross-sectionally at two different time points, one year apart in a general youth population ($N = 605$, 80% female). In response to evolving cultural norms around appearance-ideals, this research extends the traditional focus on weight and shape to include concerns about muscularity and leanness. We hypothesize that greater impairments in emotion regulation and a stronger perception of appearance-related rejection are associated

with heightened levels of body dissatisfaction and muscle dysmorphic symptoms. To fully understand how these variables evolve over the course of a year, we examined both *absolute and relative level stability*. Absolute level stability deals with average temporal change, i.e., whether mean values of a characteristic change or remain on the same level over a one-year study period. Relative level stability, in contrast, deals with individual temporal change, i.e., whether people differ in their temporal change over the one-year time period from each other and thus whether the correlation between values of a characteristic measured one year apart is high or low (Newsom, 2023).

The prevalence of DECB is increasing among adolescents and young adults, where elevated levels during adolescence not only persist into early adulthood but also contribute to the onset of subthreshold/threshold eating disorders (Foster et al., 2024; Glazer et al., 2019; Herpertz-Dahlmann et al., 2015; Stice et al., 2017; Yamamiya et al., 2023; Yamamiya & Stice, 2024). Moreover, DECB are associated with various physical and mental health impairments, including unhealthy body weight, low self-esteem, negative body image, depression, suicidal ideation, and anxiety, emphasizing the substantial impact these behaviors have on the quality of life of young people (Hansson & Schmidt, 2025; Loose et al., 2023; Loth et al., 2014; Stice et al., 2013). Thus, DECB represent a critical public health concern, necessitating a deeper understanding of the underlying mechanisms (Cosh et al., 2023; Glazer et al., 2019; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018).

Emotion regulation difficulties are consistently identified as a significant transdiagnostic risk factor in the development and maintenance of various DECB (Prefit et al., 2019; Trompeter et al., 2021). Young people who struggle with emotion regulation and are dissatisfied with their appearance often engage in DECB, particularly when they perceive themselves as not meeting societal appearance-ideals (Cunningham, Szabo, et al., 2020; Hughes & Gullone, 2011; Lucibello et al., 2024; Morin & Meilleur, 2024). These DECB often aim to reduce weight or enhance muscularity and leanness to conform to these prescribed appearance-ideals (McLean et al., 2022; Nagata et al., 2022; Schuck et al., 2018).

In addition to body dissatisfaction (concerns about weight, shape, and muscularity), various *cognitive*, *physiological*, and *psychological factors* also influence the frequency of different DECB and simultaneously impact young people's satisfaction with their appearance. For instance, societal *muscular-/athletic-ideals* and their *internalization* significantly impact young people's body dissatisfaction and disturbed eating behaviors (Ricciardelli & Yager, 2015). Frequent exposure to these unrealistic and unattainable appearance-ideals, particularly through image-based social media platforms, often leads to *body-related cognitive distortions*, which may culminate in beliefs about weight gain, feelings of fatness, and perceptions of moral wrongdoing when people fail to meet their appearance-ideals (Dubois et al., 2016; Mason et al., 2021; Munsch, Messerli-Bürge, et al., 2021; Wyssen, Coelho, et al., 2016). Both *high and low BMI* are associated with increased body dissatisfaction and DECB, driven by concerns related to beliefs about not being thin, muscular, or lean enough (Blundell et al., 2024; Meschberger-Annweiler et al., 2024; Morin & Meilleur, 2024; Rosenqvist et al., 2024; Sarrar et al., 2020). Additionally, the presence of *negative mood* and *social anxiety symptoms* is known to significantly exacerbate DECB, particularly among those struggling with emotion regulation difficulties (Sander et al., 2021; Spettigue et al., 2020; Wonderlich et al., 2022).

In alignment with the enhancements Trompeter et al. (2021) introduced to the original CBT-E Model (Fairburn et al., 2003), this dissertation aims to further delineate *multiple mediating pathways* (cognitive, physiological, psychological, body image-related) linking emotion regulation difficulties and disturbed eating within the comprehensive *path model* (see figure 1).

Publication II: A Path Model Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behavior in Young Females

Building on the existing literature, the *second publication* investigated the comprehensive path model of disturbed eating (see figure 1) in a sample of young females ($N = 627$) from the general population. This model integrates two sets of serially linked mediators (see figure 1): The *first set* includes cognitive mediators, such as the *internalization of appearance-ideals* and *body-related cognitive distortions*; physiological mediators like *body mass index*; and psychological mediators including *negative mood* and *social anxiety symptoms*. The second set focuses on body image-related mediators, specifically concerns about weight, shape, muscularity, and leanness (referred to as *body dissatisfaction*).

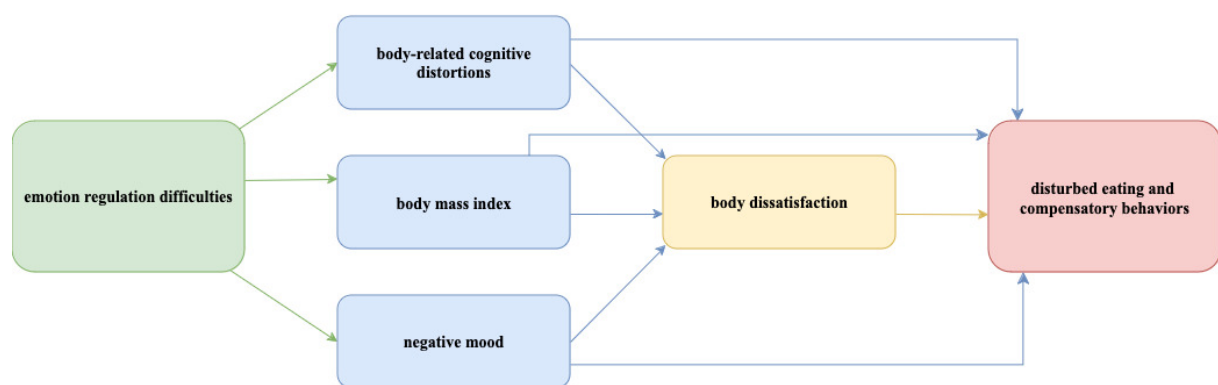
The deliberate ordering of these mediators is crucial, as it establishes body dissatisfaction as a mediator whose vulnerability is heightened by the preceding cognitive, physiological, and psychological mediators. With multiple mediators arranged both serially and in parallel, this model allows for the examination of various *path coefficients*, highlighting the critical role these mediators play in linking emotion regulation difficulties to DECB. The second publication aims to provide a detailed analysis of these paths to understand how each mediator influences the overall impact of emotion regulation difficulties on DECB. This publication fills a significant research gap, as previous studies have not investigated such a comprehensive path model of disturbed eating within a sample of female adolescents and young adults from the general population. Given the rising incidence of DECB and subthreshold/threshold eating disorders among young females over the past decade (Santomauro et al., 2021), understanding the complex interplay of these factors through a detailed path model is crucial for developing targeted, effective interventions.

Publication III: Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behaviors in Adolescents and Young Adults: A Path Model Analysis

Young males are notably underrepresented in research on eating disorder pathology, despite a significant number engaging in disturbed eating behaviors (Rubo et al., 2020; Schuck et al., 2018; Wyssen, Bryjova, et al., 2016). Considering that gender significantly influences the persistence, etiology, and manifestation of DECB (Hansson et al., 2016; Klimek et al., 2018; Nagata et al., 2020), greater attention for this group is warranted in future studies (Foster et al., 2024; Hansson & Schmidt, 2025; Klimek et al., 2018). Moreover, since most current treatment approaches are primarily derived from studies involving female participants (Murray et al., 2017), including young males is crucial to enhance our understanding of how eating disorder pathology develops and is maintained in this group, considering potential differences in etiological mechanisms compared to females. Therefore, early detection and intervention of DECB in both genders, combined with a comprehensive understanding of its contributing factors, are crucial for reducing the negative long-term impact of subthreshold/threshold eating disorders (Trompeter, Bussey, Forbes, et al., 2022; Turel et al., 2018).

The **third publication** aims to investigate the multiple mediating mechanisms by which emotion regulation difficulties influence DECB in a mixed-gender sample ($N = 803$, 83% female), and to specify if these mechanisms differ between genders. This is of particularly interest, as previous research has highlighted gender-specific differences in body-related cognitive distortions (Dubois et al., 2016) and body dissatisfaction (McLean et al., 2022; Widmer Howald et al., 2018) and indicated that females are more likely to use DECB to lose weight, whereas males tend to engage in muscularity-enhancing DECB (McLean et al., 2022; Nagata et al., 2022; Wyssen, Bryjova, et al., 2016). Therefore, we *refined* the path model of disturbed eating, previously tested on young females in the second publication, to accommodate the lower participation rate of males. This necessitated simplifying the original path model by excluding some mediators to effectively investigate gender differences. The refined path model of disturbed eating integrates two sets of serially linked mediators (see figure 2): The first set, covering cognitive (*body-related cognitive distortions*), physiological (*body mass index*), and psychological (*negative mood*) factors; and the second set, focusing on a body-image-related factor (*body dissatisfaction*). This study was the first to determine the relative importance of these mediators and the paths to which they are linked, specifically investigating whether these paths differ between young females and males.

FIGURE 2 | Refined path model of disturbed eating



Note. predictor = emotion regulation difficulties, outcome = disturbed eating and compensatory behaviors, cognitive mediator = body-related cognitive distortions, physiological mediator = body mass index, psychological mediator = negative mood, body image-related mediator = body dissatisfaction.

Empirical publications

The following chapter contains the three empirical publications included in this cumulative dissertation. It concludes with a comprehensive discussion wherein the main findings of these publications are examined in the context of existing literature. This section further addresses limitations, offers recommendations for future research, and discusses the theoretical and clinical implications.

Publication I: Psychological correlates of body dissatisfaction in Swiss youth over a one-year study-period

Published as:

Mueller, V. M., Forrer, F., Meyer, A. H., & Munsch, S. (2024). Psychological correlates of body dissatisfaction in Swiss youth over a one-year study-period. *Frontiers in psychology*, 14, 1269364. <https://doi.org/10.3389/fpsyg.2023.1269364>

Published in:

Frontiers in Psychology – Pediatric Psychology

Prof. Dr. Andrea S. Hartmann (Topic Editor), University of Konstanz, Germany

Abstract

Background: It is well known that young people often report pronounced negative perceptions and attitudes towards their own body or intense fear of being not muscular enough. There is much less data available, however, on the role of psychological mechanisms on these perceptions and attitudes, such as emotion regulation difficulties, correlates of alexithymia, and appearance-related rejection sensitivity. We therefore set out to assess associations between these psychological mechanisms, and body dissatisfaction as well as muscle dysmorphic symptoms.

Methods: Our sample was recruited as part of a larger-scale study aiming at assessing correlates of mental health (with a focus on eating disorder symptoms) in German speaking Switzerland. The first wave (T1), starting in April 2021, included 605 participants (80% female, 19.6 ± 2.5 years) who completed the online-questionnaire and were reassessed in a second wave (T2), one year later.

Results: At both waves, emotion regulation difficulties and appearance-based rejection sensitivity were both positively cross-sectionally associated with body dissatisfaction and muscle dysmorphic symptoms at the first assessment time-point and one year later at follow-up assessment. Moreover, alexithymia was positively cross-sectionally associated with muscle dysmorphic symptoms at both waves. We further observed high absolute and relative level stabilities for all variables involved across the one-year study period.

Conclusions: Even though the effects for some associations were rather small, our findings underline the relevance of such mechanisms in the development of body dissatisfaction and to a lesser extent of muscle dysmorphic symptoms over the period of one year. Additional research is necessary to replicate these findings in other youth samples.

Background

Body dissatisfaction (BD) is an important element of body image which encompasses the negative self-evaluation of physical appearance and consequently influences how people think, feel, perceive, and act about their bodies (Grogan, 2021; Schuck et al., 2018; Vuong et al., 2021; White et al., 2023). In this context, BD is based on cognitive and emotional aspects and according to the biopsychosocial model of body image (Rodgers et al., 2014, 2020) can vary under the influence of *psychological* (e.g., emotion regulation difficulties), *biological* (e.g., body mass index) or *sociocultural* factors (e.g., educational status).

Research from Western society samples indicates that BD is a prevalent condition and is often referred to as *normative discontent*, which can occur throughout the lifespan (Tantleff-Dunn et al., 2011). Especially adolescence may be characterized as a period of particular vulnerability in the development of BD, with major physical, social, cognitive and emotional changes, and identity formation occurring (Reel et al., 2015). Many adolescents place significant importance on their appearance, as attractiveness often brings higher social status in their peer groups (Borch et al., 2011; Ricciardelli & Yager, 2015) and are therefore more vulnerable to the development of BD (Grosick et al., 2013). Also, early adulthood represents a distinctive developmental stage characterized by significant transitions (e.g., increasing autonomy), self-identity formations and physical changes (e.g., weight gain, changes in body proportion; Bucchianeri et al., 2013; Wang et al., 2019). Given that, high BD may hinder a healthy transition from adolescence into adulthood and relates to the development of mental health impairment (McLean et al., 2022). In a recent report published by Health Promotion Switzerland, it was found that only 35% of females and 56% of males aged 13-17 ($n = 371$; 47.4% females) expressed satisfaction with their appearance (Widmer Howald et al., 2018). These prevalence rates of BD in Swiss youth are comparable with previous research conducted in Europe, Australia and the North America (Aanesen et al., 2017; Frisén et al., 2015; Hoffmann & Warschburger, 2018; Lacroix et al., 2022; McLean et al., 2022; Wang et al., 2019). To the best of the authors knowledge, no research is currently available regarding the prevalence of BD among young adult samples in the German-speaking region, highlighting the need of new studies within this age group.

Over the last decade, BD has been recognized as a serious public health concern (McLean et al., 2022), with onset typically occurring in early adolescence (Rohde et al., 2015). For instance, BD has been identified as one of the most important and growing risk factors in the development and maintenance of eating disorders (Rohde et al., 2015; Sharpe et al., 2018;

Stice et al., 2017) and has also been shown to occur in people with depressive (Brechan & Kvaalem, 2015) and social anxiety disorder (Bijsterbosch et al., 2020) or body dysmorphia (Arji et al., 2016), as well as in people without mental disorders (Bucchianeri et al., 2013; Frisén et al., 2015; Mond et al., 2013). Moreover, BD is associated to low self-esteem (Wojtowicz & von Ranson, 2012), overweight/obesity (Loth et al., 2015), emotional and negative mood distress (Ferreiro et al., 2014; Sharpe et al., 2018) and reduced overall quality of life (Griffiths et al., 2016). BD further predicts disturbed eating behaviors, such as strategies to reduce weight (e.g., restrictive dieting, excessive exercise) and increase muscularity (e.g., extreme weightlifting, steroid misuse), to conform a certain appearance-ideal (McLean et al., 2022).

Particularly in more recent research *muscle dysmorphia (MD)* has gained interest (Edwards et al., 2016; Klimek et al., 2018; Mitchison et al., 2022). MD is defined by a preoccupation around muscularity as well as a distorted perception of one's own body (McFarland & Kaminski, 2009; Pope et al., 1997) and was included as a specifier of body dysmorphic disorder in the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; American Psychiatric Association, 2013). People with MD engage in unhealthy body change behaviors with the aim of achieving muscular hypertrophy and low body fat levels (mesomorphic-ideal). This may include extreme exercise, strict dieting to either gain weight (for muscularity; e.g., high-protein intake) or to lose weight (for thinness and low body fat; e.g., fasting) and the use of anabolic steroids or other muscle-enhancing substances (e.g., protein powder; Klimek et al., 2018; Nagata et al., 2020). Despite having a well-developed muscular physique, people with MD frequently perceive themselves as lacking in leanness and muscularity, resulting in elevated levels of BD (e.g., avoidance of body exposure; Mitchison et al., 2022; Schuck et al., 2018). However, currently little is known about mechanisms related to MD as the most frequent used BD questionnaires primarily assess weight and shape concerns but do not capture dissatisfaction with and drive for muscularity. This is why the frequency of BD, especially among young males, has been potentially underestimated so far. While MD is predominantly observed in males (Pope et al., 1997), recent studies indicate a potential increase in the drive for muscularity and related behaviors among females. Nonetheless, the research of MD has mainly focused on people seeking treatment or those involved in bodybuilding and competitive sport (González-Martí et al., 2014), rather than being conducted in the general youth population. As a result, there is a notable absence of epidemiological data concerning the prevalence of MD among young people, despite the likelihood of compulsive muscularity-related behaviors being most prevalent during late adolescence (Nagata et al., 2020). Given that, in the

current study we extend the concept of BD by including symptoms of MD (from now on included in the abbreviation BD) and aim to provide additional information on the development of BD during youth.

Considering the well-known negative impact of BD, it is crucial to understand the mechanisms that contribute to its development and persistence. Research suggests that the perception and satisfaction of youth with their body shape, body size and muscularity are influenced by a variety of bio-psycho-social factors (Cafri et al., 2005; Rodgers et al., 2020). BD is affected by *biological* factors such as age, gender and body weight (Frederick et al., 2022; Nelson et al., 2018; Vuong et al., 2021; Wyssen, Bryjova, et al., 2016) as well as *social* factors including appearance pressure from peers and families or media (Castellanos Silva & Steins, 2023; Rodgers et al., 2014, 2020) as well as the role of socio-educational status (Ramos et al., 2019).

Body weight, or *body mass index (BMI)*, probably has the closest link to BD during youth. Independent of gender, higher BMI has been strongly associated with increased BD in various cross-sectional and longitudinal studies (Frederick et al., 2022; Holsen et al., 2012; Sarrar et al., 2020), including research conducted among Swiss adolescents (Knauss et al., 2008). Furthermore, increasing BMI over time was associated with higher BD in adolescence and early adulthood, whereas people who transitioned to a lower BMI category reported greater satisfaction with their bodies (Eisenberg et al., 2006). Due to the consistency of these findings regarding the importance of weight in the development of BD, we chose to control for BMI in the present study and concentrated on the role of psychological factors and their respective impact at two time points, one year apart.

Within the scope of *psychological* factors, *emotion regulation difficulties (ERD)* are likely to be of a high potential to influence BD. Emotion regulation is the capacity to identify, recognize, express and regulate short and longer lasting affective and emotional states and refraining from impulsive behavior. ERD are especially prevalent in adolescence and early adulthood, where emotion regulation abilities are still developing (Riediger & Luong, 2015). ERD refer to both cognitive as well as behavioral obstacles related to identifying emotions and modulating emotional responses (R. A. Thompson, 1994). According to Gratz and Roemer (2004) this includes six distinct but related dimensions: lack of emotional clarity and awareness, difficulties engaging in goal-directed behavior, non-acceptance of emotional responses, impulse control difficulties and limited access to emotion regulation strategies. These dimensions have direct connections to other emotion-related factors, such as *alexithymia*, facilitating meaningful

comparisons (Trompeter et al., 2021). In the present study, we have therefore chosen to additionally assess alexithymia, which refers to the inability to identify, understand, and express one's own emotions, as well as a limited capacity to recognize and interpret emotions in others (Sifneos, 1973).

The relevance of ERD in the maintenance of BD has been confirmed in a recent cross-sectional study involving Canadian adolescent males ($n = 423$, 14.7 ± 1.1 years). The authors found that higher levels of ERD were associated with increased levels of BD, engagement in muscle-building behaviors, and restrained eating (Morin & Meilleur, 2024). In a US American sample of undergraduate males ($n = 196$, 18.9 ± 1.4 years), ERD were identified as a significant predictor of BD, even after controlling for BMI and negative affect (Lavender & Anderson, 2010). Data from 551 Italian males (20.82 ± 4.43 years) demonstrates that ERD amplify the association between BD and the desire for muscularity (Dakanalis et al., 2015). Moreover, Swedish students ($n = 1265$, 54.5 % female, 13.5-19 years) with exceedingly high BD scores reported higher ERD (Hansson et al., 2016). Also, a study conducted with Australian high school and university students ($n = 756$, 60% female, 17.94 ± 1.98 years) found that increased levels of ERD were associated with higher reports of body dysmorphic symptoms (Gardner et al., 2021). Sim and Zeman (2005) discovered ERD to be a significant predictor of BD and disturbed eating in US American adolescent females ($n = 235$, mean age: 12.11 years), even after accounting for age and BMI. A study conducted among Australian adolescents ($n = 533$, 61% female, 15.6 ± 2.5 years) found that a greater reliance on dysfunctional ER strategies was associated with more BD, restrained eating, and bulimic tendencies (Hughes & Gullone, 2011). Moreover, 18-29-year-old students ($n = 603$, 77.6% female) with higher ERD showed elevated levels of BD and eating disorder symptoms, as well as decreased self-esteem. Conversely, emotion regulation strategies employed to deal with BD have been associated with psychosocial functioning (Cash et al., 2005). Findings of an Australian study (Cunningham et al., 2020) suggest that females ($n = 221$, 20.0 ± 3.55 years) with ERD, experience a higher drive for muscularity attitudes and behaviors over and above BMI and general negative affect. Furthermore, males ($n = 304$, 22.49 ± 4.38 years) with higher levels of alexithymia were more likely to report MD symptoms (Leone et al., 2015).

Besides ERD, young people are particularly responsive to signs of rejection from others, especially their peers (Webb et al., 2017). *Appearance-based rejection sensitivity (ARS)* is a relatively stable personality trait characterized by the tendency to anxiously expect, readily perceive, and overreact to signs of rejection based on personal appearance (Park, 2007; Park &

Pinkus, 2009). This encompasses both affective and cognitive dimensions: the affective component includes anxious concerns about being rejected for one's looks, while the cognitive component involves expectations of such rejection (Park, 2007). Additionally, ARS has been linked to various psychological impairments, including low self-esteem, social anxiety, depressive symptoms, disturbed eating, and peer victimization (Bowker et al., 2013; Hawes et al., 2020; Park, 2007; C. Roberts et al., 2018; Webb & Zimmer-Gembeck, 2015). Moreover, people who experience high levels of ARS tend to interpret even ambiguous signs of rejection as confirmation of their fears. This leads them to withdraw from social interactions, which in turn contributes to their social isolation and fear of rejection (self-defeating prophecy; Bowker et al., 2013; Park & Pinkus, 2009).

In cross-sectional studies involving adolescents and young adults, it has been found that females tend to report higher levels of ARS compared to males (Park et al., 2009; Webb et al., 2014; Webb & Zimmer-Gembeck, 2015) and that higher ARS predicted BD, acceptance of cosmetic surgery, and disturbed eating (Park et al., 2009). A current study among Australian adolescents ($n = 897$, 42.21 % female, 14.8 ± 1.4 years) examined the moderating role of ARS in the relationship between appearance-based peer victimization and increased weight/shape concerns in a one-year follow-up (Trompeter, Bussey, Forbes, et al., 2022). Results illustrated an association between current appearance-related victimization and weight/shape concerns, which was dependent on ARS. However, stronger associations were found for lower levels of ARS. This study's results are the only findings contradicting earlier research from different countries that proposed adolescents with a heightened ARS may be more vulnerable to weight/shape concerns when experiencing peer victimization (Lavell et al., 2014; J. Schmidt & Martin, 2019). In a sample of British university students ($n = 106$, 77.4% female, 21.54 ± 8.34 years) higher levels of ARS were further positively associated with more excessive BD (e.g., "how worried are you about the way that you look?") and with acceptance of cosmetic surgery (Calogero et al., 2010). Moreover, Australian high school and university students ($n = 756$, 60% female, 17.94 ± 1.98 years) reported more body dysmorphic symptoms when they experienced more appearance-based rejection by their peers (Gardner et al., 2021).

Although previous research shows that many adolescents and young adults do have very high concerns about appearance rejection, no studies have examined the influence of ARS on BD in a general youth sample cross-sectional and one year later. So far, most studies have predominantly focused on university students or patients with body dysmorphic disorder and were conducted cross-sectionally. Moreover, ARS is poorly researched in the German-speaking region owing to a lack of assessment instruments. Beyond that, the influence of ARS has been

primarily examined on body dysmorphic concerns, but not on BD (e.g., weight, shape, and muscularity concerns).

In sum, despite the findings from existing cross-sectional and longitudinal studies that have identified *biological*, *social*, and *psychological* factors associated with BD, there continues to be a lack of data on psychological mechanisms such as struggles with regulating negative emotions and concerns with appearance contributing to the development of both BD and symptoms of MD cross-sectionally over time. In order to improve prevention and treatment interventions targeting BD, it seems crucial to enhance our understanding of the punctual and/or longer lasting influence of ERD, alexithymia and ARS in a youth sample from the general population. Therefore, the aim of this study was to determine the influence of ERD, alexithymia and ARS on BD and MD cross-sectionally, at two different time points, one year apart. We hypothesized that higher values of impairment in emotion regulation, alexithymia and hastily perception of appearance-related rejection are associated with higher measures of BD and MD symptoms, while controlling for age, gender, BMI and educational status in our Swiss youth sample at both time points.

To better understand how the investigated variables (correlates and outcomes) develop over a one-year period, we assessed absolute and relative level stability. Absolute level stability deals with average temporal change, i.e., whether mean values of a characteristic change or remain on the same level over a one-year study period. Relative level stability, in contrast, deals with individual temporal change, i.e., whether people differ in their temporal change over the one-year time period from each other and thus whether the correlation between values of a characteristic measured one year apart is high or low (serial correlation; Newsom, 2023).

Methods

Study design

This online-questionnaire study is part of a large-scale, Swiss research project (Binge Eating Adolescent and Young Adults Treatment; i-BEAT) conducted at the University of Fribourg (Switzerland). It was started in April 2021 with the overarching aim to assess determinants of mental health – especially disturbed eating behaviors such as loss of control eating – in the general youth population. In the online-questionnaire sub-study presented here, we assessed mental health correlates of a German-speaking general youth sample across two measurement points, one year apart (baseline, 12-month follow-up), using the platform Qualtrics. The study received approval from the cantonal ethical committee of Bern, has been registered (Study ID: 2019-01277; DRKS-ID: DRKS00023706) and the protocol has been published (Munsch, Forrer, et al., 2021). The present study is the first to report results from the i-BEAT study.

Participants

Between April 2021 and May 2023, a total of $n = 605$ adolescents and young adults participated. Inclusion criteria for study participation in this online-questionnaire study were age (14-24 years), sufficient German language proficiency, absence of pregnancy or lactation and online written informed consent. Recruitment was conducted via social media (Instagram, LinkedIn), mailing lists at local schools and universities, flyers, newspapers and mental health institutions in Switzerland and Germany. For the 12-month follow-up, participants received 20 Swiss francs, whereas the screening was not financially compensated. Psychology students from the University of Fribourg (Switzerland) received course credits for participation.

Procedure

Registration of participants was conducted through our study-website. Subsequently, participants were emailed a link to the online-questionnaire and first provided with the information and aims of the study, to which they had to give online informed consent in order to proceed. The questionnaire then started with an assessment of the sociodemographic characteristics, followed by different mental health questionnaires (for the selection used in this study see measures and a detailed overview see Munsch, Forrer, et al., 2021). Completion of the whole online-questionnaire took approximately 30-45 minutes and was anonymous. A progress bar provided an overview on the percentage of completed questions. The e-mail address was used

to create a unique 64-digit ID, thereby allowing the online-questionnaires from the two measurement points to be matched. For the encryption process the SHA-256 algorithm was used.

Assessment Instruments

Sociodemographic Data

In order to assess sociodemographic characteristics of the sample, the online-questionnaire included self-reported items on participant's gender (male, female, other), current age (in years), educational status, current body weight (in kg) and height (in cm). Body mass index (BMI) was calculated using the standard formula (kg/m^2 ; Weir & Jan, 2025).

Correlates of general mental health in a youth sample

The **Patient Health Questionnaire-4 (PHQ-4)** (original version: Kroenke et al., 2009; German version: Löwe et al., 2010) is an ultra-brief self-report questionnaire, which combines the 2-item depression scale (PHQ-2) and the 2-item anxiety scale (GAD-2), each provided on a 4-point Likert scale (0 = not at all; 3 = nearly every day). The PHQ-4 has been widely used in research and clinical settings, within a range of populations. Moreover, the PHQ-4 shows good construct validity, with associations between the PHQ-4 and scales from the Medical Outcomes Study Short-Form General Health Survey (SF-20; Kroenke et al., 2009). The strongest association was observed between the PHQ-4 and mental health (0.80). For the present study, we therefore decided to use the PHQ-4 total score as a comprehensive measure of general mental health (see table 1). The PHQ-4 total score was computed as a sum score, ranging from 0 to 12, with higher scores indicating greater mental health impairment (0-2 = normal; 3-5 = light, 6-9 = moderate; ≥ 10 = severe). Among others, the PHQ-4 correlates well with age, gender and education level, which are established risk factors for anxiety and depression (Löwe et al., 2010). Cronbach's alpha and McDonald's omega in the present sample were 0.82 and 0.85, respectively. Just recently Wicke et al. (2022) provided an update of normative data from the German general population and suggested that scores of six or higher prompt a more detailed clinical interview for diagnosis of depression or anxiety disorders.

Global eating disorder pathology was assessed using the total score of the 8-item short version of the **Eating Disorder Examination (EDE-Q8)**; original German version: Kliem et al., 2016). The EDE-Q8 consists of two items from each of the four subscales: eating concern, weight concern, shape concern and restraint during the past 28 days, rated on a 7-point Likert scale (0 = no day, 6 = every day). The total score (range: 0-6) is calculated by summing the means of the subscales and dividing the obtained value by the number of subscales, with a higher total score indicating higher eating disorder pathology. According to Kliem et al. (2016), the EDE-Q8 is particularly suitable for use in epidemiological research, when an economical assessment of global eating disorder pathology is required. Based on good psychometric properties, including an excellent correlation ($r = .97$) with the original and well-established 36-item Eating Disorder Examination-Questionnaire (EDE-Q; original version: Fairburn & Cooper, 1993; German version: Hilbert & Tuschen-Caffier, 2016) the use of the EDE-Q8 appears to be appropriate. Cronbach's alpha and McDonald's omega in the present sample were 0.95 and 0.97.

Outcomes

Currently, there is no questionnaire on BD available, which includes also symptoms of MD. The construct, BD, is therefore assessed using the following two validated questionnaires:

We used the total sum score of the German short-version of the **Body Shape Questionnaire (BSQ-8C)**; original version: Evans & Dolan, 1993; German version: Pook et al., 2002) to quantify BD within the last four weeks prior to the two assessments (T1 and T2). It contains 8 gender non-specific items, which are scored on a 6-point Likert scale (1 = never; 5 = always) with higher scores indicating greater trait BD (range: 8-40). Values below 19 indicate no concerns with body shape, scores from 19-25 mild concerns, and values above 25 moderate to marked concerns (Evans & Dolan, 1993). Two items of the BSQ-8C ask for feelings about being fat or worries about becoming fat. The other items include situational and personal causes, as well as consequences of feeling fat. The BSQ-8C has high internal consistency, excellent test-retest reliability as well as high convergent validity and is therefore very well suited to investigate the occurrence and change in BD (Pook et al., 2008; Welch et al., 2012). Cronbach's alpha and McDonald's omega in the present sample were 0.94 and 0.95, respectively.

The **Muscle Dysmorphic Disorder Inventory (MDDI)** (original version: Hildebrandt et al., 2004; German version: Zeeck et al., 2018) is a 13-item measure that assesses aspect of MD on three different subscales: drive for size (DFS; e.g., thoughts of being thinner), appearance intolerance (AI; e.g., negative beliefs about one's body), and functional impairment (FI; e.g., excessive and compulsive exercise). Due to the increasing importance of muscularity (e.g., mesomorphic body) in both genders (Mitchison et al., 2022; Rodgers et al., 2018; Vuong et al., 2021), we decided to use the MDDI-total sum score, which can be derived from sum of the underlying subscales. The three-factor structure of the MDDI has been reported to be independent of gender with no statistically significant difference in the total sum score (range: 13-65; Zeeck et al., 2018). Participants rate statements on a 5-point Likert scale (1 = never; 5 = always), with higher scores indicating higher MD-related symptoms. The MDDI showed good internal consistency (total score: $\alpha = .75$; Zeeck et al., 2018). Cronbach's alpha and McDonald's omega in the present sample were 0.80 and 0.88, respectively.

Psychological correlates of body dissatisfaction and muscle dysmorphic symptoms

ERD were examined by the short-form of the **Difficulties in Emotion Regulation Scale (DERS-SF)** (original version: Kaufman et al., 2016). For the German translation we have followed the original items of the well validated and frequently used Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) and used the same items for each shortened subscale as Kaufman et al. (2016). The DERS-SF consists of 18 items answered on a 5-point Likert scale (1 = almost never; 5 = almost always). A total of six subscales can be formed from three items each: lack of emotional clarity (*clarity*), lack of emotional awareness (*awareness*), difficulties engaging in goal-directed behavior (*goals*), non-acceptance of emotional responses (*non-acceptance*), impulse control difficulties (*impulse*) and limited access to emotion regulation strategies (*strategies*). Higher mean values in each scale (range: 1-5) represent greater difficulties in this facet of emotion regulation. The DERS-SF total score, which is calculated as total sum score (range: 18-90), was used to multidimensionally assess overall ERD. Cronbach's alpha and McDonald's omega in the present sample were 0.90 and 0.93, respectively. Kaufman et al. (2016) observed for the DERS-SF scales satisfactory to good reliability coefficients as well as indications of validity.

The **Toronto Alexithymia Scale-20 (TAS-20)** (original version: Bagby et al., 1994; German version: Bach et al., 1996) is a 20-item self-report measure to assess the three components of alexithymia: difficulty identifying emotions (DIF), difficulty describing emotions (DDF) and an externally-orientated thinking style (EOT) whereby people rarely pay attention to their own emotions. All items can be rated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree) and summed into a total score (range: 20-100) which we used as an overall marker of alexithymia. Five items are reversed scored (items: 3, 4, 10, 17, 18). Cronbach's alpha and McDonald's omega in the present sample were 0.86 and 0.88, respectively.

The short-form of the **Appearance-Based Rejection Sensitivity Scale (ARS-D)** (original version: Park, 2007; German version: Schmidt & Martin, 2017) assesses the degree to which people are anxiously concerned and expect to be rejected based on their appearance. The ARS-D originally contains 15 items that describe brief scenarios related to one's appearance in different social contexts. For the present study, we used only four of these scenarios (items 1, 2, 4, 11) and adapted the language to our younger target sample. Participants rated each scenario on a 6-point Likert scale to indicate their worries about being rejected (affective component; 1 = very unconcerned; 6 = very concerned) and the estimated likelihood of rejection (cognitive component; 1 = very unlikely; 6 = very likely) based on appearance. The ARS-D shows high internal consistency as well as convergent and discriminant validity (Park, 2007; J. Schmidt & Martin, 2017). For each scenario the scores of the affective and cognitive component are multiplied and averaged, leading to a total sum score (range: 1-36), where higher scores indicate stronger ARS. Cronbach's alpha and McDonald's omega in the present sample were 0.64 and 0.68, respectively and therefore lower than those reported in literature ($\alpha = .90$ for the ARS global score, Park, 2007; $\alpha = .90$ for the ARS-D global score, Schmidt & Martin, 2017).

Covariates of body dissatisfaction

We further recorded the following variables which were used as covariates in our analyses: participants' age (in years), gender (male, female, other), educational status, BMI and whether the assessment of the online-questionnaires took place during the COVID-19 pandemic or thereafter. We decided to choose April 1st 2022 as the cut-off date, as all remaining COVID-19 restrictions were lifted in Switzerland at this date (e.g., compulsory isolation of infected persons, compulsory use of masks in public; Federal Council of Switzerland, 2022).

Statistical analyses

Statistical analyses were performed using R, version 4.2.2. Correlates of outcomes (body dissatisfaction, aspect of muscle dysmorphia) at both waves were analyzed using multiple linear regression models. Each model contained the respective outcome at T1 or T2, the three correlates (appearance-based rejection sensitivity, emotion regulation difficulties, and components of alexithymia), all measured at the same wave as the corresponding outcome, plus the covariates age, gender and educational status of the respondent, plus an additional covariate, denoting whether the assessment took place during the COVID-19 pandemic (i.e., before 1 April 2022) or thereafter. Note that at time of publication, data assessment for T1 was complete according to the study protocol of Munsch, Forrer, et al. (2021), while data of the second assessment time point at T2 was not yet available for all participants. Thus, sample size at T1 were considerably higher than that for T2 (see table 2) and we therefore analyzed the models for T1 in two different ways. First using all data available at T1 and second using only data of the completers, i.e., of those participants for whom data at both waves were available. Using all available data analysis allowed us to determine associations of correlates with high statistical power (due to the large sample size), while using completer data only lead to results which could be more easily compared between T1 and T2, as they contained the same subjects. To assess relative and absolute level stabilities we computed serial correlations and changes in mean values, respectively, between the two waves. To estimate effect sizes (Cohen's d) for changes in mean values between waves, we used the method as described in Feingold (2009; see the term $d_{\text{GMA-RAW}}$ therein). Regarding regression model assumptions, multicollinearity was no issue with variance inflation factors (VIF) never exceeding the value 1.47 for any of the estimated models (see supplementary material for more detailed information). Visual inspection of the distribution of the residuals using Q-Q plots and frequency distributions revealed no major deviation from normality. Each model was analyzed with and without potential outliers (based on Cook's distance). Since results were comparable between the two variants, we only report here results based on data not excluding outliers. Apriori power analyses revealed that a predictor which is entered in the multiple regression model containing already seven predictors/covariates (as in our model) should have an effect size beta of 0.17 (i.e., small to medium) in a sample of size 260 (as in wave T2), given $\alpha = .05$ and $1-\beta = .8$ to reach significance.

Results

Sample characteristics

Response rate until May 2023 was 64.1% (i.e., 388 participants could have reached T2 by then). Participants' age ranged from 14.6 to 24.9 years at T1, and from 15.8 to 26.2 years at T2. According to BMI (Weir & Jan, 2025) 10% ($n = 62$) of participants were underweight (< 18.5), 74% ($n = 445$) had a healthy weight (from 18.5 to 24.9), 13% ($n = 79$) were overweight (from 25 to 29.9) and 3% ($n = 18$) were obese (≥ 30). Completion of the online-questionnaire at T1 occurred for 217 (36%) participants while COVID-19 restrictions were in force and for 388 (64%) participants after the lifting of COVID-19 restrictions. At the time of T2 all remaining COVID-19 restrictions in Switzerland had been lifted. The average mental health impairment was moderate at both measurement points with average PHQ-4 total scores of 7.8 ($SD = 2.6$) at T1 and 7.5 ($SD = 2.6$) at T2. Regarding global eating disorder pathology, the sample showed an EDE-Q4 total score of 2.0 ($SD = 1.7$) at T1 and 1.6 ($SD = 1.4$) at T2, these values lying both below the suggested cut-off score of 3.88 (Machado et al., 2020). Sample characteristics are summarized in table 1. For T2 we compared responders with non-responders regarding the sample characteristics in table 1. Controlled for multiple testing, no significant differences occurred between these two groups.

TABLE 1 | Sample's characteristics with respect to measures at T1 and T2.

Variable	T1 (screening)	T2 (follow-up)
<i>n</i>	605	260
	<i>n (%)</i>	<i>n (%)</i>
Gender		
Female	481 (80)	219 (84)
Male	112 (19)	37 (14)
Non-binary	12 (2)	4 (2)
COVID-19		
During restrictions	217 (36)	0 (0)
After restrictions	388 (64)	260 (100)
Nationality		
Swiss	412 (68)	181 (70)
German	150 (25)	78 (30)
Other	43 (7)	1 (<1)
Education		
Still in school	278 (46)	118 (45)
At university	289 (48)	131 (50)
In training	8 (1.3)	1 (0.4)
Employed	16 (2.6)	4 (1.5)
Other	14 (2.3)	6 (2.3)
	<i>M (SD)</i>	<i>M (SD)</i>
Age (years)	19.6 (2.5)	20.3 (2.5)
Body Mass Index (kg/m ²)	22.1 (3.5)	21.9 (3.6)
BSQ (total score)	23.4 (11.1)	20.8 (10.0)
MDDI (total score)	10.6 (4.2)	10.5 (4.0)
ARS-D (total score)	10.6 (4.5)	10.1 (4.2)
DERS-SF (total score)	40.3 (12.4)	38.1 (12.0)
TAS-20 (total score)	49.6 (11.9)	48.4 (12.3)
PHQ-4 (total score)	7.8 (2.6)	7.5 (2.6)
EDE-Q8 (total score)	2.0 (1.7)	1.6 (1.4)

Note. BSQ = Body Shape Questionnaire (short form); MDDI = Muscle Dysmorphic Disorder Inventory; ARS-D = Appearance-related Rejection Sensitivity; DERS-SF = Difficulties in Emotion Regulation Scale (short form); TAS-20 = Toronto-Alexithymie-Skala-20, PHQ-4 = Patient Health Questionnaire for anxiety and depression; EDE-Q8 = Eating Disorder Questionnaire (short form); percentages do not always add up to 100% due to rounding.

Outcome body dissatisfaction

Correlates of body dissatisfaction

At T1, BD was positively associated with the two correlates ERD and ARS, whether all available data or only completers were considered (see table 2). Corresponding effect sizes (b) were medium for ARS and medium to large for ERD. The association between BD and the alexithymia was very small and not significant. At T2, BD was also positively associated with the two correlates ERD and ARS, while effect sizes were medium for ARS and small to medium for ERD. In contrast to T1, the association between BD and alexithymia at T2 was not negligible, though of small effect size.

Correlates of muscle dysmorphic symptoms

At T1, MD was positively associated with ERD, whether all available data or only completers were considered (table 2). The effect size for this association was small to medium. In contrast, only small associations were found between MD and ARS at T1. The association between MD and alexithymia was small to medium when considering all available data, but only small when considering completers only. At T2, MD was positively associated with ERD, with a small to medium effect size. Very small associations were found between MD and ARS and for alexithymia at T2.

TABLE 2 | Multiple Regression model with outcomes BD or MD and correlates ERD, ARS, and alexithymia. Covariates (not shown) were age, sex, educational status, BMI and COVID-19 phase.

Sample	Outcome	Correlate	b	SE	<i>t</i>	df	<i>p</i>	β
All data at T1	BSQ-8C	DERS-SF	0.334	0.037	9.15	559	<0.001	0.37
Completers at T1	BSQ-8C	DERS-SF	0.354	0.053	6.67	242	<0.001	0.40
Completers at T2	BSQ-8C	DERS-SF	0.185	0.054	3.41	241	<0.001	0.22
All data at T1	BSQ-8C	TAS-20	0.005	0.038	0.14	559	0.890	0.01
Completers at T1	BSQ-8C	TAS-20	0.041	0.057	0.72	242	0.472	0.04
Completers at T2	BSQ-8C	TAS-20	0.132	0.054	2.45	241	0.015	0.16
All data at T1	BSQ-8C	ARS-D	0.694	0.076	9.09	559	<0.001	0.28
Completers at T1	BSQ-8C	ARS-D	0.649	0.111	5.86	242	<0.001	0.27
Completers at T2	BSQ-8C	ARS-D	0.769	0.117	6.57	241	<0.001	0.32
All data at T1	MDDI	DERS-SF	0.043	0.018	2.48	559	0.014	0.13
Completers at T1	MDDI	DERS-SF	0.059	0.025	2.32	242	0.021	0.17
Completers at T2	MDDI	DERS-SF	0.066	0.026	2.57	241	0.011	0.20
All data at T1	MDDI	TAS-20	0.063	0.018	3.44	559	<0.001	0.18
Completers at T1	MDDI	TAS-20	0.039	0.027	1.43	242	0.155	0.11
Completers at T2	MDDI	TAS-20	0.028	0.026	1.09	241	0.277	0.09
All data at T1	MDDI	ARS-D	0.069	0.037	1.89	559	0.059	0.07
Completers at T1	MDDI	ARS-D	0.091	0.053	1.72	242	0.086	0.10
Completers at T2	MDDI	ARS-D	0.047	0.056	0.84	241	0.399	0.05

Note. Table 2 contains the total scores of the following questionnaires: BSQ = Body Shape Questionnaire (short form); MDDI = Muscle Dysmorphic Disorder Inventory; ARS-D = Appearance-related Rejection Sensitivity; DERS-SF = Difficulties in Emotion Regulation Scale (short form); TAS-20 = Toronto-Alexithymic-Skala-20, PHQ-4 = Patient Health Questionnaire for anxiety and depression; EDE-Q8 = Eating Disorder Questionnaire (short form). The terms *b* and β denote the unstandardized and standardized regression coefficient, respectively.

Absolute and relative level stabilities between waves T1 and T2

Relative level stabilities were in general high with serial correlations among the two waves varying between .63 and .75 (see Table 3 and figure 1) except for the ARS-D which had a considerably lower value of .45.

TABLE 3 | Relative level stabilities of all 5 variables (correlates and outcomes) involved in the analyses. Serial correlations between waves T1 and T2.

Variable	<i>r</i>	<i>t</i>	<i>p</i>	N
BSQ-8C	0.749	17.8	<0.001	248
MDDI	0.704	15.6	<0.001	246
ARS-D	0.447	7.83	<0.001	246
DERS-SF	0.630	12.9	<0.001	252
TAS-20	0.661	13.8	<0.001	245

Note. BSQ = Body Shape Questionnaire (short form); MDDI = Muscle Dysmorphic Disorder Inventory; ARS-D = Appearance-related Rejection Sensitivity; DERS-SF = Difficulties in Emotion Regulation Scale (short form); TAS-20 = Toronto-Alexithymic-Skala-20, PHQ-4 = Patient Health Questionnaire for anxiety and depression; EDE-Q8 = Eating Disorder Questionnaire (short form)

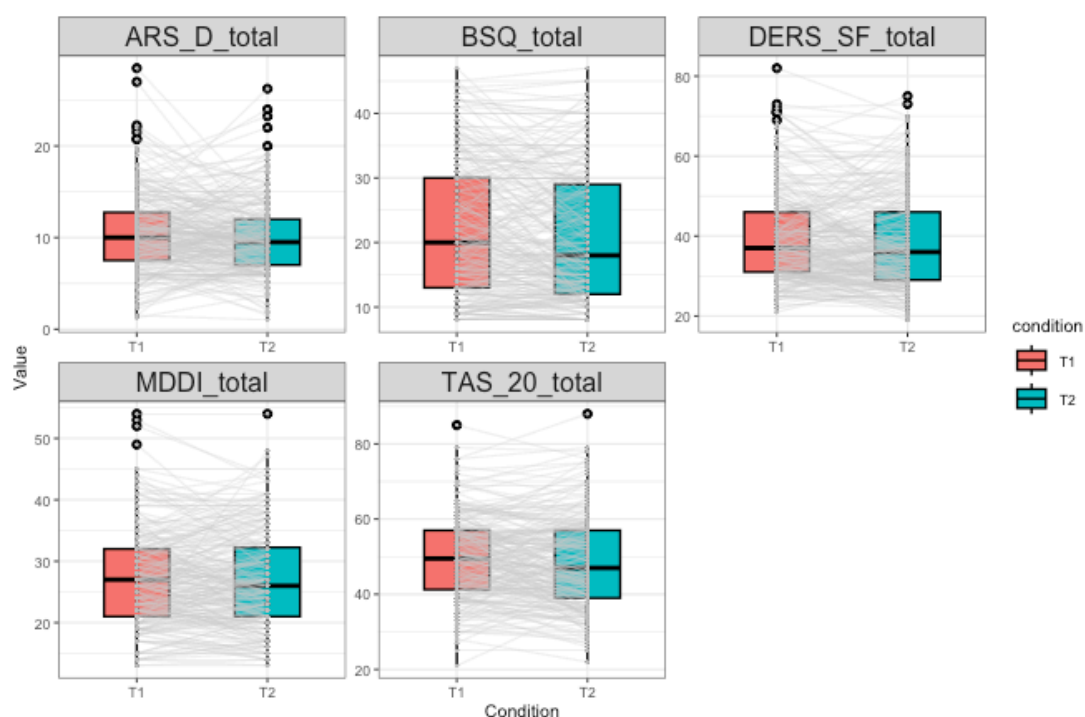
Absolute level stabilities are summarized in table 4 and figure 1. Mean values of all variables hardly changed between waves. Strongest decreases were observed for BSQ-8C and TAS-20. Effect sizes for the change in the average value between T1 and T2 ranged between 0.03 and 0.14 and were thus all small to very small.

TABLE 4 | Absolute level stabilities of all five variables (correlates and outcomes) involved in the analyses. Mean values for T1 and T2 are shown, including statistics for mean changes.

Variable	M (T1)	N (T1)	M (T2)	N (T2)	diff.	<i>t</i>	<i>p</i>	<i>d</i>
BSQ-8C	22.3	250	20.8	249	1.42	3.11	0.002	0.14
MDDI	27.1	248	26.9	247	0.23	0.59	0.559	0.03
ARS-D	10.5	248	9.99	247	0.47	1.65	0.100	0.11
DERES-SF	39.3	254	38.1	253	1.23	1.91	0.058	0.10
TAS-20	49.6	247	48.3	246	1.32	2.13	0.034	0.12

Note. BSQ = Body Shape Questionnaire (short form); MDDI = Muscle Dysmorphic Disorder Inventory; ARS-D = Appearance-related Rejection Sensitivity; DERES-SF = Difficulties in Emotion Regulation Scale (short form); TAS-20 = Toronto-Alexithymie-Skala-20, PHQ-4 = Patient Health Questionnaire for anxiety and depression; EDE-Q8 = Eating Disorder Questionnaire (short form)

FIGURE 1 | Boxplots showing the distribution of all five variables (correlates and outcomes) involved in the analyses at both waves. Gray lines connect the values of each individual participant between the two waves. This figure can be used to visually examine absolute level (boxplots) and relative level (grey lines) stability.



Discussion

In the context of mental health in adolescences and young adults, BD has gained recognition as a significant public health concern (McLean et al., 2022) in females and males (Vuong et al., 2021), typically emerging during early adolescence (Rohde et al., 2015). For instance, BD has been identified as one of the most important and growing risk factors in the development and maintenance of eating disorders and also occurs in people with other mental disorders, as well as in the general population. Therefore, the main aim of the present study was to determine the association between different psychological factors on the development and persistence of BD.

Psychological correlates of body dissatisfaction

On average, our participants showed mild symptoms of BD, even though the majority had a healthy weight, and relatively low eating disorder pathology at both waves (see table 1). This is consistent with previous research, which indicates that BD is a prevalent and normative discontent in Western society samples, particularly during adolescence and early adulthood – a period characterized by heightened vulnerability in the onset and intensification of BD (Tantleff-Dunn et al., 2011; Wang et al., 2019). The results of our study are in line with other research conducted in the German-speaking region, which revealed that only 35% of females and 56% of males aged 13-17 were satisfied with their appearance (Widmer Howald et al., 2018). In accordance with our hypothesis, there was a significant positive association between BD and the psychological factors of ERD and ARS at both waves. The effect sizes for ERD were medium to large at T1 and small to medium at T2, whereas the effect sizes for ARS were medium at both waves. Results are consistent with previous research, thereby highlighting the relevance of ERD and ARS in the onset and maintenance of BD in adolescents and young adults (Gardner et al., 2021; Hansson et al., 2016; Morin & Meilleur, 2024; Sim & Zeman, 2005). Moreover, our findings add to previous research underlining that the tendency to hastily feel rejected regarding one's own appearance may heighten the vulnerability to develop and maintain BD in youth (Calogero et al., 2010; Park et al., 2009; Schmidt & Martin, 2019).

Our study was the first to examine the association between alexithymia (inability to identify, understand, and express one's own emotions, as well as a limited capacity to recognize and interpret emotions in others; Sifneos, 1973) and BD at two different data assessment waves one year apart. We found only very small associations between BD and alexithymia at T1, indicating no clinical importance. Furthermore, the association between BD and alexithymia at T2 was of small effect size, despite being significantly different from 0. In other words, if

corroborated in future studies, it can be assumed that low levels of alexithymia, as measured in our study (see table 1) might not be important for the development of BD, whereas the observed moderate levels of ERD are important.

As mentioned above, the strength of these associations differed somewhat between the two waves. The discrepancies could be interpreted in two ways. First, they may point to developmental changes occurring over the course of the one-year study period. As previous studies have shown, adolescence and early adulthood are both characterized as periods with major physical, social, cognitive and emotional changes, and identity formation occurring (Reel et al., 2015). According to a prior study (Steinberg, 2005) adolescence is characterized by an increased need to regulate affect and behavior in accordance with long-term goals and consequences. Due to the differential maturation – which can extend into early adulthood – of the developing brain, emotion, cognition, and behavior, this developmental phase is often characterized by heightened vulnerability (e.g., for the onset of mental health impairments) and adjustment. Second, these discrepancies might be a methodological issue as the sample size was much smaller in T2 than T1. However, since the completer sample at T1 revealed similar results compared to the full sample at T1, this suggests that developmental changes may have actually played a role in this context, though of limited size.

Psychological correlates of muscle dysmorphic symptoms

Currently, there is limited knowledge regarding the mechanisms associated with MD, as the most frequently used BD questionnaires neglect to address dissatisfaction with and the drive for muscularity. Nevertheless, recent studies suggest a potential rise in the drive for muscularity and associated behaviors among males and females, due to cultural shifts in Western societies towards leaner, toned, and more muscular body-ideals (Cunningham et al., 2019; Girard et al., 2018; Mitchison et al., 2022). This highlights the importance of including measures that capture weight, shape, *and* muscularity concerns as significant aspects of BD in future mixed-gender cross- and longitudinal research. The present study is one of the first to examine MD in a general youth sample, whereas previous research has primarily focused on people seeking treatment (e.g., body dysmorphic disorder) or those involved in bodybuilding or competitive sports. Our aim was to assess the impact of the psychological factors ERD, alexithymia, and ARS on MD symptoms. On average, the sample showed low MD symptoms at both waves according to the cut-off values reported elsewhere (Zeeck et al., 2018). It should be noted that our sample primarily consisted of young females (80% at T1, 84% at T2), which may have influenced the manifestation of MD in this study. Accordingly, research has shown that females are more

likely to engage in strategies to lose or control weight, while males are more inclined to perform muscularity-enhancing behaviors (McLean et al., 2022; Nagata et al., 2020; Wyssen, Bryjova, et al., 2016).

In line with our hypotheses, the results revealed a significant positive association between MD and ERD at both waves, albeit with effect sizes being rather small. Note in this context that we made no attempt to control for multiple testing, and that doing so may have led to a non-significant result for this particular association (the corresponding *p*-values ranged between 0.11 and 0.21, see table 2). Our study findings nevertheless contribute to the few studies which have included muscularity concerns in their analyses and demonstrated that higher levels of ERD are associated with increased levels of BD as well as engagement in muscle-building behaviors at both waves (Morin & Meilleur, 2024). Moreover, other research demonstrated that ERD amplify the association between BD and the desire for muscularity (Cunningham et al., 2020; Dakanalis et al., 2015). The limited influence of ERD on symptoms of MD in our study might be due to differences in sampling strategy. While other studies (Schmidt & Martin, 2019) mainly focused on people known for their vulnerability in MD (e.g., people seeking treatment for body dysmorphia or those involved in bodybuilding and competitive sport), we recruit young people from the general population. Hence, findings from prior research may be biased, resulting in a potential underestimation of MD and small effect sizes in our study, while also reducing comparability. Effect sizes for associations between MD and alexithymia and between MD and ARS were all small at best, except for the association between MD and alexithymia at T1 when considering all available data, which was highly significant, with small to medium effect size. At this point, it should be noted that there is scarce literature available in young people regarding this association, which complicates the interpretation and comparability of our data.

Absolute and relative level stabilities between waves T1 and T2

We showed that both relative and absolute level stabilities were generally high in our sample. A high *relative level stability* means in the context of our study that participants with high/low values of psychological correlates of BD and of high values of BD and MD at T1, were likely to have corresponding high/low values at T2 one year later. This was, however, somewhat less the case for the ARS, where relative level stability was considerably lower compared to ERD, alexithymia, BD, and MD (see table 3). This points to stronger individual fluctuations over the one-year period for ARS, although the average value of ARS hardly changed within that period (absolute level stability, see table 4). One explanation might be, that ARS often occurs within the context of *peer victimization* (Lavell et al., 2014; J. Schmidt & Martin, 2019), which we did not include in this study. Moreover, the rates of bullying may have been mitigated due to the COVID-19 pandemic and the accompanying restrictions (e.g., homeschooling). Similarly, a study involving Canadian students in grades 4-12 ($n = 6578$; mean age 13.05 ± 2.34 years) provided further evidence, indicating significantly higher rates of bullying involvement before, compared to during the COVID-19 pandemic across all forms of bullying (general, physical, verbal, and social), except for cyberbullying, where the differences in rates were less pronounced (Vaillancourt et al., 2021). Thus, individual fluctuations could potentially be explained by varying levels of peer victimization in youth as well as lower rates of bullying during the COVID-19 pandemic.

Absolute level stabilities were also high. Mean values of all investigated variables hardly changed between the two waves. Strongest changes were observed for BD and alexithymia, albeit with small effect sizes. In other words, in this study sample consisting of Swiss youth with predominantly high school or university educational background, the measured facets of ERD and subjective appearance-related rejection experiences were of relevance to determine weight and shape concerns or concerns over being not muscular enough at two different time points, one year apart.

Limitations and recommendations for future studies

The strengths of this study include the use of a relatively large sample of 605 participants at T1, the repeated assessment one year later (T2), and the use of online versions of short-form questionnaires that reduced participation burden and led to a comparably low drop-out rate. Another strength is, that we decided to also include concerns related to muscularity in our definition of BD, as increased desire for muscularity is detected in both, females and males (Cunningham et al., 2019; Klimek et al., 2018; Nagata et al., 2022).

When interpreting the findings of the current study, several limitations must be considered. To obtain more generally interpretable results, it would be beneficial to replicate our study in a more diverse sample with respect to educational status, as most of the participants were university (48%) or high school students (46%). Moreover, males were underrepresented with a participation rate of 19% at T1 and 14% at T2, which was already observed in previous mental health research studies (Ellis et al., 2014; Ryan et al., 2019), even though the current study made strong efforts to recruit males as well as participants from various educational levels via social media ads and reduced burden (e.g., online registration, short-form questionnaires). Therefore, in our study, we cannot draw meaningful conclusions about gender differences but instead controlled for the influence of gender. Given the data, since there are indeed gender differences with respect to the relevance of the muscularity, future studies should focus more specifically on this research question (Vuong et al., 2021). Findings on diverse study groups in terms of educational status and gender are important as they allow to better ensure that these groups also benefit from mental health research and that prevention as well as psychotherapy are tailored to their needs.

It should further be noted that we shortened the Appearance-Based Rejection Sensitivity Scale (ARS-D; Schmidt & Martin, 2017), leading to reduced internal consistency and lower reliability values compared to those denoted in the literature (see assessment instruments; Park, 2007; Schmidt & Martin, 2017). There are also only few comparative studies on ARS in the German-speaking region due to the lack of assessment instruments. So far, only the ARS-D (original version: Park, 2007) is available, which was translated and validated by Schmidt and Martin (2017), mostly for well-educated females aged 18-55 years ($n = 391$; 74.9% female; 47.8% high school; 26.9% university). This is why we had to make linguistic and content adjustments for our age group (e.g., scenarios were missing where youth experienced appearance-based rejection on social media and/or peer victimization). In the future, studies are needed to adapt and validate ARS questionnaires for adolescents and young adults. In addition, it must be noted that BD/MD and ARS in other studies were assessed using many different questionnaires,

which complicates the comparability of the findings. Another limitation of this study is that we did not differentiate between diverse sexual orientation categories (e.g., hetero-, homo-, bisexual). Although, evidence has shown that especially homosexual male adolescents and young adults, tend to exhibit higher levels of BD and display a greater drive for thinness and muscularity (Cella et al., 2010; Jankowski et al., 2014). It is therefore possible that psychological correlates of BD/MD may have a different impact depending on sexual orientation, which is why sexual orientation should be considered as an additional variable in future research. At this point, it should also be noted that there is currently no validated German version of the DERS-SF available. Nevertheless, in our study sample, Cronbach's alpha and McDonald's omega were 0.90 and 0.93, respectively, thus providing evidence that the German version of the DERS-SF can be effectively used in adolescents and young adults.

Furthermore, sociocultural factors, such as the media-promoted *thin- and muscular-/athletic-ideal* and the associated degree of *internalization* of these ideals as well as appearance pressure from peers and families to conform to these ideals have been shown to highly impact youths' BD and could be included in future research (Ricciardelli & Yager, 2015). Given that exposure to these appearance-ideals is frequent, especially through image-based social media platforms (e.g., Instagram, TikTok) and advertisements, future research should prioritize investigating cognitive processes, such as *thought-shape fusion* (Munsch, Messerli-Bürge, et al., 2021; Wyssen, Bryjova, et al., 2016). Additionally, there should be a particular focus on investigating resulting unhealthy body change behaviors, such as weight reduction or muscle gain strategies (McLean et al., 2022; Neumark-Sztainer et al., 2006).

Conclusion

The findings of this study underline the punctual and potentially longer lasting cross-sectional associations between ERD, alexithymia and ARS in a youth sample and concerns about their body shape, weight and muscularity at two assessment time points one year apart. They need to be corroborated but highlight the pertinence to develop and validate prevention and treatment modules to address emotion regulation competences and coping with subjective appearance-related rejection sensitivity already at a young age. Future studies including assessment of these mechanisms in daily life and the evaluation of the effect of corresponding treatment modules will help to enhance our understanding of the role and stability of these processes (i.e., (Munsch, Forrer, et al., 2021).

Supplementary Material

TABLE 5 | Correlation matrix of for correlates and covariates included in the regression models ($n = 572$).

	Age	Sex	Education	BMI	COVID-19	DERS-SF	ARS-D
Age	–						
Sex	–0.03	–					
Education	–0.04	0.09	–				
BMI	0.18	0.04	–0.09	–			
COVID-19	–0.26	0.02	–0.08	0.07	–		
DERS-SF	–0.06	–0.12	–0.03	0.16	0.13	–	
ARS-D	–0.05	–0.16	–0.06	0.10	0.08	0.21	–
TAS-20	–0.26	–0.04	–0.07	0.05	0.22	0.64	0.22

TABLE 6 | Correlation matrix for regression model with all available cases at wave 1.

	VIF scores
Age	1.22
Gender	1.12
Education	1.06
BMI	1.11
COVID-19	1.13
DERS-SF	1.88
ARS-D	1.10
TAS-20	1.93

Publication II: A Path Model Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behavior in Young Females

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Abstract

Background: An increasing number of young females are reporting disturbed eating and compensatory behaviors (DECB), with studies showing that higher levels during adolescence not only persist into early adulthood but also are associated with the onset of subthreshold/threshold eating disorders. Emotion regulation difficulties (ERD) have been identified as one of the most relevant transdiagnostic risk factors associated with the development and maintenance of various DECB. The aim of this study was to explore the mediating mechanisms between ERD and DECB within a newly developed path model. **Methods:** A total of 627 females (mean age 19.90, $SD = 2.50$) participated in a cross-sectional online questionnaire study. **Results:** The results highlighted body-related cognitive distortions (TSF-B), either alone ($\beta = 0.160$, $p < 0.000$), or in conjunction with body dissatisfaction ($\beta = 0.124$, $p < 0.000$), as key mediators. **Conclusions:** This study identifies TSF-B and body dissatisfaction as key mediators in the link between ERD and DECB. These findings emphasize the importance of addressing maladaptive information processing in theoretical models and incorporating corresponding interventions in prevention and intervention programs. Further cross-sectional and longitudinal research across genders and in both clinical and community samples remain crucial.

Background

Numerous studies have highlighted that *disturbed eating* (e.g., restricting food intake, binge-eating) and *compensatory behaviors* (e.g., purging, excessive exercise) (**DECB**) are a major public health concern, often emerging in females during adolescence and early adulthood (Cosh et al., 2023; Glazer et al., 2019; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018). Current data from Switzerland indicate that about one third of females aged between 15 and 24 exhibit DECB (Peter et al., 2023). Other studies have reported similar numbers (Foster et al., 2024; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018), with females being generally more affected than males. Furthermore, high levels of DECB during adolescence not only persist into early adulthood but also contribute to the development of subthreshold or threshold eating disorders (ED; (Glazer et al., 2019; Herpertz-Dahlmann et al., 2015; Stice et al., 2017; Yamamiya et al., 2023; Yamamiya & Stice, 2024)). Subthreshold ED are recognized as the most prevalent ED among young females (Stice et al., 2013), not meeting the full diagnostic criteria for ED, while including various DECB, which can frequently co-occur (Peschel, Sigrist, et al., 2024). Compared to DECB, subthreshold ED are linked to higher psychological distress and greater functional impairments (Jacobi et al., 2011; Solmi et al., 2024). Moreover, young females with subthreshold/threshold ED experience higher levels of emotional distress, suicidality, and unhealthy body weight in comparison to peers without ED (Stice et al., 2013). During the COVID-19 pandemic, the prevalence and severity of DECB increased due to heightened levels of stress, social isolation, and changes in daily routines, especially among the general youth population and those with subthreshold/threshold ED (Baceviciene & Jankauskiene, 2021; S. A. McLean et al., 2022; Simone et al., 2021). Consequently, early detection and intervention on DECB, alongside a thorough understanding of the contributing factors, are more crucial than ever before for reducing the negative long-term impact of subthreshold/threshold ED in adolescents and young adults (Trompeter, Bussey, Forbes, et al., 2022; Turel et al., 2018).

Emotion regulation difficulties (ERD) have been discussed as one of the most relevant transdiagnostic risk factors contributing to the development and maintenance of various DECB in young females (Leppanen et al., 2022; Peschel, Fürtjes, et al., 2024; A.-B. Prefit et al., 2019; Sander et al., 2021; Warne et al., 2023). They include problems in identifying emotions or employing adaptive regulatory strategies and are especially common among adolescents and young adults whose emotion regulation abilities are still developing (Gratz & Roemer, 2004;

Riediger & Luong, 2015). Indeed, studies have found that ERD are linked to higher rates of DECB, both in young clinical and community samples (Della Longa & De Young, 2018; Dworschak et al., 2023; Félix et al., 2025; Goldschmidt et al., 2017b; Leppanen et al., 2022; Mikhail et al., 2024; Mikhail & Kring, 2019; Trompeter et al., 2021). For example, non-clinical females exhibiting DECB reported more ERD (e.g., lack of emotional awareness, clarity, acceptance) and greater use of maladaptive emotion regulation strategies (e.g., rumination, avoidance, suppression) in comparison to controls without DECB (A.-B. Prefit et al., 2019). This has led Trompeter et al. 2021 to expand the original transdiagnostic model of ED (CBT-E model; Fairburn et al., 2003)), incorporating a broader perspective on ERD as a distinct underlying predictive mechanism of DECB, in addition to the overvaluation of weight and shape (hereafter referred to as body dissatisfaction). A recent study published by our research group showed a significant positive cross-sectional association between dissatisfaction with one's body and ERD among adolescents and young adults (Mueller et al., 2024). These results are consistent with previous research, highlighting the predictive relevance of ERD, in the onset and maintenance of body dissatisfaction (Cunningham, Szabo, et al., 2020b; Hansson et al., 2016).

Body dissatisfaction (BD), defined as an individual's negative perceptions and feelings regarding their body and appearance, is a widespread phenomenon particularly prevalent among young females and commonly characterized as *normative discontent* (S. A. McLean et al., 2022; Rohde et al., 2015; Schuck et al., 2018). Specifically, BD often manifests as distress over not achieving a culturally endorsed *thin-ideal*, characterized by concerns regarding body shape, feelings of being perceived as overweight, and fears of weight gain (S. A. McLean et al., 2022; White et al., 2023). Therefore, BD has emerged as one of the most robust risk factors in the development and maintenance of subthreshold/threshold ED (Stice, 2016; Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024). A recent study conducted in Switzerland revealed that only 35% of females between the ages of 13 and 17 were satisfied with their appearance (Widmer Howald et al., 2018). These numbers are comparable with previous research conducted in other Western youth samples (Hoffmann & Warschburger, 2018; S. A. McLean et al., 2022; Meschberger-Annweiler et al., 2024; Wang et al., 2019).

Recent research also indicates a growing drive for highly toned athletic physique (i.e., leanness combined with muscularity) among young females (Bozsik et al., 2018; Marashi et al., 2024; Mitchison et al., 2022). This trend is associated with ***muscle dysmorphic symptoms (MD)***, characterized by an obsessive focus on muscularity and a distorted body image, which typically leads to feelings of being insufficiently athletic or muscular, thereby heightening BD (Mitchison et al., 2022; Nagata et al., 2022). Furthermore, MD are commonly associated with

DECB aimed at achieving muscular hypertrophy and reduced body fat levels (*muscular-/athletic-ideal*). This may include DECB such as strength training or strict dieting to either gain weight (for muscularity; e.g., high-protein intake) or to lose weight (for leanness; e.g., fasting) and the use of muscle-enhancing substances (Cunningham et al., 2022; Lucibello et al., 2024; Nagata et al., 2022).

Although seemingly contradictory, the internalization of both *thin- and muscular-/athletic-ideals* can also coexist among young females (Wagner et al., 2022). A previous study by our research group has demonstrated that young females with higher levels of ERD exhibit higher levels of BD as well as MD (Mueller et al., 2024), which in turn may lead them to engage more frequently in DECB (Cunningham, Szabo, et al., 2020b; Hughes & Gullone, 2011a; Lucibello et al., 2024; Morin & Meilleur, 2024). For example, a study involving 533 adolescents found that a higher reliance on dysfunctional emotion regulation strategies was associated with increased BD, more frequent restrained eating, and compensatory behaviors (Hughes & Gullone, 2011b). Other results indicate that young females with ERD exhibit a higher drive for muscularity and associated DECB (e.g., specific workout routines, supplement use, diet plans, and tracking; (Cunningham, Szabo, et al., 2020a)).

In recent years, image-based social media platforms such as Instagram and TikTok have significantly shaped young females' perceptions, often showcasing unrealistic and unattainable appearance-ideals (e.g., *thin-, muscular-/athletic-ideal*), which foster upward social comparisons from an early age (Castellanos Silva & Steins, 2023; Pedalino & Camerini, 2022). Research indicates that these *appearance-ideals* negatively impact psychological well-being only when they are *internalized* (Griffiths & Stefanovski, 2019). According to the *dual pathway model* (Stice, 2001), internalizing unrealistic and unattainable appearance-ideals can lead to increased BD (Girard et al., 2018; Karazsia et al., 2013; Marashi et al., 2024; Munsch, Messerli-Bürge, et al., 2021; Paterna et al., 2021), which serves as a mediator, prompting DECB such as restrictive dieting among young females striving to achieve these internalized appearance-ideals (Stice & Van Ryzin, 2019). An 8-year longitudinal study following community-recruited females throughout adolescence found support for the dual pathway model as internalization of the thin-ideal and/or BD predicted the future onset of subthreshold/threshold ED (Yamamiya & Stice, 2024).

At present, being confronted with appearance-ideals is part of young females' everyday life. ***Thought-shape fusion (TSF-B)*** describes *thin-ideal-associated body-related cognitive distortions* (Shafran et al., 1999), triggered by imagining unrealistic thin-ideals and striving for one's own thin-ideals, which may diminish psychological flexibility and intensify negative body image (Coelho et al., 2015; Wyssen, Coelho, et al., 2016; Wyssen et al., 2018). This can lead to beliefs in actual weight gain, feelings of fatness, the perception of moral wrongdoing, and subsequently, increased BD (Mason et al., 2021; Munsch, Messerli-Bürge, et al., 2021; Wyssen, Coelho, et al., 2016). Additionally, studies have shown that females exhibiting greater TSF-B show more pronounced BD and DECB (Dubois et al., 2016; Munsch, Messerli-Bürge, et al., 2021; Wyssen et al., 2020) as well as higher ED psychopathology (Coelho et al., 2015; Wyssen et al., 2018). Thus, TSF-B should be recognized as a critical *cognitive* correlate of the phenomenology and etiology of subthreshold/threshold ED. However, it is important to note that TSF-B is not limited to individuals diagnosed with ED but is also observed among young females in the general population (Wyssen, Coelho, et al., 2016). An ecological momentary assessment study found that TSF-B was associated with higher DECB, indicating its high prevalence even in the everyday lives of healthy young females (Wyssen, Coelho, et al., 2016). To date, TSF-B remains a relatively understudied cognitive distortion within studies analyzing its mediating role, even though information processing style is becoming more important with the continuously increasing use of social media.

Extensive research indicates that a higher ***body mass index (BMI)*** is associated with increased BD among young females, particularly concerning their shape and weight (Frederick et al., 2022; Meschberger-Annweiler et al., 2024; Pedalino & Camerini, 2022; Rosenqvist et al., 2024; Sarrar et al., 2020). During puberty, girls often experience rapid increases in weight and body fat in areas such as the waist, hips, and thighs, heightening their BD as they move away from the cultural thin-ideal. A 10-year longitudinal study found that BD increased from middle to high school and intensified further into early adulthood, parallel with increases in BMI (Bucchianeri et al., 2013). Conversely, those with a lower BMI during this period reported less BD. Driven by a desire to conform to a specific thin-ideal by reducing weight, females might more frequently engage in DECB, such as fasting, skipping meals, or purging (Lafrance Robinson et al., 2014; Mohorić et al., 2023; Sifre et al., 2024). Additionally, some studies have explored the connections among ERD, BMI, and DECB (Casagrande et al., 2020; Lafrance Robinson et al., 2014). For instance, findings from a non-clinical undergraduate sample indicate that BMI and specific ERD positively correlate with DECB (Lafrance Robinson et al., 2014).

Female adolescents and young adults are particularly vulnerable to developing depression and anxiety disorders, which are not only the most common comorbidities in subthreshold/threshold ED (Swanson et al., 2011) but also are associated with more severe DECB (Sander et al., 2021). For instance, individuals diagnosed with lifetime major depression or anxiety disorders have a fourfold increased risk of developing an ED (Garcia et al., 2020). Additionally, psychological factors such as *negative mood* and *symptoms of social anxiety* have been linked to increased DECB. Multiple studies have documented that negative mood is significantly linked to DECB, especially among young females experiencing ERD (Gitimu et al., 2016; A. B. Prefit & Szentagotai-Tătar, 2018; Sander et al., 2021; J. A. Wonderlich et al., 2022). Similarly, research indicates that symptoms of social anxiety are more closely associated with DECB (Alcaraz-Ibáñez et al., 2023; Spettigue et al., 2020) than other subtypes of anxiety (Garipey et al., 2010). One explanation is that females with heightened social anxiety are more likely to experience negative feelings due to perceived criticism and face difficulties in regulating these emotions (ERD), which can exacerbate DECB (C. P. McLean et al., 2007). However, most studies have been conducted with clinical samples, and there is a notable lack of data from the general youth population.

Building on current literature, this study aimed to extend the revised CBT-E model (Trompeter et al., 2021) by developing and testing a comprehensive path model (see figure 1) linking ERD (*predictor*) to DECB (*outcome*). According to the Dual Pathway Model (Stice, 1994), various risk factors associated with DECB are thought to interact in a temporal sequence, with one emerging after another (Stice & Van Ryzin, 2019). BD, in particular, has been identified as a primary driver for DECB (Stice, 2001). Recent research underscores the critical need for further studies evaluating existing mediational etiological models, such as the Dual Pathway Model, with a focus on incorporating multiple mediators (Yamamiya & Stice, 2024). Given the rising prevalence of DECB and ED among young females over the past decade (Santomauro et al., 2021), alongside extensive research highlighting ERD as a significant predictor (Félix et al., 2025; A.-B. Prefit et al., 2019; Warne et al., 2023), it is essential to examine the impact and interplay of multiple mediators.

Drawing from previous theoretical models (Stice & Van Ryzin, 2019; Trompeter et al., 2021; Yamamiya et al., 2023), the path model (see figure 1) incorporates two sets of serial key mediators: *m1*, covering *cognitive* (internalization, distortion), *physiological* (body mass index), and *psychological* (negative mood, social anxiety symptoms) factors; and *m2*, focusing

on *body-image-related factors* (body dissatisfaction, muscle dysmorphic symptoms). Our path model deliberately establishes BD as a central concept and mediator, whose influence on DECB is altered by ERD and the preceding m1 mediators. With the inclusion of multiple mediators arranged both serially and in parallel, this path model allows for the examination of various pathways, highlighting how these multiple mediators each play a role in linking ERD to DECB. This model addresses a notable research gap, as previous studies have not explored such a comprehensive path model within a sample of young females recruited from the general population. Moreover, this study represents an initial exploratory step toward identifying which of the selected m1 and m2 mediators play a substantial role in linking ERD to DECB and which may exert a weaker influence.

Methods

Aim, Design and Setting

This online questionnaire study is part of a larger research project (Binge-Eating Adolescent and Young Adults Treatment, i-BEAT; (Munsch, Forrer, et al., 2021)), conducted at the University of Fribourg, Switzerland. Initiated in April 2021, the study's overarching aim was to investigate the determinants of mental health, particularly disordered eating behaviors, in a general German-speaking, mainly Swiss sample of adolescents and young adults. In this cross-sectional study, baseline assessments were used. Participants registered through the study website. Afterwards, participants received an email with a link to the online questionnaire on Qualtrics, where they were first presented with the study information and aims and required to give online informed consent to proceed. The questionnaire began with sociodemographic characteristics, followed by various mental health questionnaires (for the selection used in this study see *Instruments*; for a detailed overview see (Munsch, Forrer, et al., 2021)). Completing the questionnaire took approximately 30-45 minutes and participation was anonymous. A progress bar indicated the percentage of completed questions. Participants' email addresses were used to generate a unique 64-digit ID, allowing the online questionnaires to be matched with the other sub-studies. The SHA-256 algorithm was used for the encryption process. The study received approval from the Cantonal Ethics Committee of Bern and was registered (Study ID: 2019-01277; DRKS-ID: DRKS00023706).

Participants

Between April 2021 and May 2024, $n = 770$ young people participated in the study, 627 of whom were females, constituting the study sample. Inclusion criteria for participation were age (14–24 years), sufficient German language skills, absence of pregnancy or lactation, and provision of online written informed consent. Recruitment targeted the general youth population and was conducted via social media (e.g., Instagram), mailing lists, and on-site visits at local schools and universities, youth clubs (e.g., sports teams), flyers, newspapers, and mental health institutions in Switzerland and Germany. Psychology students from the University of Fribourg (Switzerland) received course credits for their participation. No financial compensation was provided.

Instruments

To assess the sociodemographic characteristics of the sample, the online questionnaire included self-reported items on current age (in years), nationality, education, sexual orientation, social media use, average screen time, current body weight (in kg) and height (in cm).

In the present study, the *predictor* ERD was measured by the short-form of the **Difficulties in Emotion Regulation Scale (DERS-SF)**; original: (Kaufman et al., 2016)). At present, no officially validated German version of the DERS-SF is available. Therefore, we used the well-validated and widely applied German translation of the original full DERS (Gratz & Roemer, 2004), selecting the same items for each shortened subscale as the original DERS-SF (Kaufman et al., 2016). The DERS-SF consists of 18 items rated on a 5-point Likert scale (1 = almost never; 5 = almost always), forming six subscales: lack of emotional clarity (*clarity*), lack of emotional awareness (*awareness*), difficulties engaging in goal-directed behavior (*goals*), non-acceptance of emotional responses (*non-acceptance*), impulse control difficulties (*impulse*) and limited access to emotion regulation strategies (*strategies*). Higher mean scores in each subscale (range: 1-5) indicate greater difficulties in this facet of emotion regulation. The DERS-SF total score (range: 18-90), calculated as a sum score across all items, was used to provide a comprehensive assessment of overall ERD. In our sample, the internal consistency was deemed suitable for use among female adolescents and young adults, evidenced by Cronbach's alpha and McDonald's omega being 0.91 and 0.93, respectively.

For the *outcome measure* of this study, a new variable was created to assess **DECB**, following the approach established by our group in Wyssen et al. (Wyssen, Coelho, et al., 2016), to avoid conceptual overlap between the two cognitive m1 mediators (SATAQ-G-Int, TSF-B-Con) and

the m2 mediators (BSQ-8C, MDDI). The DECB variable involves the behavioral subscale *restrained eating* from the EDE-Q8 (items 1-2; (Kliem et al., 2016)) and four *additional behavioral items* from the original EDE-Q (items: 13-18; (Hilbert & Tuschen-Caffier, 2016)). Thus, the items assessing eating, shape, and weight concerns from the EDE-Q8 scale were omitted in the DECB variable. The two EDE-Q8 items were rated on a scale from 0 to 6, while the EDE-Q items were coded based on the reported frequency of binge-eating, self-induced purging, laxative use, and exercising over the past 28 days. The coding was performed as follows: 0 days/events = 0; 1–5 days = 1; 6–12 days = 2; 13–15 days = 3; 16–22 days = 4; 23–27 days = 5; 28 days and more = 6. A detailed overview of the specific items used to construct the DECB variable can be found in table 3 in the supplemental material. It should be noted that Wyssen et al. (Wyssen, Coelho, et al., 2016) used only items from the subscale "restrained eating" of the original EDE-Q (5 items), whereas the present study used the EDE-Q8 (2 items). Nevertheless, the internal consistency of our measures, as indicated by Cronbach's alpha and McDonald's omega of 0.88 and 0.94, respectively, supports the comparability of our results with those reported by Wyssen et al. (Wyssen, Coelho, et al., 2016).

Assessment of the m1 mediators:

The German version of the **Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-G-Int;** original: (Heinberg et al., 1995); German: (Knauss et al., 2009)) was utilized to assess the cognitive style impacting body image. In the present study, the 6-item subscale *internalization of media body-ideals* (items 6-9,11,16) was used. Items are rated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree), whereby a higher subscale sum score is associated with a more pronounced cognitive internalization (total range: 6-30). To better reflect the increasing importance of social media in recent years, formulations were partly adjusted. For example, in item 6, the wording "in magazines and on TV" was extended to include "on social media". Cronbach's alpha and McDonald's omega in the present sample were 0.90 and 0.92, respectively. The correlation between the SATAQ-G total score and the SATAQ-G-Int was .94.

Body-related cognitive distortions were measured with the **Thought-Shape Fusion Body Questionnaire (TSF-B-Con;** original: (Coelho et al., 2013); German: (Wyssen et al., 2017)). The present study used only the 12-item concept scale, which comprises two subscales: *imagination of thin-ideals* (items 1,2,8,9,10) and *striving for own thin ideal* (items 3-7,11,12). All items were rated on a 5-point Likert scale, ranging from 0 (not at all) to 4 (totally/always),

with higher sum scores representing greater cognitive distortions (range: 0-48). Cronbach's alpha and McDonald's omega in the present sample were 0.95 and 0.96, respectively.

Body mass index (BMI) was calculated using self-reported weight and height (kg/m^2). The National Institutes of Health uses BMI to classify individuals as underweight (< 18.5), healthy weight ($18.5\text{--}24.9$), overweight ($25\text{--}29.9$), and obese (≥ 30) (Weir & Jan, 2025).

The **Beck Depression Inventory Fast Screening (BDI-FS; original: (Beck et al., 2012); German: (Kliem et al., 2014))** is a brief seven-item questionnaire that assesses depressive symptoms during the past week. Each item is rated on a 4-point Likert scale, resulting in a total sum score ranging from 0 to 21. Higher scores indicate more severe depressive symptoms, categorized as minimal (0-3), mild (4-6), moderate (7-9), and severe (10-21) depression. Cronbach's alpha and McDonald's omega in the present sample were 0.88 and 0.91, respectively.

Social anxiety levels were assessed using the brief 6-item short-form of the **Social Interaction Anxiety Scale (SIAS-6; original: (Peters et al., 2012))**. Correlations with the long version were reported to be high ((Mattick & Clarke, 1998); $r = .88$). Since no German version of the SIAS-6 was available, the corresponding items from the long version, already translated into German by Stangier et al. (Stangier et al., 1999), were used. These items were also highly correlated with the long version ((Mattick & Clarke, 1998); $r = .88$). Items were rated on a 5-point Likert scale (0 = not at all characteristic of me, 4 = extremely characteristic of me), with a total sum score ranging from 0 to 24, where higher scores indicate higher levels of social anxiety. Cronbach's alpha and McDonald's omega in the present sample were 0.88 and 0.91, respectively.

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anxiety. Cronbach's alpha and McDonald's omega in the present sample were 0.88 and 0.91, respectively.

Assessment of the m2 mediators:

The total sum score of the German short version of the **Body Shape Questionnaire (BSQ-8C)**; original: (Evans & Dolan, 1993); German: (Pook et al., 2002)) was used to quantify BD. This 8-item questionnaire is scored on a 6-point Likert scale (1 = never; 6 = always), with higher scores indicating greater BD (range: 8-40). Scores below 19 indicate no concerns with body shape, 19-25 indicate mild concerns, and above 25 indicate moderate to marked concerns. Two items inquire about feelings of being overweight or concerns about gaining weight, while the other items address situational and personal causes and consequences of these perceptions. Cronbach's alpha and McDonald's omega in the present sample were 0.94 and 0.95, respectively.

The **Muscle Dysmorphic Disorder Inventory (MDDI)**; original: (Hildebrandt et al., 2004); German: (Zeeck et al., 2018a)) is a 13-item measure assessing MD across three subscales: *drive for size* (e.g., desire to increase muscle mass), *appearance intolerance* (e.g., negative beliefs about one's body), and *functional impairment* (e.g., excessive and compulsive exercise). Given the increasing importance of muscularity in females (Bozsik et al., 2018; Marashi et al., 2024; Mitchison et al., 2022), the total sum score was used, derived from the sum of the subscales. Participants rate statements on a 5-point Likert scale (1 = never; 5 = always), with higher scores indicating higher MD-related symptoms. Cronbach's alpha and McDonald's omega in the present sample were 0.81 and 0.89, respectively.

Covariates

The following variables were used as covariates in our analyses: *sexual orientation* and whether the online questionnaires were completed *during the COVID-19 pandemic* or *thereafter*. April 1, 2022, was selected as the cutoff date because all remaining COVID-19 restrictions in Switzerland were lifted on this date (Federal Council of Switzerland, 2022).

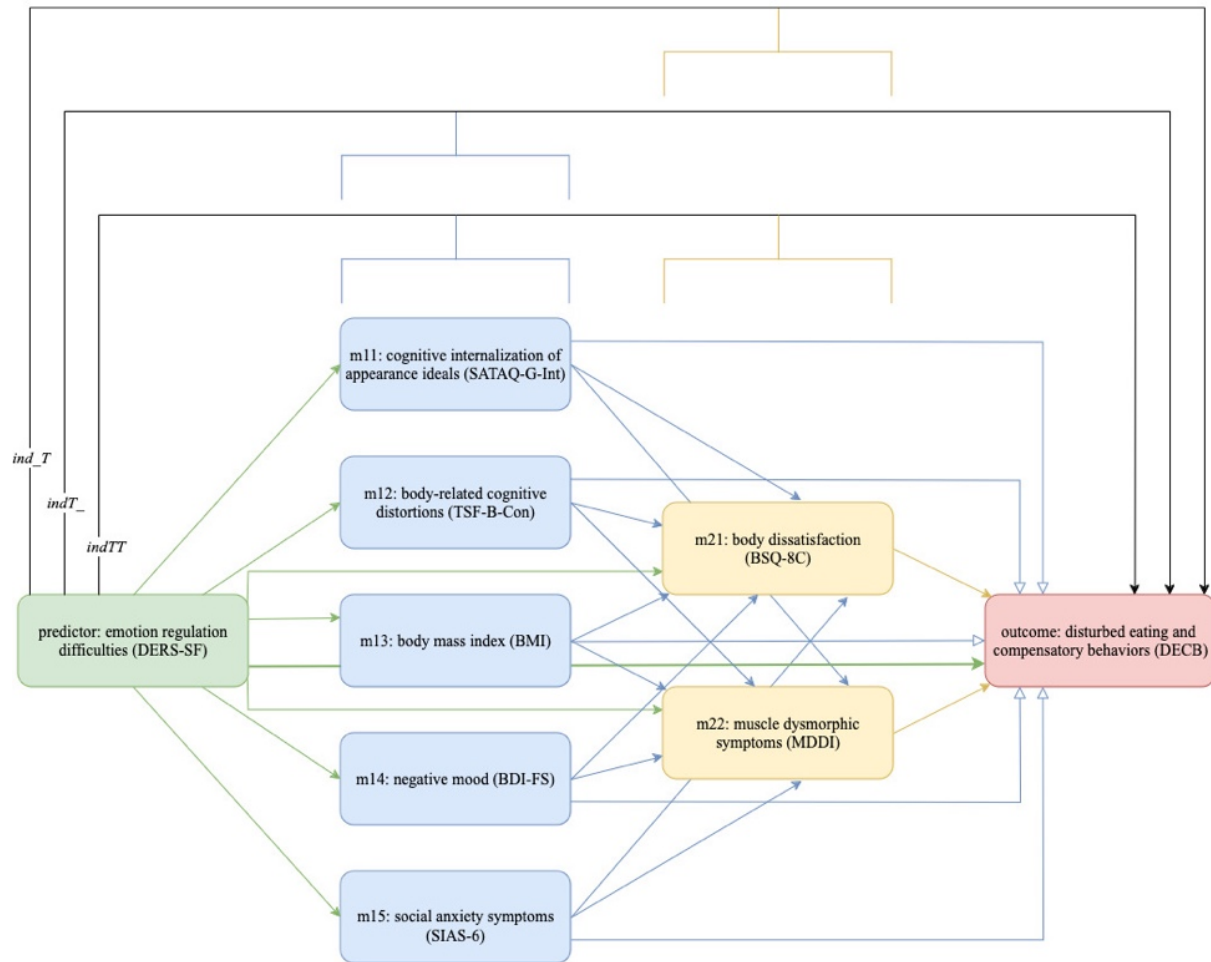
Statistical analyses

All statistical analyses were performed using R (version 4.3.2), including the R-package lavaan (version 0.6-15) (Rosseel, 2012). The path model contained DERS-SF as predictor (x), DECB as outcome (y), and two sets of mediators (m1 and m2) which were serially linked to each other as shown in figure 1. There were five m1 mediators and two m2 mediators: m1 mediators were SATAQ-G-Int, TSF-B-Con, BMI, BDI-FS, and SIAS-6; m2 mediators were BSQ-8C and MDDI. Total, direct and indirect effects were estimated using the delta method. All endogenous variables were checked for normality and transformed if necessary. The following transformations were applied: $\sqrt{x}$ for DERS-SF, TSF-B-Con, BDI-FS, BSQ-8C, and DECB, and $\log(x)$ for BMI. To test for multicollinearity when predicting the outcome DECB, variance inflation factors (VIF) were computed. Values of the VIF ranged between 1.1 and 5.7 and were below the threshold of 10, which is often suggested (Kline, 2016). We also tested for univariate and multivariate outliers by calculating z-scores and Cook's distances, respectively. We identified 30 multivariate outliers and analyzed the data with and without multivariate outliers (based on Cook's distance; see table 4, supplementary material). Since the results were comparable between the two variants, we report only the results including outliers ($n = 30$). Missing values were dealt with using the full information maximum likelihood estimation method, which leads to unbiased estimates in case of "missing completely at random" (MCAR) or "missing at random" (MAR) patterns.

Path model

All calculated effects (total, direct, indirect) are delineated in the path model (see figure 1). The *total effect* (total) refers to the overall effect of the predictor (DERS-SF) on the outcome (DECB), thus omitting any mediator in the model. This effect can then be partitioned into a direct effect and multiple indirect effects. The *direct effect* (dir) refers to the effect of the predictor on the outcome, controlled for all mediators in the model. The various *indirect effects* relate to the paths of the predictor to the outcome via the different sets of mediators m1 and m2. Thus, the path model delineates indirect effects that link both mediators m1 and m2 (indTT), indirect effects which omit m2 mediators (indT_), and indirect effects which omit m1 mediators (ind_T). Fit indices are not reported for this path model since they are not informative here because the model is completely saturated (i.e. just-identified) and hence perfectly reproduces the observed covariance matrix since none of the path coefficients in the model are set to zero (Baron & Kenny, 1986).

FIGURE 1 | Path model of DECB



Note. predictor = emotion regulation difficulties (DERS-SF); outcome = disturbed eating and compensatory behaviors (DECB); five m1 mediators: m11 = cognitive internalization of appearance-ideals (SATAQ-G-Int), m12 = body-related cognitive distortions (TSF-B-Con), m13 = body mass index (BMI), m14 = negative mood (BDI-FS) and m15: social anxiety symptoms (SIAS-6); two m2 mediators: m21 = body dissatisfaction (BSQ-8C) and m22 = muscle dysmorphic symptoms (MDDI); indirect effects: ind_{TT} = sum of all indirect effects running from ERD via both mediators m1 and m2 to DECB; ind_{T-} = sum of all indirect effects running from ERD through m1 mediators directly to DECB, while omitting m2 mediators; ind_{T} = sum of all indirect effects running from ERD directly to the m2 mediators, then to DECB, while omitting m1 mediators.

Results

Sample characteristics

Sample characteristics are summarized in table 1.

TABLE 1 | Sample characteristics.

Variable	
<i>Sample size (N)</i>	627
	<i>n (%)</i>
COVID-19	
During restrictions	175 (28%)
After restrictions	452 (72%)
Sexual orientation	
Heterosexual	492 (78%)
Homosexual	14 (2.2 %)
Bisexual	98 (16%)
Other	23 (3.7%)
Nationality	
Swiss	386 (62%)
German	184 (29%)
Other	57 (9.1%)
Education	
Still in (high)school	242 (39%)
At university/higher education	321 (51%)
In training	13 (2.1%)
Employed	27 (4.3%)
Other	24 (3.8%)
Social media use (e.g., Instagram, TikTok, Snapchat)	
Never	7 (1.1%)
Rarely	41 (6.6%)
Often	195 (31%)
Very often	381 (61%)
Average screen time per day (e.g., smartphone, tablet)	
< 1h hour	2 (0.3%)
1-2 hours	51 (8.2%)
2-4 hours	247 (40%)

4-6 hours	219 (35%)
> 6 hours	105 (17%)

	<i>M (SD)</i>	<i>N</i>	<i>Min</i>	<i>Max</i>
Age (years)	627	19.90 (2.50)	14.6	24.9
PHQ-4 (total score)	614	8.61 (2.90)	4	16
DERS-SF (total score)	611	43.92 (13.75)	18	84
SATAQ-G-Int (internalization subscale)	603	19.47 (6.93)	11	55
TSF-B-Con (concept subscale)	605	16.14 (13.32)	0	48
BMI (kg/m ²)	624	22.34 (3.95)	15	43
BDI-FS (total score)	614	5.12 (4.48)	0	21
SIAS-6 (total score)	604	16.29 (5.83)	6	30
BSQ-8C (total score)	604	26.89 (11.47)	8	48
MDDI (total score)	601	29.38 (8.88)	13	57
DECB (total score)	614	1.45 (1.29)	0	6
EDE-Q8 (total score)	614	2.27 (2.02)	0	6
restraint eating (RE)	614	2.10 (2.16)	0	6
eating concerns (EC)	614	2.85 (2.16)	0	6
weight concerns (WC)	614	3.00 (1.99)	0	6
shape concerns (SC)	614	2.56 (1.86)	0	6
EDE-Q (supplementary items)				
frequency of over-eating over the past 28 days	614	5.77 (8.05)	0	60
frequency of loss of control-eating over the past 28 days	614	5.16 (7.87)	0	60
frequency of binge-eating over the past 28 days	614	4.72 (6.83)	0	28
frequency of compensatory behavior over the past 28 days	614	2.27 (6.16)	0	56

Note. PHQ-4 = Patient Health Questionnaire-4 short-form; EDE-Q8 = Eating Disorder Examination short-form; DERS-SF = Emotion Regulation Difficulties short-form; SATAQ-G-Int = Sociocultural Attitudes Towards Appearance Questionnaire; TSF-B-Con = Thought-Shape Fusion Body Trait Questionnaire; BMI = Body mass index; BDI-FS = Beck Depression Inventory Fast Screening; SIAS-6 = Social Interaction Anxiety Scale short-form; BSQ-8C = Body Shape Questionnaire; MDDI = Muscle Dysmorphic Disorder Inventory; DECB = Disturbed Eating and Compensatory Behavior. Percentages do not always add up to 100% due to rounding. The DECB variable incorporates the 'restrained eating' subscale from the EDE-Q8 (items 1-2; (Kliem et al., 2016)) along with four additional items from the EDE-Q (items 15-18; (Hilbert & Tuschen-Caffier, 2016)). The term 'compensatory behavior' encompasses behaviors such as purging, excessive exercising, and the use of laxatives.

Path model

A comprehensive overview of all indirect effects (total, direct, indirect), unstandardized (b) and standardized (β), within the path model are reported in table 2 (for additional path coefficients see table 5 in the supplemental material). In the text we usually refer to standardized effects since these can be interpreted as effect sizes (partial correlation coefficients). Variances accounted for are reported for each endogenous variable (i.e., each variable to which at least one arrow points).

There was a strong positive total effect (total; $\beta = 0.494$) between the predictor (DERS-SF) and the outcome (DECB). The corresponding direct effect (dir; $\beta = 0.101$) was small and accounted for 21.0% of the total effect. In contrast, the total indirect effect (ind_tot; $\beta = 0.393$), i.e., the sum across all possible indirect effects in the path model, was medium to large and accounted for 79.0% of the total effect.

Since our model contained two sets of mediators, multiple indirect effects could be calculated which are all shown in table 2. Thus, the indirect effect can be further partitioned into a combined effect running via both sets of mediators m1 and m2 (indTT), a combined effect running via m1 mediators (omitting m2 mediators) and then directly to the outcome (indT_), and a combined effect running from the predictor directly to the m2 mediators (omitting m1 mediators) and then to the outcome (ind_T). Standardized values for these three indirect combined effects were $\beta = 0.225$ (indTT), $\beta = 0.117$ (indT_), and $\beta = 0.051$ (ind_T).

The combined standardized indirect effect of all m1 mediators via the m2 mediator BSQ-8C only (omitting the m2 mediator MDDI) was small to medium (indT1; $\beta = 0.184$), while the corresponding effect via the m2 mediator MDDI (omitting the m2 mediator BSQ-8C) was very small (indT2; $\beta = 0.041$) and much smaller than the former effect ($\beta = 0.144$, $b = 0.268$, $SE = 0.061$, $z = 4.431$, $p < 0.001$). Of the indirect effects running via specific m1 mediators via the combined m2 mediators (ind1T to ind5T), the largest was that via TSF-B-Con (ind2T; $\beta = 0.146$), whereas those for BMI and SIAS-6 were very small (ind3T; $\beta = 0.006$ and ind5T; $\beta = -0.011$, respectively).

Of all indirect effects running via specific m1 and/or m2 mediators (ind11 to ind52, ind1_ to ind5, ind_1 to ind_2), the following two were by far the largest: via m1 mediator TSF-B-Con and m2 mediator BSQ-8C (ind21; $\beta = 0.124$) and via m1 mediator TSF-B-Con and then directly to the outcome (DECB), omitting m2 mediators (ind2_; $\beta = 0.160$).

Variances accounted for were 19.9% for SATAQ-G-Int, 28.7% for TSF-B-Con, 3.0% for BMI, 58.6% for BDI-FS, 31.1% for SIAS-6, 81.2% for BSQ-8C, 47.1% for MDDI, and 67.2% for DECB.

TABLE 2 | Partitioning of the total effect between ERD and DECB into the different indirect effects and the direct effect.

Defined Parameter	b	SE	z	p	β
total	0.923	0.067	13.793	0.000	0.494
dir	0.189	0.072	2.643	0.008	0.101
ind_tot	0.733	0.074	9.909	0.000	0.393
indTT	0.420	0.057	7.320	0.000	0.225
indT_	0.218	0.074	2.937	0.003	0.117
ind_T	0.095	0.029	3.255	0.001	0.051
indT1	0.344	0.055	6.298	0.000	0.184
indT2	0.076	0.022	3.430	0.001	0.041
ind1T	0.076	0.015	5.091	0.000	0.040
ind2T	0.273	0.039	7.033	0.000	0.146
ind3T	0.012	0.005	2.144	0.032	0.006
ind4T	0.082	0.022	3.745	0.000	0.044
ind5T	-0.021	0.011	-1.863	0.062	-0.011
ind11	0.062	0.013	4.728	0.000	0.033
ind12	0.014	0.006	2.385	0.017	0.007
ind21	0.231	0.037	6.243	0.000	0.124
ind22	0.041	0.013	3.294	0.001	0.022
ind31	0.014	0.006	2.281	0.023	0.007
ind32	-0.002	0.001	-1.648	0.099	-0.001
ind41	0.055	0.018	3.087	0.002	0.029
ind42	0.027	0.011	2.444	0.015	0.014
ind51	-0.017	0.009	-1.851	0.064	-0.009
ind52	-0.004	0.005	-0.793	0.428	-0.002
ind1_	-0.024	0.028	-0.837	0.403	-0.013
ind2_	0.299	0.051	5.831	0.000	0.160
ind3_	-0.001	0.005	-0.171	0.864	-0.000
ind4_	0.047	0.053	0.890	0.373	0.025
ind5_	-0.103	0.030	-3.468	0.001	-0.055

Note. Outliers are included. All relevant effects ($\beta > 0.1$) are highlighted in bold. **total** = total effect between predictor and outcome; **dir** = direct effect for the association between predictor and outcome; **ind_tot** = sum of all indirect effects (total minus dir); **indTT** = total indirect effect running via both mediators m1 and m2; **indT_** = total indirect effect running via m1 mediators and then directly to the outcome (omitting m2 mediators); **ind_T** = total indirect effect running from the predictor directly to the m2 mediators (omitting m1 mediators) and then to the outcome; **indT1** = combined standardized indirect effect of all m1 mediators via the m2 mediator BSQ-8C; **indT2** = combined standardized indirect effect of all m1 mediators via the m2 mediator MDDI; **ind11 to ind52** = all indirect effects concerning one specific m1 and m2 mediator; **ind1T to ind5T** = all indirect effects of specific m1 mediators via the combined m2 mediators; **ind1_ to ind5_** = all indirect effect via m1 mediators (omitting m2 mediators); **ind11 to ind52, ind1_ to ind5_, ind_1 to ind_2**, = all indirect effects concerning specific m1 and/or m2 mediators.

Discussion

This study aims to clarify the role of two serially linked sets of mediators: *m1*, which includes *cognitive* (internalization, distortion), *physiological* (body mass index), and *psychological* factors (negative mood, social anxiety symptoms), and *m2*, focused on *body-image-related factors* (body dissatisfaction, muscle dysmorphic symptoms) on the relationship between ERD and DECB in a newly developed *path model* (see figure 1). Moreover, this study was the first to determine the relative importance of these mediators and the specific paths through which they exert their influence, the most relevant of which will be discussed in subsequent sections. To this aim, a large sample of young females ($N = 627$) from the general population was recruited, in contrast to other studies that have primarily focused on at-risk or older samples. Although these participants had a normal BMI, they reported moderate mental health impairments and exhibited higher levels of ED psychopathology, along with significant concerns regarding body weight and shape (see table 1).

The ***total effect (total)*** measures the overall association between ERD (predictor) and DECB (outcome), including both direct and indirect effects, and was found to be large ($\beta = 0.494$) in our analysis, suggesting a strong positive relationship between the two. This aligns with findings from previous studies (Leppanen et al., 2022; Peschel, Fürtjes, et al., 2024; A.-B. Prefit et al., 2019; Trompeter, Bussey, Forbes, et al., 2022) and is supported by therapeutic frameworks like *Integrative Cognitive-Affective Therapy*, which highlights ERD as a key component of DECB (Peterson et al., 2020; S. A. Wonderlich et al., 2014). In contrast, the ***direct effect (dir)*** quantifies the association between ERD and DECB, controlling for all mediators in the path model. It represents the portion of the total effect that persists after accounting for all mediators, was small in our study ($\beta = 0.101$) and explaining only 21% of the total effect. This indicates that most of the association between ERD and DECB is mediated. In this context, it should be noted that additional unmeasured mediator variables, if included in the path model, may have further lowered the size of the direct effect. These could include variables such as perfectionism, identity formation, or cognitive styles reflecting impulsivity like “jumping to conclusions” (Balzan et al., 2022; Donahue et al., 2018; Mohorić et al., 2023; Verschueren et al., 2018), which have been identified in previous research concerning various DECB and difficulties in impulse and emotion regulation. The ***total indirect effect (ind_tot)*** quantifies the portion of the total effect due to mediating variables, representing the cumulative association of all indirect paths through which ERD affects DECB. This effect was medium in size ($\beta = 0.393$) and

accounted for 79% of the total effect, indicating that the relationship between ERD and DECB is largely transmitted through these indirect paths. The *sum of all indirect effects (indTT)* from ERD via *both mediators m1 and m2* to DECB was found to be the largest of all indirect effects. This effect was of medium size ($\beta = 0.225$) and accounted for 57% of the total indirect effect and 46% of the total effect, thus demonstrating that a substantial portion of the association between ERD and DECB can be explained through both mediators (m1, m2).

To further dissect the mediation, the sum of all indirect effects running from ERD through *m1 mediators* directly to DECB, while *omitting m2 mediators (indT₋)*, was small ($\beta = 0.117$), accounting for 30% of the total indirect effect and 24% of the total effect, still indicating a substantial mediation through the m1 path alone on DECB. Conversely, the *sum of all indirect effects* running from ERD directly to the *m2 mediators*, then to DECB, while *omitting m1 mediators (ind₋T)*, was very small ($\beta = 0.051$), accounting for 13% of the total indirect effect and 10% of the total effect, indicating a comparatively small mediation through the m2 path alone. Although m2 mediators are relevant, they appear less central than m1 mediators, likely because their associations are more secondary or indirectly related to ERD, leading to a less dominant presence in relation to DECB. The *combined standardized indirect effect* of all m1 mediators via the *m2 mediator BD (indT1; $\beta = 0.184$)* was much higher than the one via the m2 mediator MD (*indT2; $\beta = 0.041$*). This indicates that in our female sample, dissatisfaction with their body is more strongly associated with DECB than symptoms of muscle dysmorphia. Moreover, the *difference* between these associations was highly significant, highlighting a substantially stronger mediation effect through BD compared to MD. Given the difference between the two effect sizes, BD's mediating paths in our sample may have stronger or more direct connections with DECB than MD.

Previous longitudinal studies have also identified BD as one of the major factors fostering DECB (Stice et al., 2017), highlighting it as a critical public health concern among young females (S. A. McLean et al., 2022). Especially young females with higher levels of ERD often exhibit higher levels of BD (Mueller et al., 2024), which frequently leads to a higher incidence of DECB (Hughes & Gullone, 2011a; Lucibello et al., 2024). On average, our female participants exhibited moderate to marked dissatisfaction with their bodies, even though most maintained a healthy weight (see table 1). BD may represent a developmental phase of 'normative discontent' in our sample, suggesting that the adherence to a culturally endorsed thin-ideal is prevalent and significantly associated with DECB. Conversely, MD was relatively low among young females, indicating that the desire to conform to a muscular-/athletic-ideal is not as pronounced and has a smaller adverse effect on eating behaviors in this study. Accordingly,

research has shown that females are more likely to engage in strategies to lose or control weight rather than pursuing muscularity-enhancing strategies (Cunningham et al., 2022; Nagata et al., 2022; Wyssen, Bryjova, et al., 2016). Among the indirect effects mediated by *specific m1 mediators* through combined m2 mediators, the most significant association was transmitted *via TSF-B (ind2T; $\beta = 0.146$)*. Moreover, of all indirect effects involving *specific m1 and/or m2 mediators*, the two most pronounced were those mediated by the *m1 mediator TSF-B* in conjunction with the *m2 mediator BD (ind21; $\beta = 0.124$)*, and those mediated by *TSF-B alone*, directly associated with DECB while omitting m2 mediators (*ind2_*; $\beta = 0.160$). This analysis highlights a notable difference in the impact of specific mediators on DECB. In particular, the paths involving body-related cognitive distortions either individually or in conjunction with BD consistently show stronger associations compared to other mediators (see table 2), underscoring the significant role of *cognitive* mechanisms on DECB. These findings are consistent with prior research, highlighting that body-related cognitive distortions are a common phenomenon in the daily lives of young females, who frequently encounter unrealistic thin-ideals, particularly on social media (Munsch, Messerli-Bürge, et al., 2021; Wyssen, Coelho, et al., 2016; Wyssen et al., 2017). Such threatening cognitions (e.g., "I want to limit my eating after imagining slim people") will heighten DECB, especially among young females who also exhibit higher dissatisfaction with their bodies (Dubois et al., 2016; Wyssen et al., 2020).

Recommendations for future studies and limitations

Several limitations and future recommendations should be acknowledged when evaluating the results of this study. To allow for the generalization of the findings to the general population and to increase external validity, it would be advantageous to replicate this study in a *more demographically diverse sample*, as most of the young females were university (51.0%) or high school students (39.0%; see table 1). Although substantial efforts were made to recruit participants from diverse educational backgrounds through social media ads, school and university on-site visits and mailing lists, flyers, youth clubs and by lowering barriers to participation (e.g., online registration, short-form questionnaires), the sample remained relatively homogenous. For future studies aiming to better represent the general youth population, we recognize the need to develop and implement additional recruitment strategies.

Moreover, *BMI* did not vary much among the female participants, as most of them fell within the normal BMI range. However, higher and lower BMI have been strongly associated with increased BD in various cross-sectional and longitudinal studies (Sarrar et al., 2020), along with the engagement in different DECB to lose weight in order to conform to specific

appearance-ideal (Sifre et al., 2024). Including diverse study groups in terms of education and weight status is crucial as it ensures that these groups also benefit from mental health research and that prevention and psychotherapy are tailored to their specific needs. To extend the findings of this study to clinical samples, the path model should be tested with a treatment-seeking sample that includes people with different subthreshold/threshold ED.

This study was partly conducted during the *COVID-19 pandemic* (28%, see table 1), likely affecting the daily routines of young females, increasing their media exposure, and reducing social support while limiting access to support services. Empirical findings indicate that during and after the COVID-19 pandemic, ERD worsened, and females increasingly became more preoccupied with appearance-ideals, reported greater concerns about their weight and shape, experienced higher BD, and consequently, showed more DECB (Peter et al., 2023; Schneider et al., 2023; Sifre et al., 2024; Simone et al., 2021). Accordingly, we controlled whether the assessment of the online questionnaires took place during the COVID-19 pandemic or thereafter.

Sexual orientation was included as a covariate due to mixed findings in the literature concerning young sexual minority females (e.g., bisexual, homosexual). Recent reviews (Bankoff & Pantalone, 2014; Breton et al., 2023; Parker & Harriger, 2020a) have highlighted both elevated risk and variability in DECB within these populations. In particular, bisexuality remains comparatively underexplored, and existing research remains limited and preliminary. Since sexual orientation was not the focus of the present publication, we chose to control for its potential contribution by including it as a covariate instead. This was especially relevant given that 16% of females in our sample identified as bisexual and 2.2% as homosexual (see table 1).

To minimize *conceptual overlap* between the two cognitive m1 mediators (internalized appearance-ideals, TSF-B) and the m2 mediators (BD, MD), only the restrained eating subscale from the EDE-Q8, which represents the behavioral component, was used to create the DECB variable. In contrast, concerns related to eating, shape, and weight, which are considered cognitive subscales, were excluded (Wyssen, Bryjova, et al., 2016). However, internalized appearance-ideals and MD show strong Pearson correlations ($r = 0.59$ and $r = 0.61$) and TSF-B and BD even stronger correlations ($r = 0.77$ and $r = 0.79$) with DECB (see table 6, supplementary material).

The study included a *limited range of DECB*, such as dietary restraint, binge eating, loss of control, and compensatory behaviors (e.g., excessive exercise, purging, and the use of laxatives; (Wyssen, Bryjova, et al., 2016)). This corresponds with other research that has similarly assessed DECB, showing that various DECB are commonly observed in young non-clinical

individuals (Peschel, Fürtjes, et al., 2024; Peschel, Sigrist, et al., 2024). However, to align with prevalent thin- or muscular-/athletic-ideals, previous studies have demonstrated that DECB are employed not only to reduce weight but also to enhance muscularity in an increasing number of young females (Cunningham et al., 2022; Nagata et al., 2022). To enhance the evaluation of the mediating role of MD in the path model, the study should have included additional DECB items relevant for muscle building. These should encompass high-protein intake, strength training, weightlifting, the cycling of bulking and cutting phases, adherence to rigid meal schedules, and the use of muscle-enhancing substances. Such approaches should also be adopted in future research aimed at identifying relevant gender differences, as these DECB reflect behaviors more commonly observed in males.

When analyzing mediation models, care must be taken when attempting to interpret the different pathways causally, as doing so necessitates numerous assumptions, including some that are particularly strict. These assumptions encompass directional pathways, the reliability of the mediators involved, the lack of confounding factors (i.e., all necessary covariates have been collected and included in the model), and the absence of interaction effects (i.e. the mediators' role on the outcome does not vary across different levels of the predictor). In the case of cross-sectional data, where the predictor variable has not been obtained via random assignment, such assumptions, especially causal precedence, cannot be evaluated.

In this line, it must be noted that even though there is theoretical plausibility regarding the assumed pathways in our model, its just-identified structure limits the possibility of evaluating the overall model. In other words, our model is not necessarily the most plausible one, simply because it is completely saturated. Alternative models could provide equally or even more plausible explanations for the same data, but with different theoretical implications. Such models could contain effects pointing in reversed directions. Thus, the directions of the effects as set up in our model are based on theoretical considerations and cannot be tested empirically. While our model is guided by theoretical frameworks that position ERD as a predictor of DECB, alternative directions – such as DECB exacerbating emotional dysregulation – are also supported in the literature (Haedt-Matt & Keel, 2011; Leppanen et al., 2022). Notably, clinical and theoretical work suggests that DECB may intensify ERD over time via mechanisms like guilt, shame, physiological disruption, or perceived loss of control (Haedt-Matt & Keel, 2011; Leppanen et al., 2022). This underscores the need for future longitudinal research to explore reversed or reciprocal pathways, as these may fit the data just as well as the model used in the current study.

While this publication did not include male participants due to the substantially smaller male sample size, which resulted in insufficient statistical power to test our comprehensive path model (see figure 1), a forthcoming study by our research group will aim to test a reduced version of the path model in a *mixed-gender sample* in order to explore *gender differences* (Mueller et al., n.d.-b). This is of particular interest, as previous studies have already demonstrated gender differences in TSF-B (Dubois et al., 2016) as well as BD (S. A. McLean et al., 2022; Widmer Howald et al., 2018) and indicated that females are more likely to use DECB to lose or control weight, whereas males tend to engage in muscularity-enhancing DECB (S. A. McLean et al., 2022; Nagata et al., 2022; Wyssen, Bryjova, et al., 2016). Future studies with larger male samples should also test the comprehensive path model and incorporate gender comparisons. Accordingly, the current findings do not yet allow conclusions to be drawn for males. Additionally, it could be advantageous to further explore and evaluate the characteristics involved in this path model in participants' natural environment through *ecological momentary assessment* (Peschel, Fürtjes, et al., 2024; Peschel, Sigrist, et al., 2024). This method might also provide insights into how contextual and temporal factors influence these relationships. For example, current research has indicated a noticeable increase in DECB during periods of examination stress in college students (Sifre et al., 2024), which is particularly relevant since most of our participants are either at university or senior high school (see table 1). Moreover, exposure to thin-ideals on social media can heighten cognitive distortions such as TSF-B, BD and subsequently DECB (Aparicio-Martinez et al., 2019; Munsch, Messerli-Bürky, et al., 2021). Employing repeated sampling in real time will reduce recall bias inherent in retrospective questionnaire-based assessments, thereby enabling more precise evaluations of the experiences, cognitions, and behaviors in the daily lives of young females. Finally, while this study focused on cross-sectional associations, conducting longitudinal studies to explore the stability of the path model and the postulated sequence of the mediators would be highly beneficial. This would help to determine whether the variables included are indeed linked to a heightened risk for the development of subthreshold/threshold ED in young females.

Theoretical and clinical implications

The present study emphasizes the importance of including DECB in future research, as they are highly prevalent among females during adolescence and early adulthood (Peschel, Sigrist, et al., 2024; Peter et al., 2023). If left unaddressed, they may progress to the development of sub-threshold/threshold ED and other mental health issues, incurring substantial individual and societal costs (Glazer et al., 2019).

Theoretical implementations: The current version of the CBT-E model suggests that the over-evaluation of weight and shape (referred to as BD), along with ERD, interpersonal difficulties, perfectionism, and low self-esteem drive ED psychopathology, including DECB (Trompeter et al., 2021). Building on the existing literature, this study aimed to further expand the CBT-E model by investigating ERD as a predictor of DECB and integrating two sets of serially linked key mediators that shape this relationship, all within a comprehensive path model. The results, like those of Trompeter et al. (Trompeter et al., 2021) confirm that ERD is a significant predictor. However, this study also demonstrated that its association with DECB is primarily mediated by body-related cognitive distortions, either alone or in conjunction with dissatisfaction with one's own body. This suggests that the current CBT-E model should be expanded as it does not yet include cognitive mechanisms. The findings from the serially linked key mediators also suggest that TSF-B intensifies BD in our cross-sectional study. Importantly, addressing the sequence of mediators could help mitigate cascading negative effects, where cognitive biases triggered by imagining unrealistic thin-ideals and the over-evaluation of weight/shape exacerbate DECB in young individuals whose emotion regulation abilities are already compromised. Based on this, the configuration of variables within the CBT-E model should be reevaluated and eventually revised, especially if our results can be replicated in further cross-sectional and longitudinal studies as well as in daily life across clinical and community samples of different genders.

Clinical implementations: To mitigate the protracted course of DECB, early detection and targeted intervention strategies are essential (cf. recommendations from national guidelines; (Herpertz et al., 2011)). Thus, the findings from our study, which identify TSF-B and BD as key mediators between ERD and DECB in young females, could significantly enhance the development of more effective prevention and intervention programs by raising clinicians' awareness of these mediators' roles in the development and maintenance of DECB. Furthermore, if future research including both female and male participants diagnosed with different

types of ED confirms these results, it will be crucial to incorporate them into clinical practices such as *Integrative Cognitive-Affective Therapy*, which already recognizes ERD as a critical element of DECB (Peterson et al., 2020; S. A. Wonderlich et al., 2014). Young females struggling to regulate their maladaptive emotions may be particularly vulnerable to body-related distorted information processing. This can lead to higher dissatisfaction with their own bodies and, ultimately, to DECB. Consequently, future therapeutic approaches should target TSF-B and incorporate in-session strategies such as exposure to triggers which activate body-related cognitive distortions, identifying individual cognitive distortions through 'thinking out aloud' tasks, and conducting corrective interventions aimed at detaching from those (cf. (Wyssen et al., 2020)). Moreover, it is crucial to include strategies to reduce and cope with BD (e.g. concerns about weight/shape) in prevention and intervention programs, thereby challenging negative feelings resulting from BD and fostering healthier body image and self-perception. Awareness campaigns could also be launched to educate young females about the impact of social media on BD. Additionally, promoting body appreciation from childhood can act as a protective factor against the development of BD.

Conclusion

This study is the first to examine a comprehensive path model incorporating multiple mediators to investigate the relationship between ERD and DECB in a large sample of young females. The identification of TSF-B and BD as key mediators highlights the importance of addressing maladaptive information processing in prevention and intervention efforts, and of refining theoretical models. Finally, this study adds valuable insight to the existing literature on the development and maintenance of subthreshold and threshold ED.

Supplementary Material

TABLE 3 | *Composition of the DECB outcome measure*

English version	German version
Item 1 (EDE-Q8, restrained eating): Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	Item 1 (EDE-Q8, gezügeltes Essverhalten): Hast Du bewusst versucht, die Nahrungsmenge, die Du gegessen hast, zu begrenzen, um Deine Figur oder Dein Gewicht zu beeinflussen (unabhängig davon, ob es Dir tatsächlich gelungen ist)?
Item 2 (EDE-Q8, avoidance of foods): Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	Item 2 (EDE-Q8, Vermeidung von Nahrungsmitteln): Hast Du versucht, Nahrungsmittel, die Du magst, von Deiner Ernährung auszuschliessen, um Deine Figur oder Dein Gewicht zu beeinflussen (unabhängig davon, ob es Dir tatsächlich gelungen ist)?
Item 13 (EDE-Q): Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)?	Item 13 (EDE-Q): Wie oft hast Du während der letzten 28 Tage (vier Wochen) eine Nahrungsmenge gegessen, die andere Menschen als ungewöhnlich gross ansehen würden?
Item 14 (EDE-Q): On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?	Item 14 (EDE-Q): In wie vielen dieser Situationen, in denen Du zu viel gegessen hast, hattest Du in den letzten 28 Tagen (vier Wochen) das Gefühl, die Kontrolle über Dein Essverhalten verloren zu haben (während des Essens)?
Item 15 (EDE-Q): Over the past 28 days, on how many days have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?	Item 15 (EDE-Q): An wie vielen der letzten 28 Tage (vier Wochen) ist es vorgekommen, dass Du eine ungewöhnlich grosse Nahrungsmenge gegessen hast und das Gefühl hattest, die Kontrolle über Dein Essverhalten verloren zu haben?
Items 16–18 (combined into one variable): Over the past 28 days, how many times have you vomit (item 16), taken laxatives (item 17) or exercised in a “driven” or “compulsive” way (item 18) as a means of controlling your shape or weight?	Items 16–18 (combined into one variable): Wie oft hast Du während der letzten 28 Tage (vier Wochen) Erbrechen selbst herbeigeführt (Item 16), Abführmittel eingenommen (Item 17) oder zwanghaft Sport getrieben (Item 18) um Deine Figur oder Dein Gewicht zu kontrollieren?

Note. For the outcome measure of this study, a new variable was created to assess DECB, following the approach established by Wyssen et al. (Wyssen, Coelho, et al., 2016). The DECB variable involves the behavioral subscale restrained eating from the EDE-Q8 (items 1-2; (Kliem et al., 2016)) and four additional behavioral items from the original EDE-Q (items: 13-18; (Hilbert & Tuschen-Caffier, 2016)).

TABLE 4 | Partitioning of the total effect between ERD and DECB into the different indirect effects and the direct effect. Estimates based on data without outliers.

Defined Parameter	b	SE	z	p	β
total	0.992	0.067	14.847	0.000	0.533
dir	0.192	0.066	2.901	0.004	0.103
ind_tot	0.800	0.074	10.873	0.000	0.430
indTT	0.454	0.057	7.978	0.000	0.244
indT_	0.217	0.070	3.104	0.002	0.116
ind_T	0.130	0.032	4.083	0.000	0.070
indT1	0.361	0.054	6.752	0.000	0.194
indT2	0.093	0.023	4.076	0.000	0.050
indTDifl2	0.269	0.059	4.527	0.000	0.144
ind1T	0.093	0.017	5.463	0.000	0.050
ind2T	0.303	0.040	7.571	0.000	0.162
ind3T	0.012	0.006	2.194	0.028	0.007
ind4T	0.075	0.023	3.256	0.001	0.040
ind5T	-0.029	0.012	-2.371	0.018	-0.015
ind11	0.074	0.015	5.089	0.000	0.040
ind12	0.019	0.007	2.660	0.008	0.010
ind21	0.257	0.038	6.768	0.000	0.138
ind22	0.045	0.012	3.689	0.000	0.024
ind31	0.014	0.006	2.342	0.019	0.008
ind32	-0.002	0.001	-1.592	0.111	-0.001
ind41	0.040	0.018	2.252	0.024	0.021
ind42	0.035	0.012	2.848	0.004	0.019
ind51	-0.024	0.010	-2.506	0.012	-0.013
ind52	-0.004	0.005	-0.800	0.423	-0.002
ind1_	-0.036	0.029	-1.239	0.215	-0.019
ind2_	0.335	0.051	6.556	0.000	0.180
ind3_	0.002	0.005	0.348	0.728	0.001
ind4_	0.011	0.048	0.238	0.812	0.006
ind5_	-0.096	0.027	-3.570	0.000	-0.052

Note. **total** = total effect between predictor and outcome; **dir** = direct effect for the association between predictor and outcome; **ind_tot** = sum of all indirect effects (total minus dir); **indTT** = indirect effect running via both mediators m1 and m2; **indT_** = indirect effect running via m1 mediators and then directly to the outcome (omitting m2 mediators); **ind_T** = indirect effect running from the predictor directly to the m2 mediators (omitting m1 mediators) and then to the outcome; **indT1** = combined standardized indirect effect of all m1 mediators via the m2 mediator BSQ-8C; **indT2** = combined standardized indirect effect of all m1 mediators via the m2 mediator MDDI; **indTDifl2** = difference between indT1 and indT2; **ind11 to ind52** = all indirect effects concerning one specific m1 and m2 mediator, **ind1T to ind5T** = all indirect effects of specific m1 mediators via the combined m2 mediators; **ind1_ to ind5_** = all indirect effect via m1 mediators (omitting m2 mediators), **ind11 to ind52, ind1_ to ind5, ind_1 to ind_2**, = all indirect effects concerning specific m1 and/or m2 mediators.

TABLE 5 | Path coefficients of the Path Model Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behavior

Defined Parameter	b	SE	z	p	β
DERS-SF $\rightarrow$ SATAQ-G-Int	0.285	0.026	11.013	0.000	0.421
DERS-SF $\rightarrow$ TSF-B-Con	0.939	0.067	13.968	0.000	0.502
DERS-SF $\rightarrow$ BMI	0.016	0.007	2.485	0.013	0.104
DERS-SF $\rightarrow$ BDI-FS	0.809	0.030	26.899	0.000	0.734
DERS-SF $\rightarrow$ SIAS-6	0.302	0.020	14.952	0.000	0.530
DERS-SF $\rightarrow$ BSQ-8C	0.076	0.033	2.336	0.019	0.067
SATAQ-G-Int $\rightarrow$ BSQ-8C	0.324	0.044	7.428	0.000	0.193
TSF-B-Con $\rightarrow$ BSQ-8C	0.367	0.017	21.410	0.000	0.605
BMI $\rightarrow$ BSQ-8C	1.248	0.136	9.198	0.000	0.172
BDI-FS $\rightarrow$ BSQ-8C	0.101	0.030	3.429	0.001	0.098
SIAS-6 $\rightarrow$ BSQ-8C	-0.085	0.044	-1.928	0.054	-0.043
DERS-SF $\rightarrow$ MDDI	0.164	0.042	3.916	0.000	0.190
SATAQ-G-Int $\rightarrow$ MDDI	0.178	0.056	3.189	0.001	0.139
TSF-B-Con $\rightarrow$ MDDI	0.164	0.022	7.443	0.000	0.353
BMI $\rightarrow$ MDDI	-0.469	0.174	-2.697	0.007	-0.085
BDI-FS $\rightarrow$ MDDI	0.122	0.038	3.219	0.001	0.155
SIAS-6 $\rightarrow$ MDDI	-0.046	0.056	-0.812	0.417	-0.030
DERS-SF $\rightarrow$ DECB	0.189	0.072	2.643	0.008	0.101
SATAQ-G-Int $\rightarrow$ DECB	-0.083	0.099	-0.839	0.401	-0.030
TSF-B-Con $\rightarrow$ DECB	0.318	0.050	6.415	0.000	0.319
BMI $\rightarrow$ DECB	-0.055	0.320	-0.171	0.864	-0.005
BDI-FS $\rightarrow$ DECB	0.058	0.065	0.891	0.373	0.034
SIAS-6 $\rightarrow$ DECB	-0.342	0.096	-3.567	0.000	-0.104
BSQ-8C $\rightarrow$ DECB	0.669	0.091	7.381	0.000	0.408
MDDI $\rightarrow$ DECB	0.270	0.071	3.808	0.000	0.126

Note. b denotes the estimate of a specific path coefficient (with β denoting its standardized value), SE denotes the standard error of the path coefficient, z denotes the test statistics for a test against 0, and p the corresponding observed significance level.

TABLE 6 | Correlation table of all variables in the path model

	Sexual orientation (heterosexual)	Sexual orientation (homosexual)	Sexual orientation (bisexual)	Covid (during/after restrictions)	DERS-SF (total score)	SATAQ-G-Int (internalization subscale)	TSF-B-Con (concept subscale)	BMI (kg/m ²)	BDI-FS (total score)	SIAS-6 (total score)	BSQ-8C (total score)	MDDI (total score)	DECB (total score)
Sexual orientation (heterosexual)	1.00	-0.30	-0.82	-0.12	-0.19	0.00	-0.05	-0.03	-0.19	-0.16	-0.07	-0.05	-0.06
Sexual orientation (homosexual)	-0.30	1.00	-0.07	0.05	0.14	0.05	0.08	-0.03	0.13	0.13	0.06	0.11	0.08
Sexual orientation (bisexual)	-0.82	-0.07	1.00	0.09	0.19	0.02	0.05	0.05	0.18	0.15	0.07	0.02	0.05
Covid (during/after restrictions)	-0.12	0.05	0.09	1.00	0.21	0.18	0.23	0.14	0.24	0.16	0.23	0.24	0.25
DERS-SF (total score)	-0.19	0.14	0.19	0.21	1.00	0.43	0.52	0.13	0.76	0.55	0.54	0.53	0.52
SATAQ-G-Int (internalization subscale)	0.00	0.05	0.02	0.18	0.43	1.00	0.73	0.22	0.44	0.36	0.73	0.53	0.59
TSF-B-Con (concept subscale)	-0.05	0.08	0.05	0.23	0.52	0.73	1.00	0.30	0.53	0.38	0.87	0.61	0.77
BMI (kg/m ²)	-0.03	-0.03	0.05	0.14	0.13	0.22	0.30	1.00	0.14	0.03	0.42	0.11	0.29
BDI-FS (total score)	-0.19	0.13	0.18	0.24	0.76	0.44	0.53	0.14	1.00	0.55	0.56	0.53	0.51
SIAS-6 (total score)	-0.16	0.13	0.15	0.16	0.55	0.36	0.38	0.03	0.55	1.00	0.35	0.34	0.27
BSQ-8C (total score)	-0.07	0.06	0.07	0.23	0.54	0.73	0.87	0.42	0.56	0.35	1.00	0.63	0.79
MDDI (total score)	-0.05	0.11	0.02	0.24	0.53	0.53	0.61	0.11	0.53	0.34	0.63	1.00	0.61
DECB (total score)	-0.06	0.08	0.05	0.25	0.52	0.59	0.77	0.29	0.51	0.27	0.79	0.61	1.00

Note. Pearson correlations around ± 0.10 are considered small, around ± 0.30 moderate, and ± 0.50 or higher strong. DERS-SF = Emotion Regulation Difficulties short-form; SATAQ-G-Int = Sociocultural Attitudes Towards Appearance Questionnaire; TSF-B-Con = Thought-Shape Fusion Body Trait Questionnaire; BMI = Body mass index; BDI-FS = Beck Depression Inventory Fast Screening; SIAS-6 = Social Interaction Anxiety Scale short-form; BSQ-8C = Body Shape Questionnaire; MDDI = Muscle Dysmorphic Disorder Inventory; DECB = Disturbed Eating and Compensatory Behavior. The DECB variable involves the subscale restrained eating from the EDE-Q8 (items 1-2;(Kliem et al., 2016)) and four additional items from the EDE-Q (items: 15-18; (Hilbert & Tuschen-Caffier, 2016)).

Publication III: Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behaviors in Adolescents and Young Adults: A Path Model Analysis

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Abstract

Background: A rising number of adolescents and young adults exhibit disturbed eating and compensatory behaviors (DECB), with studies showing that elevated levels during adolescence not only persist into early adulthood but also contribute to the onset of subthreshold/threshold eating disorders. Emotion regulation difficulties (ERD) are consistently recognized as a transdiagnostic risk factor in the development and maintenance of various DECB. This study aimed to investigate multiple mediating mechanisms between ERD and DECB within a newly developed path model in a mixed-gender sample of adolescents and young adults to determine if these paths are gender-specific. **Methods:** A total of 803 adolescents and young adults (83% female, mean age 19.97, $SD = 2.54$) participated in a cross-sectional online-questionnaire study. **Results:** Across both genders the results highlighted body-related cognitive distortions (TSF-B), either alone ($\beta = 0.142, p < 0.000$), or in conjunction with body dissatisfaction ($\beta = 0.154, p < 0.000$), as key mediator in the association between ERD and DECB. **Conclusions:** Notably, the pathway linking ERD through TSF-B and body dissatisfaction to DECB was much stronger in females than in males. Taken together, these findings highlight the need and potential benefits of tailoring prevention and intervention programs to gender-specific nuances in information processing. Further cross-sectional and longitudinal research in both clinical and community samples will help to specify models like the transdiagnostic model of eating disorders (CBT-E) across different genders and enhance therapeutic frameworks such as Integrative Cognitive-Affective Therapy.

Background

Research has shown that *disturbed eating* (e.g., restricting food intake, binge-eating) and *compensatory behaviors* (e.g., purging, excessive exercise) (**DECB**) represent a major public health concern, often developing during adolescence and continuing into early adulthood (Cosh et al., 2023; Glazer et al., 2019; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Rauen et al., 2025; Schuck et al., 2018). DECB do not meet the criteria for an eating disorder diagnosis according to the Diagnostic and Statistical Manual for Mental Disorders (American Psychiatric Association, 2013), due to their insufficient frequency and severity. Nevertheless, high levels of DECB during adolescence not only persist into early adulthood but also lead to significant distress and contribute to the development of subthreshold or threshold eating disorders (Foster et al., 2024; Glazer et al., 2019; Herpertz-Dahlmann et al., 2015; Stice et al., 2017; Yamamiya et al., 2023; Yamamiya & Stice, 2024). Additionally, DECB are often associated with physical and mental health problems in young people, including unhealthy body weight, low self-esteem, negative body image, depression, suicidal ideation, and anxiety (Hansson et al., 2016; Hansson & Schmidt, 2025; Loose et al., 2023; Loth et al., 2014; Rohde et al., 2015). Therefore, DECB significantly impact the development and quality of life of adolescents and young adults, reinforcing its status as a critical public health concern. Recent data from Switzerland show that approximately 32% of females and 17% of males aged between 15 and 24 exhibit DECB (Peter et al., 2023). Other studies also found a greater incidence in females than in males, with gender differences becoming more pronounced during adolescence (Hansson et al., 2016; Herpertz-Dahlmann et al., 2015; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018). Notably, young males are underrepresented in DECB research, despite a significant number engaging in pathological eating behaviors. Given that gender plays a crucial role in the persistence, etiology, and manifestation of DECB (Hansson et al., 2016; Klimek et al., 2018; Lafrance Robinson et al., 2014; Mond et al., 2014; Nagata et al., 2020), greater attention for this group is warranted in future studies (Foster et al., 2024; Hansson & Schmidt, 2025; Klimek et al., 2018). Amid the COVID-19 pandemic, the prevalence and severity of DECB increased due to heightened stress, social isolation, and changes in daily routines, especially among young people and those with subthreshold/threshold eating disorders (Baceviciene & Jankauskiene, 2021; C. P. McLean et al., 2022; Simone et al., 2021). Therefore, early detection and intervention of DECB in both genders, combined with a comprehensive understanding of its contributing factors, are crucial for reducing the negative long-term impact of subthreshold/threshold eating disorders (Trompeter, Bussey, Forbes, et al., 2022; Turel et al., 2018).

Emotion regulation difficulties (ERD) are widely recognized as the most relevant *transdiagnostic risk factors* contributing to the development and maintenance of various DECB in young people (Hansson et al., 2016; Hughes & Gullone, 2011a; Leppanen et al., 2022; Morin & Meilleur, 2024; Peschel, Fürtjes, et al., 2024; A.-B. Prefit et al., 2019; Sander et al., 2021; Warne et al., 2023). They include problems in identifying emotions or employing adaptive regulatory strategies and are especially common among adolescents and young adults whose emotion regulation abilities are still developing (35,36). Numerous studies, both cross-sectional and longitudinal, have established that ERD are associated with higher incidences of DECB across both clinical and community-based youth samples (Della Longa & De Young, 2018; Dworschak et al., 2023; Félix et al., 2025; Goldschmidt et al., 2017a; Leppanen et al., 2022; Mikhail et al., 2024; Mikhail & Kring, 2019; Trompeter et al., 2021). For instance, people from the general population exhibiting DECB reported more ERD (e.g. lack of emotional awareness, clarity, acceptance) and greater use of maladaptive emotion regulation strategies (e.g., rumination, avoidance, suppression) compared to controls without DECB (s. meta-analysis by Prefit et al. (A.-B. Prefit et al., 2019)).

Prompted by previous findings, Trompeter et al. (40) expanded the original *transdiagnostic model of eating disorders* (CBT-E model; (Fairburn et al., 2003)) by adding ERD as a crucial underlying mechanism of DECB, alongside the overvaluation of weight and shape (commonly referred to as body dissatisfaction). A recent study conducted by our research group identified a significant positive cross-sectional association between body dissatisfaction and ERD in adolescents and young adults (Mueller et al., 2024). This finding aligns with earlier work demonstrating the role of ERD in both the onset and maintenance of body dissatisfaction (Cunningham, Szabo, et al., 2020a; Hansson et al., 2016). These results are consistent with previous research and underscore the predictive role of ERD in the onset and maintenance of body dissatisfaction in young people (Bornioli et al., 2019; Cunningham, Szabo, et al., 2020a; Hughes & Gullone, 2011a; Lucibello et al., 2024; Morin & Meilleur, 2024).

Body dissatisfaction can be defined as a person's negative subjective perceptions and feelings of their body, which often involves a discrepancy between one's actual body and one's idealized body (Grogan, 2021). This includes concerns about body weight, shape, muscularity, and tone (Klimek et al., 2018; S. A. McLean et al., 2022; Vuong et al., 2021; White et al., 2023). Specifically, it manifests as distress over not achieving a culturally endorsed *appearance-ideal*, such as the thin- or muscular/athletic-ideal (Homan, 2010; C. P. McLean et al., 2022; White et al., 2023). Therefore, body dissatisfaction has emerged as one of the most robust

risk factors in the development and maintenance of subthreshold/threshold eating disorders (Shagar et al., 2017; Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024). While body dissatisfaction has long been prevalent among young females and is increasingly observed among young males, current studies indicate that females predominantly report higher levels of body dissatisfaction than males (Dubois et al., 2016; Mueller et al., 2024; Purton et al., 2019; Ruisoto et al., 2015). Additionally, there is a significant gender difference in the direction of body dissatisfaction: while females often feel pressured to be thin, males' concerns tend to be two-dimensional, revolving around either increasing muscularity and/or achieving leanness, with less focus on weight loss (Hansson & Schmidt, 2025; Klimek et al., 2018; Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015). As such, each appearance-ideal is associated with different forms of DECB, such as dietary restraint or strength training (Cunningham et al., 2022; Klimek et al., 2018; Nagata et al., 2022; Viborg et al., 2018; Vuong et al., 2021; Wyssen, Bryjova, et al., 2016). Body dissatisfaction is particularly widespread during adolescence and early adulthood, a developmental period marked by significant body changes and increasing self-consciousness and criticism of one's body (Bucchianeri et al., 2013; Reel et al., 2015; Wang et al., 2019). It is therefore often described as *normative discontent* (S. A. McLean et al., 2022; Rohde et al., 2015; Schuck et al., 2018). A study conducted in Switzerland revealed that merely 35% of females and 56% of males aged between 13 and 17 expressed satisfaction with their appearance (Widmer Howald et al., 2018). These numbers are comparable with previous research conducted in other Western youth samples (Hoffmann & Warschburger, 2018; S. A. McLean et al., 2022; Meschberger-Annweiler et al., 2024; Wang et al., 2019).

Exposure to appearance ideals is a common aspect of young people's everyday lives. ***Thought-shape fusion (TSF-B)*** refers to body-related cognitive distortions (Shafran et al., 1999), whereby merely imagining unrealistic appearance ideals can trigger negative evaluations of one's body. Such cognitive processes have been linked to reduced psychological flexibility and a more negative body image (Coelho et al., 2015; Dubois et al., 2016; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016; Wyssen et al., 2018). This can lead to beliefs in actual weight gain, feelings of fatness and the perception of moral wrongdoing, especially when failing to achieve appearance-ideals. Previous research indicates that people with eating disorders reveal higher values of TSF-B (Coelho et al., 2015; Mason et al., 2021; Wyssen et al., 2018). Thus, TSF-B should be recognized as a critical *cognitive* correlate of the phenomenology and etiology of subthreshold/threshold eating disorders. Given the regular exposure of young people to unrealistic appearance-ideals, especially through image-based social media

platforms (Munsch, Messerli-Bürgy, et al., 2021), it is crucial to investigate the role of TSF-B and its potential negative impacts on DECB in non-clinical samples from the general population. Prior studies have found that body-related cognitive distortions occur in both young females and males, with females displaying significantly higher levels of TSF-B (Dubois et al., 2016; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016). Earlier work by our research group has demonstrated that body-related cognitive distortions increase the vulnerability of young people to body dissatisfaction, which in turn enhances the probability of DECB (Munsch, Messerli-Bürgy, et al., 2021; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016; Wyssen et al., 2020). Moreover, a recent study by our research group identified body-related cognitive distortions – either alone or in combination with body dissatisfaction – as key mediators in the association between ERD and DECB among young females (Mueller et al., 2025). To date, TSF-B remains a relatively understudied cognitive distortion, particularly among young males. This gap is notable given the growing relevance of information processing styles in the context of the continuously increasing use of social media, resulting in a lack of studies examining its role in the development and maintenance of DECB.

Both higher and lower *body mass index (BMI)* have been strongly associated with increased DECB and body dissatisfaction among young people in various cross-sectional and longitudinal studies (Blundell et al., 2024; Chu et al., 2021; Frederick et al., 2022; Meschberger-Annweiler et al., 2024; Morin & Meilleur, 2024; Pedalino & Camerini, 2022; Rosenqvist et al., 2024; Sarrar et al., 2020). Research also highlights significant gender differences regarding BMI. For example, females with obesity tend to be more dissatisfied with their bodies compared to their normal-weight peers or obese males (Weinberger et al., 2016). Furthermore, females consistently report higher levels of body dissatisfaction, even when their BMIs are lower than those of males (see meta-analysis by Weinberger et al. (Weinberger et al., 2016)). This increased dissatisfaction among young females with higher BMI is likely driven by societal pressures to conform to a specific thin-ideal. Therefore, many young females frequently engage in weight-loss oriented DECB such as fasting, skipping meals, or purging (Chu et al., 2021; Lafrance Robinson et al., 2014; S. A. McLean et al., 2022; Mohorić et al., 2023; Ruisoto et al., 2015; Sifre et al., 2024). In contrast, young males with lower BMI often resort to muscle-enhancing DECB to increase their weight to gain muscular volume, striving to meet a muscular-/athletic-ideal (33,57,59,60). Additionally, some studies have explored the connections among ERD, BMI, and DECB (Casagrande et al., 2020; Lafrance Robinson et al., 2014).

For instance, findings from a non-clinical undergraduate sample indicate that BMI and specific ERD positively correlate with DECB (Lafrance Robinson et al., 2014).

The period of adolescence and young adulthood is not only critical for the development of eating disorders but also represents a vulnerable phase for the development of depressive symptoms and depressive disorders, which are the most common comorbidity in subthreshold/threshold eating disorders at that age (American Psychiatric Association, 2013; Swanson et al., 2011). People diagnosed with lifetime major depression are four times more likely to develop eating disorder psychopathology (Garcia et al., 2020). Additionally, multiple studies have documented that *negative mood* significantly influences DECB, especially among young people experiencing ERD (Hansson et al., 2016; A. B. Prefit & Szentagotai-Tătar, 2018; Sander et al., 2021; J. A. Wonderlich et al., 2022). However, most of this research has focused on clinical samples, with a notable lack of data from community-based youth samples. Moreover, negative mood has been linked to increased body dissatisfaction (Brechan & Kvaalem, 2015; Ferreira et al., 2012; Gitimu et al., 2016; Hansson et al., 2016; Liechty & Lee, 2013; Sander et al., 2021). However, there is a notable lack of comparative research on how these relationships differ between young females and males.

According to the Dual Pathway Model (Stice, 1994), risk factors for DECB interact in a temporal sequence, with one emerging after another (Stice & Van Ryzin, 2019). Body dissatisfaction has been identified as a primary driver of DECB (Stice, 2001). More recent research underscores the need to re-evaluate mediational etiological models, including the Dual Pathway Model, by explicitly incorporating multiple mediators (Yamamiya & Stice, 2024). Building on this literature, the present study extended the revised CBT-E model (Trompeter et al., 2021) by developing and testing a comprehensive path model (see figure 1) linking ERD (*predictor*) to DECB (*outcome*). The primary aim of our study was to investigate the mechanisms underlying this association, and to assess potential gender differences. For this purpose, we refined a previously tested path model of DECB that had been examined exclusively in young females by our research group (Mueller et al., 2025). Due to the significantly lower participation rate of males in our study, we were compelled to simplify the original path model of DECB by excluding some mediators, which was necessary to investigate gender differences. More details on these adjustments can be found in the discussion section.

The path model of DECB in this study integrates two sets of serially linked mediators: *m1*, covering *cognitive* (distortion), *physiological* (body mass index), and *psychological*

(negative mood) factors; and *m2*, focusing on a *body image-related factor* (body dissatisfaction). The deliberate ordering of these mediators is crucial, as it establishes body dissatisfaction as an *m2* mediator whose vulnerability is heightened by the preceding *m1* mediators. With the inclusion of multiple mediators arranged both serially and in parallel, this path model allows for the examination of various pathways, highlighting how these multiple mediators each play a role in linking ERD to DECB. This model addresses a notable research gap, as previous studies have not explored such a comprehensive path model of DECB within a sample of female and male adolescents and young adults from the general population. Moreover, this study represents an initial exploratory step toward identifying which of the selected *m1* and *m2* mediators play a substantial role in linking ERD to DECB, and which may exert a weaker influence, while considering potential gender differences.

Methods

Aim, Design and Setting

This online-questionnaire study is part of a larger research project, the Binge-Eating Adolescent and Young Adults Treatment (i-BEAT; (97)) conducted at the University of Fribourg, Switzerland. Launched in April 2021, the study's overarching aim was to investigate the determinants of mental health, particularly disordered eating behaviors, in a general German-speaking sample of adolescents and young adults. In this cross-sectional study, baseline assessments were used. Registration for participants was facilitated through the study's website. Afterwards, participants were sent an email containing a link to the online-questionnaire hosted on Qualtrics, where they were first presented with the study information and aims and required to give online informed consent to proceed. The questionnaire commenced with questions on sociodemographic characteristics and was followed by a series of mental health questionnaires (for the selection used in this study, refer to the measures section; for a comprehensive overview, see (Munsch, Forrer, et al., 2021)). Completing the questionnaire took approximately 30–45 minutes and was anonymous. A progress bar displayed the completion percentage. Participants' email addresses were used to create a unique 64-digit ID to link responses from this part of the study to other sub-studies securely. The SHA-256 algorithm was used for the encryption process. The study received approval from the Cantonal Ethics Committee of Bern and was registered (Study ID: 2019-01277; DRKS-ID: DRKS00023706).

Participants

Between April 2021 and November 2024, a total of 803 participants were enrolled in the study, comprising 670 females and 133 males. Inclusion criteria for participation were age (14–24 years), sufficient German language skills, absence of pregnancy or lactation, and provision of online written informed consent. Recruitment targeted the general youth population and was conducted via social media (e.g., Instagram), mailing lists, and on-site visits at local schools and universities, youth clubs (e.g., sports teams), flyers, newspapers, and mental health institutions in Switzerland and Germany. Psychology students from the University of Fribourg (Switzerland) received course credits for their participation. No financial compensation was provided.

Instruments

To assess the sociodemographic characteristics of the sample, the online-questionnaire included self-reported items on current age (in years), nationality, education, sexual orientation, social media use, average screen time, current body weight (in kg) and height (in cm).

In this study, the *predictor* ERD was assessed using the short-form of the **Difficulties in Emotion Regulation Scale (DERS-SF; original: (98))**. At present, no officially validated German version of the DERS-SF is available. Therefore, we used the well-validated and widely applied German translation of the original full DERS (Gratz & Roemer, 2004), selecting the same items for each shortened subscale as the original DERS-SF (Kaufman et al., 2016). The DERS-SF includes 18 items rated on a 5-point Likert scale (1 = almost never; 5 = almost always), forming six subscales: lack of emotional clarity (*clarity*), lack of emotional awareness (*awareness*), difficulties engaging in goal-directed behavior (*goals*), non-acceptance of emotional responses (*non-acceptance*), impulse control difficulties (*impulse*) and limited access to emotion regulation strategies (*strategies*). Higher mean scores in each subscale (range: 1–5) indicate more pronounced difficulties in this aspect of emotion regulation. The DERS-SF total score (range: 18–90), calculated as a sum of all items, was used to provide a comprehensive assessment of overall ERD. In our sample, the internal consistency was deemed suitable for use among adolescents and young adults, evidenced by Cronbach's alpha and McDonald's omega being 0.91 and 0.93, respectively (female: 0.91, 0.89; male: 0.93, 0.93).

For the *outcome measure* of this study, a new variable was created to assess **DECB**, following the approach established by Wyssen et al. (71). The DECB variable includes the behavioral subscale *restrained eating* from the EDE-Q8 (items 1-2; (99)) and four *additional items* from the original EDE-Q (items: 15–18; (100)). EDE-Q8 items assessing eating, shape, and weight concerns were omitted in the DECB variable to avoid conceptual overlap between the cognitive m1 mediator TSF-B-Con and the m2 mediator BSQ-8C. Ratings for the two EDE-Q8 items range from 0 to 6, while the EDE-Q items capture the frequency of behaviors like binge-eating, self-induced purging, laxative use, and exercising over the last 28 days, coded as follows (71): 0 days/events = 0; 1–5 days = 1; 6–12 days = 2; 13–15 days = 3; 16–22 days = 4; 23–27 days = 5; 28 days or more = 6. A detailed overview of the specific items used to construct the DECB variable can be found in table 3 in the supplemental material. Notably, while Wyssen et al. (71) included only items from the 'restrained eating' subscale of the original EDE-Q, which contains five items, this study utilized the shorter EDE-Q8 version with just two items (Mueller et al.,

2025). Nevertheless, the internal consistency of our measures, as indicated by Cronbach's alpha and McDonald's omega of 0.88 and 0.93, respectively (female: 0.88, 0.94; male: 0.86, 0.92).

Assessment of the m1 mediators:

Body-related cognitive distortions were measured with the **Thought-Shape Fusion Body Questionnaire (TSF-B-Con;** original: (101); German: (102)). In this study, we only used the 12-item *concept scale*, divided into two subscales: *imagination of appearance-ideals* (items 1, 2, 8, 9, 10) and *striving for one's appearance-ideal* (items 3–7, 11, 12). Each item was rated on a 5-point Likert scale from 0 (not at all) to 4 (totally/always), where higher sum scores indicate more pronounced body-related cognitive distortions (range: 0–48). The female and male versions of the TSF-B targeted cognitive distortions concerning thin-/ vs. muscular-/athletic-ideals (e.g., "I feel fatter after picturing thin women" vs. "I feel slimmer after imagining muscular man"). Cronbach's alpha and McDonald's omega in the present sample were 0.90 and 0.91, respectively (female: 0.95, 0.96; male: 0.89, 0.92).

Body mass index (BMI) was calculated using self-reported weight and height (kg/m²). According to the National Institute of Health classifications, people are categorized as underweight (< 18.5), healthy weight (18.5-24.9), overweight (25-29.9), and obese ($\geq$ 30) (Weir & Jan, 2025).

The **Beck Depression Inventory Fast Screening (BDI-FS;** original: (Beck et al., 2012); German: (Kliem et al., 2014)) is a brief seven-item questionnaire designed to assess depressive symptoms over the previous week. Each item is rated on a 4-point Likert scale, resulting in a total sum score ranging from 0 to 21. Higher scores reflect more severe depressive symptoms, categorized as minimal (0–3), mild (4–6), moderate (7–9), and severe (10–21) depression. Cronbach's alpha and McDonald's omega in the present sample were 0.88 and 0.91, respectively (female: 0.88, 0.87; male: 0.91, 0.91).

Assessment of the m2 mediator:

The total sum score of the German short-version of the **Body Shape Questionnaire (BSQ-8C;** original: (Evans & Dolan, 1993); German: (Pook et al., 2002)) was used to quantify body dissatisfaction. It contains eight gender non-specific items, scored on a 6-point Likert scale (1 = never; 5 = always), where higher scores indicate greater body dissatisfaction (range: 8–40). Scores under 19 suggest no concerns with body shape, scores between 19 and 25 indicate mild concerns, and scores above 25 reflect moderate to marked concerns. Two items specifically probe feelings related to being overweight or concerns about weight gain, while the remaining items address situational and personal causes and consequences of these perceptions. Cronbach's alpha and McDonald's omega in the present sample were 0.94 and 0.96, respectively (female: 0.94, 0.95; male: 0.90, 0.94).

Covariates

The following variables were used as covariates in our analyses: *sexual orientation* and whether the assessment of the online-questionnaires took place *during the COVID-19 pandemic or thereafter*. April 1st, 2022 was selected as the cut-off date because all remaining COVID-19 restrictions in Switzerland were lifted on this date (Federal Council of Switzerland, 2022). These covariates were included because prior research indicate that they are associated with one or more of the variables examined in the present path model (Parker & Harriger, 2020b; M. Schmidt et al., 2022; Schneider et al., 2023; Sifre et al., 2024).

Statistical analyses

All statistical analyses were performed using R, version 4.3.2, including the R-package lavaan, version 0.6-15 (Rosseel, 2012). The path model contained DERS-SF as predictor, DECB as outcome, and two sets of mediators (m1 and m2) which were serially linked to each other as shown in figure 1. There were three m1 mediators (TSF-B-Con, BMI, BDI-FS), and one m2 mediator (BSQ-8C). Total, direct and indirect effects were estimated using the delta method. All endogenous variables were checked for normality and transformed if necessary. The following transformations were applied: $\sqrt{x}$ for DERS-SF, TSF-B-Con, BDI-FS, BSQ-8C, and DECB, and $\log(x)$ for BMI. To test for multicollinearity when predicting the outcome DECB, variance inflation factors (VIF) were computed. Values of the VIF ranged between 1.1 and 4.3 and were below the threshold of 10 which is often suggested (Kline, 2016). We also

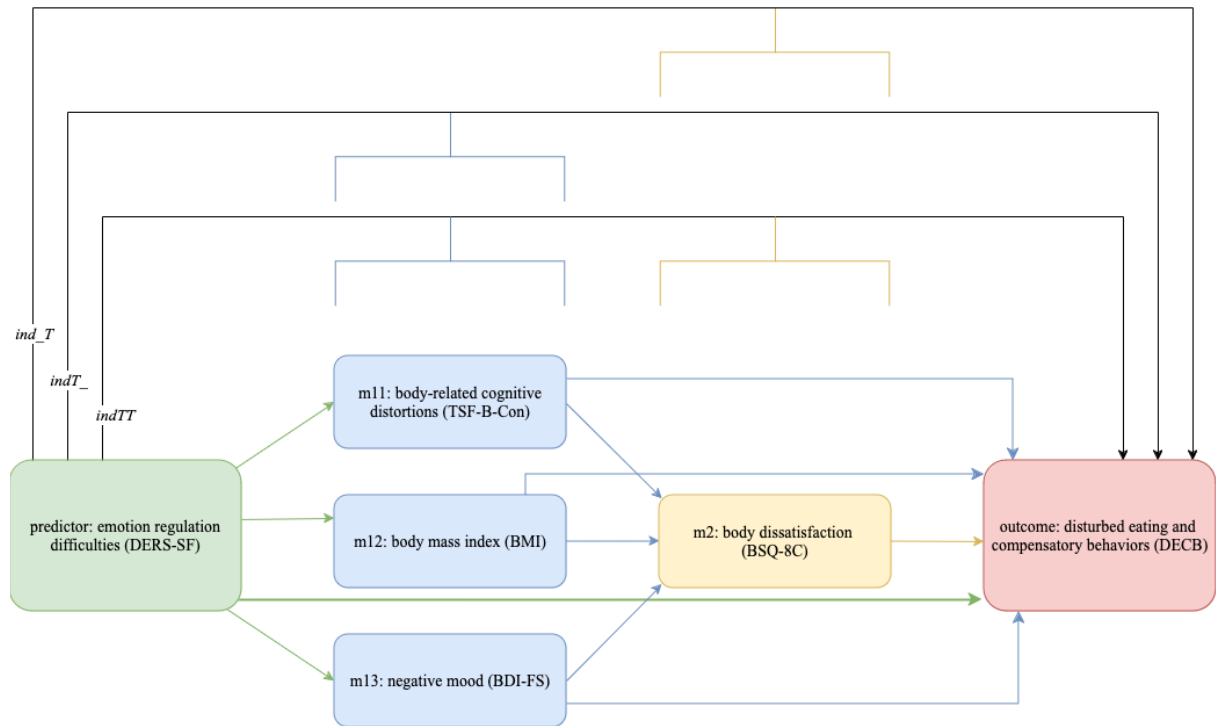
tested for univariate and multivariate outliers by calculating z-scores and Cook's distances, respectively. We identified 37 multivariate outliers and analyzed the data with and without multivariate outliers (based on Cook's distance; see table 4, supplementary material). Since the results were comparable between the two variants, we report only the results including outliers ($n = 37$). Missing values were dealt with using the full information maximum likelihood estimation method which leads to unbiased estimates in case of "missing completely at random" (MCAR) or "missing at random" (MAR) patterns.

Path model

All calculated effects (total, direct, indirect) are delineated in the path model of DECB (see figure 1). The *total effect (total)* refers to the overall effect of the predictor (DERS-SF) on the outcome (DECB), thus omitting any mediator in the model. This effect can then be partitioned into a direct effect and multiple indirect effects. The *direct effect (dir)* relates to the effect of the predictor on the outcome, controlled for all mediators (and covariates) in the model. The various indirect effects relate to the paths of the predictor to the outcome via the different sets of mediators m1 and m2. Thus, the path model of DECB delineates indirect effects which link both mediators m1 and m2 (*indTT*), indirect effects which omit the m2 mediator (*indT₋*), and indirect effects which omit m1 mediators (*ind₋T*). The *total indirect effect (ind₋tot)* quantifies the portion of the total effect due to mediating variables, representing the cumulative impact of all indirect paths through which ERD affects DECB.

Fit indices are not reported for this path model since they are not informative here because the model is completely saturated (i.e. just-identified) and hence perfectly reproduces the observed covariance matrix since none of the path coefficients in the model are set to zero (Baron & Kenny, 1986). Variances accounted for are reported for each endogenous variable (i.e., each variable to which at least one arrow points). This path model of DECB was first run across both genders, followed by a model which estimated each path coefficient for females and males separately, thereby allowing to test for differences in path coefficients between the two genders, using the Wald-test.

FIGURE 1 | Path model of DECB



Note. predictor = emotion regulation difficulties (DERS-SF); outcome = disturbed eating and compensatory behaviors (DECB); m1 mediators: m11 = body-related cognitive distortions (TSF-B-Con), m12 = body mass index (BMI) and m13 = negative mood (BDI-FS); m2 mediator = body dissatisfaction (BSQ-8C); indirect effects: ind_{TT} = sum of all indirect effects running from ERD via both mediators m1 and m2 to DECB; $ind_{T_}$ = sum of all indirect effects running from ERD through m1 mediators directly to DECB, while omitting m2 mediators; ind_T = indirect effect running from ERD directly to the m2 mediators, then to DECB, while omitting m1 mediators.

Results

Sample characteristics

Sample characteristics are summarized in table 1.

TABLE 1 | Sample characteristics.

Variable	total	female	male
Sample size (N)	803 (100%)	670 (83%)	133 (17%)
	n (%)	n (%)	n (%)
COVID-19			
During restrictions	213 (27%)	175 (26%)	38 (29%)
After restrictions	590 (73%)	495 (74%)	95 (71%)
Sexual orientation			
Heterosexual	636 (79%)	519 (77%)	177 (88%)
Homosexual (lesbian / gay)	29 (3.6 %)	18 (2.7 %)	11 (8.3 %)
Bisexual	107 (13%)	104 (16%)	3 (2.3%)
Other	31 (3.9%)	29 (4.3%)	2 (1.5%)
Nationality			
Swiss	489 (61%)	405 (60%)	84 (63%)
German	242 (30%)	201 (30%)	41 (31%)
Other	72 (9.0%)	64 (9.6%)	8 (6.0%)

Education			
Still in (high)school	314 (39%)	248 (37%)	66 (50%)
At university/higher education	408 (51%)	349 (52%)	59 (44%)
In training	18 (2.2%)	15 (2.2%)	3 (2.3%)
Employed	33 (4.1%)	31 (4.6%)	2 (1.5%)
Other	30 (3.7%)	27 (4.0%)	3 (2.3%)
BMI (kg/m ²)			
underweight (< 18.5)	77 (9.6%)	63 (9.4%)	14 (11%)
healthy weight (18.5-24.9)	564 (71%)	470 (70%)	94 (71%)
overweight (25-29.9)	120 (15%)	102 (15%)	18 (14%)
obese (≥ 30)	38 (4.8%)	32 (4.8%)	6 (4.5%)
Social media use (e.g., Instagram, TikTok, Snapchat)			
Never	9 (1.1%)	8 (1.2%)	1 (0.8%)
Rarely	57 (7.2%)	41 (6.2%)	16 (12%)
Often	262 (33%)	205 (31%)	57 (44%)
Very often	467 (59%)	411 (62%)	56 (43%)
Average screen time per day (e.g., smartphone, tablet)			
< 1h hour	5 (0.6%)	2 (0.3%)	3 (2.3%)
1-2 hours	61 (7.7%)	52 (7.8%)	9 (6.9%)
2-4 hours	303 (38%)	263 (40%)	40 (31%)
4-6 hours	289 (36%)	230 (35%)	59 (45%)
> 6 hours	137 (17%)	118 (18%)	19 (15%)

	<i>M (SD), Min, Max, N</i>	<i>M (SD), Min, Max, N</i>	<i>M (SD), Min, Max, N</i>
Age (years)	19.97 (2.54), 14.58, 25.00, 803	20.02 (2.50), 14.58, 24.92, 670	19.68 (2.73), 14.83, 25.00, 133
PHQ-4 (total score)	8.37 (2.92), 4, 16, 781	8.69 (2.91), 4, 16, 654	6.76 (2.39), 4, 16, 127
DERS-SF (total score)	42.87 (13.71), 18, 85, 778	44.30 (13.79), 18, 84, 651	35.56 (10.66), 19, 85, 127
TSF-B-Con (concept subscale)	15.53 (12.99), 0, 48, 772	16.64 (13.38), 0, 48, 645	9.91 (8.87), 0, 46, 127
BMI (kg/m ²)	22.54 (4.04), 14.43, 43.44, 799	22.52 (4.11), 15.23, 43.44, 667	22.62 (3.70), 14.43, 37.33, 132
BDI-FS (total score)	4.85 (4.47), 0, 21, 781	5.27 (4.52), 0, 21, 654	2.72 (3.51), 0, 18, 127
BSQ-8C (total score)	26.86 (11.69), 8, 48, 770	27.49 (11.47), 8, 48, 644	17.53 (8.94), 8, 46, 126
DECB (total score)	1.41 (1.30), 0, 6, 781	1.53 (1.32), 0, 6, 654	0.78 (1.02), 0, 5.17, 127
EDE-Q8 (total score)	2.42 (1.88), 0, 6, 781	2.67 (1.87), 0, 6, 654	1.16 (1.34), 0, 5.75, 127
restraint eating (RE)	2.16 (2.01), 0, 6, 781	2.36 (2.03), 0, 6, 654	1.14 (1.58), 0, 6, 127
eating concerns (EC)	1.97 (1.93), 0, 6, 781	2.19 (1.96), 0, 6, 654	0.81 (1.26), 0, 6, 127
weight concerns (WC)	2.72 (2.18), 0, 6, 781	2.99 (2.17), 0, 6, 654	1.34 (1.65), 0, 6, 127
shape concerns (SC)	2.84 (2.04), 0, 6, 781	3.13 (2.01), 0, 6, 654	1.35 (1.47), 0, 6, 127
EDE-Q (supplementary items)			
frequency of over-eating over the past 28 days	5.95 (8.09), 0, 60, 781	6.24 (8.32), 0, 60, 654	4.47 (6.63), 0, 28, 127
frequency of loss of control-eating over the past 28 days	5.01 (7.78), 0, 60, 781	5.58 (8.10), 0, 60, 654	2.09 (4.86), 0, 28, 127
frequency of binge-eating over the past 28 days	4.59 (6.84), 0, 28, 781	5.10 (7.07), 0, 28, 654	1.98 (4.75), 0, 28, 127
frequency of compensatory behavior over the past 28 days	2.27 (6.19), 0, 56, 781	2.46 (6.43), 0, 56, 654	1.31 (4.68), 0, 28, 127

Note. The DECB variable incorporates the 'restrained eating' subscale from the EDE-Q8 (items 1-2; (Kliem et al., 2016)) along with four additional items from the EDE-Q (items 15-18; (Hilbert & Tuschen-Caffier, 2016)). The term 'compensatory behavior' encompasses behaviors such as purging, excessive exercising, and the use of laxatives. PHQ-4 = Patient Health Questionnaire-4 short-form; EDE-Q8 = Eating Disorder Examination short-form; DERS-SF = Emotion Regulation Difficulties short-form; TSF-B-Con = Thought-Shape Fusion Body Trait Questionnaire; BMI = Body mass index; BDI-FS = Beck Depression Inventory Fast Screening; BSQ-8C = Body Shape Questionnaire; DECB = Disturbed Eating and Compensatory Behavior. Percentages do not always add up to 100% due to rounding. The DECB variable incorporates the 'restrained eating' subscale from the EDE-Q8 (items 1-2; (Kliem et al., 2016)) along with four additional items from the EDE-Q (items 15-18; (Hilbert & Tuschen-Caffier, 2016)). The term 'compensatory behavior' encompasses behaviors such as purging, excessive exercising, and the use of laxatives.

Path model

All effects (total, direct, indirect), unstandardized (b) and standardized (β), within the path model of DECB are reported in table 2. In the text we refer to standardized effects since these can be interpreted as effect sizes (partial correlation coefficients).

Across both genders, there was a strong positive **total effect** (*total*; $\beta = 0.501$) between the predictor (DERS-SF) and the outcome (DECB). The corresponding **direct effect** (*dir*; $\beta = 0.084$) was small and accounted for 17% of the total effect. In contrast, the total **indirect effect** (*ind_tot*; $\beta = 0.417$) was medium to large and accounted for the remaining 83% of the total effect. Since our model contained two sets of mediators, multiple indirect effects could be calculated which are all shown in table 2. Thus, the indirect effect can be further partitioned into a combined effect running via both types of mediators m1 and m2 (*indTT*), a combined effect running via m1 mediators (omitting the m2 mediator) and then directly to the outcome (*indT_*), and an effect running from the predictor directly to the m2 mediator (omitting m1 mediators) and then to the outcome (*ind_T*). Standardized values for these three indirect combined effects for the whole sample were $\beta = 0.210$ (*indTT*), $\beta = 0.166$ (*indT_*), and $\beta = 0.041$ (*ind_T*). The indirect effect of *ind_T* was thereby much smaller than that of *indTT* ($\Delta\beta = 0.169$, $z = 5.792$, $p < .001$) and of *indT_* ($\Delta\beta = 0.125$, $z = 3.229$, $p = .001$), while the indirect effects of *indTT* and *indT_* were comparable in size ($\Delta\beta = 0.044$, $z = 0.912$, $p = .362$). Of all indirect effects running via specific mediators (*ind1* to *ind3*, *ind1_* to *ind3_*), those running via the m1 mediator TSF-B-Con were by far the largest. Thus, the indirect effects via TSF-B-Con and the m2 mediator BSQ-8C and via TSF-B-Con alone (omitting the m2 mediator) were $\beta = 0.154$ (*ind1*) and $\beta = 0.142$ (*ind1_*), respectively, while all other indirect effect regarding the other two m1 mediators BMI and BDI-FS (via the m2 mediator or not) were much smaller with β -values varying between 0.00 and 0.047 (see table 2).

When comparing the two genders, there was a relatively strong positive **total effect** (*total*) between the predictor (DERS-SF) and the outcome (DECB) in both females and males (females: $\beta = 0.485$, males: $\beta = 0.387$). The corresponding **direct effects** (*dir*) were small in both genders (females: $\beta = 0.075$, males: $\beta = 0.128$) and accounted for 15% (females) and 33% (males) of the total effect. In contrast, the **total indirect effect** (*ind_tot*) was medium to large (females: $\beta = 0.410$) or medium (males: $\beta = 0.259$) and accounted for 85% (females) and 67% (males) of the total effect, respectively. None of these three effects differed between the two genders ($p > .05$ for all three comparisons). **Indirect effects** running via both sets of mediators m1 and m2 (*indTT*), via m1 mediators only (*indT_*), and via the m2 mediator only (*ind_T*) for females and males were $\beta = 0.217$ and $\beta = 0.107$ (*indTT*), $\beta = 0.164$ and $\beta = 0.117$ (*indT_*), and

$\beta = 0.029$ and $\beta = 0.035$ (ind_T) for females and males, respectively. There were no significant differences between the two genders for any of these indirect effects for all three comparisons ($p > .05$). Of note that for females the indirect effect running via the m2 mediator only (thus omitting the m1 mediators, ind_T) was much smaller than either the indirect effect running via both mediators m1 and m2 (ind_T vs. indTT, $\Delta\beta = 0.189$, $z = 5.740$, $p < .001$) or via the m1 mediator only (ind_T vs. indT_; $\Delta\beta = 0.136$, $z = 3.271$, $p = .001$), but not between the latter two (indTT vs. indT_; $\Delta\beta = 0.053$, $z = 0.963$, $p = .336$), while for males a similar but less pronounced pattern was observed (ind_T vs. indTT; $\Delta\beta = 0.073$, $z = 1.411$, $p = .158$, ind_T vs. indT_; $\Delta\beta = 0.083$, $z = 0.915$, $p = .360$, indTT vs. indT_; $\Delta\beta = 0.010$, $z = 0.102$, $p = .919$). When looking at indirect effects running via both sets of mediators (indTT), the only one differing between males and females concerned the path from DERS-SF via m1 mediator TSF-B-Con and m2 mediator BSQ-8C to DECB which was much larger for females (ind1; $\beta = 0.174$) than for males ($\beta = 0.036$, $p < .001$). Corresponding indirect effect for m1 mediators BMI and BDI-FS did not differ between genders ($p > .05$ for both comparisons).

TABLE 2 | Overview of all path coefficients in the path model of DECB (total, direct, indirect).

Defined Parameter	b	SE	z	p	β
total (all)	0.950	0.060	15.927	0.000	0.501
total (female)	0.910	0.065	13.993	0.000	0.485
total (male)	0.796	0.174	4.586	0.000	0.387
dir (all)	0.160	0.065	2.453	0.014	0.084
dir (female)	0.140	0.069	2.044	0.041	0.075
dir (male)	0.263	0.196	1.343	0.179	0.128
ind_tot (all)	0.790	0.065	12.146	0.000	0.417
ind_tot (female)	0.770	0.070	11.071	0.000	0.410
ind_tot (male)	0.533	0.176	3.031	0.002	0.259
indTT (total)	0.398	0.047	8.410	0.000	0.210
indTT (female)	0.408	0.054	7.533	0.000	0.217
indTT (male)	0.221	0.087	2.532	0.011	0.107
indT_ (total)	0.314	0.064	4.890	0.000	0.166
indT_ (female)	0.308	0.070	4.407	0.000	0.164
indT_ (male)	0.241	0.167	1.445	0.148	0.117
ind_T (total)	0.078	0.026	3.031	0.002	0.041
ind_T (female)	0.054	0.026	2.077	0.038	0.029
ind_T (male)	0.071	0.060	1.190	0.234	0.035
ind1 (total)	0.292	0.035	8.409	0.000	0.154
ind1 (female)	0.327	0.043	7.610	0.000	0.174
ind1 (male)	0.074	0.035	2.118	0.034	0.036
ind2 (total)	0.016	0.006	2.668	0.008	0.008
ind2 (female)	0.018	0.007	2.534	0.011	0.009
ind2 (male)	0.030	0.020	1.497	0.134	0.015
ind3 (total)	0.089	0.021	4.327	0.000	0.047
ind3 (female)	0.063	0.020	3.174	0.002	0.034
ind3 (male)	0.117	0.056	2.094	0.036	0.057
ind1_ (total)	0.269	0.041	6.531	0.000	0.142
ind1_ (female)	0.268	0.048	5.552	0.000	0.143
ind1_ (male)	0.156	0.068	2.284	0.022	0.076
ind2_ (total)	0.001	0.005	0.106	0.915	0.000
ind2_ (female)	-0.003	0.006	-0.590	0.555	-0.002
ind2_ (male)	0.052	0.038	1.374	0.170	0.025
ind3_ (total)	0.044	0.049	0.889	0.374	0.023
ind3_ (female)	0.043	0.051	0.841	0.400	0.023
ind3_ (male)	0.034	0.148	0.229	0.819	0.016

Note. Outliers are included. All relevant effects ($\beta > 0.1$) are highlighted in bold. **total** = total effect between predictor and outcome; **dir** = direct effect for the association between predictor and outcome; **ind_tot** = sum of all indirect effects (total minus dir); **indTT** = total indirect effect running via both mediators m1 and m2; **indT_** = total indirect effect running via m1 mediators and then directly to the outcome (omitting the m2 mediator); **ind_T** indirect effect running from the predictor directly to the m2 mediator (omitting m1 mediators) and then to the outcome; **ind1 to ind3** = indirect effects via both mediators m11 and m2, m12 and m2, and m13 and m2, respectively; **ind1_ to ind3_** = indirect effect via m1 mediators m11, m12, and m13, respectively (omitting the m2 mediator).

Discussion

The aim of our study was to investigate the mediating mechanisms between ERD and DECB in a mixed-gender sample of adolescents and young adults to assess whether these mechanisms are gender-specific. For this purpose, we refined a path model of DECB, which we had previously tested exclusively in young females (Mueller et al., 2025). The new path model of DECB incorporates two serially linked sets of mediators: m1, which includes *cognitive* (distortions), *physiological* (body mass index), and *psychological factors* (negative mood), and m2, focused on a *body image-related factor* (body dissatisfaction). This study was the first to determine the relative importance of these mediators and the paths to which they are linked in a female and a male sample, the most relevant of which will be discussed in subsequent sections. To achieve this aim, a sample of adolescents and young adults ($N = 803$, 17% male) was recruited.

In our study's sample of young females and males, difficulties in coping with emotions (ERD) were significantly associated with DECB. This relationship was reflected in a substantial ***total effect (total)*** within the path model. This result aligns with findings from previous studies (Leppanen et al., 2022; Mikhail et al., 2024; Peschel, Fürtjes, et al., 2024; A.-B. Prefit et al., 2019; Trompeter et al., 2021) and is supported by therapeutic frameworks like Integrative Cognitive-Affective Therapy, which highlights ERD as a key component of DECB (Peterson et al., 2020; S. A. Wonderlich et al., 2014). However, our findings show that most of the influence of ERD on DECB is transmitted via the mediators in the path model (see table 2). This is evidenced by a relatively small ***direct effect (dir)*** and a medium to large ***total indirect effect (ind_tot)***. It should also be considered that additional unmeasured mediators might have further reduced the size of the direct effect.

Moreover, we analyzed whether the relationship between ERD and DECB could be attributed to the combined influence of both sets of mediators or primarily to one set (see figure 1). Our findings revealed that both sets of mediators (***indTT***) – m1: body-related cognitive distortions, BMI, negative mood, and m2: body dissatisfaction – account for a considerable proportion of the impact of ERD on DECB. Specifically, these mediators collectively explain 50% (overall sample), 53% (females) and 42% (males) of the total indirect effect and 42% (overall sample), 45% (females) and 28% (males) of the total effect. Additionally, when we focused solely on the first set of mediators (m1), including cognitive distortions, BMI and negative mood, they still had a notable influence on DECB, although to a lesser extent (***indT_***). This path alone accounted for 40% (overall sample), 40% (females) and 45% (males) of the

total indirect effect and 33% (overall sample), 34% (females) and 30% (males) of the total effect. On the other hand, the influence from only the second mediator set, which focuses on body dissatisfaction, was much smaller across all groups (*ind_T*). This path alone accounts for only 10% (overall sample), 7% (females), and 13% (males) of the total indirect effect and 8% (overall sample), 6% (females), and 9% (males) of the total effect, indicating a comparatively small mediating influence through this path alone. Despite its importance, the m2 mediator body dissatisfaction alone exerts a less substantial influence than the m1 mediators, likely because its effect is more secondary or indirectly related to ERD in our sample, leading to a less dominant contribution to DECB. These findings contrast with earlier research, such as Stice's dual pathway model (Stice, 2001), which emphasizes body dissatisfaction as a primary driver of DECB (e.g. binge eating, bulimic symptoms), via two distinct pathways: restraint and negative affect. Our results indicate the potential of a shift in focus and to include the pivotal role of earlier mechanisms, such as TSF-B, BMI and negative mood, in the development of DECB. In other words, if replicated, our findings might imply that a certain (distorted) cognitive processing style, combined with observable physical traits like increased BMI and current mood, might represent a psychopathological feature, which increases vulnerability to body dissatisfaction in young people.

Within the set of early mechanisms, cognitive processes such as body-related cognitive distortions had the largest impact regarding the interplay of ERD and DECB, alone (*ind1_*) and in conjunction with body dissatisfaction (*ind1*). Compared to the central role of body-related information processing (TSF-B), pathways involving m1 mediators BMI and negative mood revealed considerably less impact, indicating minimal influence regardless of the inclusion of the m2 mediator body dissatisfaction both in males and in females (see table 2). These results align closely with those from our previous study, where we investigated a similar path model for DECB focused exclusively on young females (Mueller et al., 2025). Findings are also consistent with other prior research, highlighting that body-related cognitive distortions are a common phenomenon, especially in the daily lives of young people, who frequently encounter unrealistic appearance-ideals, particularly on social media (Dubois et al., 2016; Munsch, Messerli-Bürgy, et al., 2021; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016; Wyssen et al., 2018). Such threatening distorted cognitions (e.g., "Thinking about giving up my thin-/muscular-ideal makes me want to exercise") are likely to intensify young people's dissatisfaction with their body and drive them to engage in various DECB to alter their appearance (Dubois et al., 2016; Mueller et al., 2025; Munsch, Messerli-Bürgy, et al., 2021; Wyssen et al., 2020).

Building on this, the current study aimed to investigate whether the pathways between ERD and DECB differ across genders. In our sample, a notable *gender difference* emerged in the pathway from ERD through the *m1 mediator TSF-B* and the *m2 mediator body dissatisfaction* to DECB (*ind1*). This pathway was significantly stronger for females compared to males. However, no significant gender differences were found in all other pathways involving the m1 mediators BMI and negative mood. In our sample females demonstrated higher levels of body-related cognitive distortions, compared to males (see table 1), a finding consistent with previous research (Dubois et al., 2016; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016). Although most young people in our sample maintained a normal BMI (see table 1), females still expressed substantial concerns about their body weight and shape, while males predominantly exhibited minimal body dissatisfaction. However, gender plays a significant role in how dissatisfaction with one's own body is expressed. Driven by the desire to conform to a specific *thin-ideal*, females may experience more body-related cognitive distortions and, as a result, frequently engage in *weight-loss oriented DECB*, such as fasting, skipping meals, or purging (Lafrance Robinson et al., 2014; S. A. McLean et al., 2022; Mohorić et al., 2023; Ruisoto et al., 2015; Sifre et al., 2024). Conversely, males might more often focus on exercise to *control their weight* or *increase their weight* to gain muscular volume, aiming to align with the *muscular-/athletic-ideal* (Morin & Meilleur, 2024; Nagata et al., 2022; Ruisoto et al., 2015; Wyssen, Bryjova, et al., 2016). In our study, young females more frequently engaged in weight-loss oriented DECB than males, such as restrained eating or compensatory behaviors like purging (see table 1). Similarly, other studies have found that young females, regardless of their BMI, engage more often in weight-loss oriented DECB (Lucibello et al., 2024; Nagata et al., 2022). Previous research suggests that the tendency to engage in weight-loss oriented DECB when dissatisfied with one's own body may indicate a vulnerability to the future development of eating disorders (Machado et al., 2020; Stice et al., 2017). 31% of female participants in our sample exhibited elevated levels of eating disorder psychopathology (Machado et al., 2020), in contrast to only 7.1% of male participants. This highlights a significant gender difference in the vulnerability of eating disorder symptoms among young people. In addition, it should be noted that muscularity-oriented DECB may be as prevalent in males as eating disorders are in females (Compte et al., 2015; Klimek et al., 2018). As this aspect was not explored in this study, definitive conclusions cannot be drawn.

Although previous cross-sectional and longitudinal studies have identified body dissatisfaction as a major influence fostering DECB (Lucibello et al., 2024; S. A. McLean et al., 2022; Nagata et al., 2022; Schuck et al., 2018), our findings indicate that its impact might be

amplified when combined with other ml mediators, such as body-related cognitive distortions. Future studies should investigate whether the influence of ERD mediated via cognitive information processing such as TSF-B might represent a transdiagnostic feature impairing mental health, which has partially been shown in obsessive compulsive disorders (Kim & Lee, 2020) and whether this interaction is even more pronounced in young people with eating or other mental disorders. Moreover, elevated levels of ERD in young people often correlate with increased body dissatisfaction (Cunningham, Szabo, et al., 2020a; Hansson et al., 2016; Mueller et al., 2025), leading to a higher incidence of DECB (Bornioli et al., 2019; Hughes & Gullone, 2011a; Lucibello et al., 2024). In our study, young males reported considerably fewer difficulties coping with emotions than young females, particularly in accepting emotional responses and accessing emotion regulation strategies (see table 1). This gender difference might be linked to the generally lower self-reports of impaired mental health among males in the general population (Peter et al., 2023; Ravens-Sieberer et al., 2022). Also, within our sample, young males reported only mild distress and minimal depressive symptoms (see table 1). Moreover, these differences might contribute to the higher incidence of DECB in young females, as numerous cross-sectional and longitudinal studies have consistently demonstrated associations between maladaptive emotion regulation and disordered eating symptoms (A.-B. Prefit et al., 2019).

Recommendations for future studies and limitations

Several limitations and future recommendations must be acknowledged when evaluating the results of this study. To enhance external validity and generalization of our findings, it would be beneficial to replicate our study with a *more demographically diverse sample*, as most participants were either *university* (51%) or *high school students* (39%), and only 17% were *males* – a trend common in mental health studies (Ellis et al., 2014; Ryan et al., 2019). Despite extensive recruitment efforts and streamlined processes like online registration and short-form questionnaires, our sample remained relatively homogeneous. For future studies aiming to better represent the general youth population, we recognize the need to develop and implement additional recruitment strategies.

The *BMI range* was also limited, mostly within healthy range, although both higher and lower BMI have been linked to increased DECB and body dissatisfaction among young people (Blundell et al., 2024; Meschberger-Annweiler et al., 2024; Morin & Meilleur, 2024; Sarrar et al., 2020). Future studies should aim to include more diverse groups in terms of education, gender, and weight status to ensure broader applicability of the findings and that interventions

are appropriately tailored to their specific needs. To enlarge the findings of this study to clinical samples, the path model of DECB should be tested with a *treatment-seeking sample* that includes different subthreshold/threshold eating disorders.

The most commonly used *body dissatisfaction questionnaires*, such as the BSQ-8 (Pook et al., 2002), primarily target concerns about weight and shape. However, they do not adequately capture dissatisfaction with or the drive for muscularity and leanness, traits that are predominantly observed in males (Klimek et al., 2018; Lucibello et al., 2024; Nagata et al., 2022) and increasingly common among females (Bozsik et al., 2018; Cunningham, Szabo, et al., 2020a; Marashi et al., 2024). Consequently, the prevalence of body dissatisfaction among young males may have been underestimated to date. Incorporating traits of body dissatisfaction, which are frequently observed in males, into future research would provide a more comprehensive evaluation across genders. This would also deepen our understanding of body dissatisfaction's prevalence and its influence on DECB.

To minimize *conceptual overlap* between the cognitive m1 mediator TSF-B and the m2 mediator body dissatisfaction, only the restrained eating subscale from the EDE-Q8, which represents the behavioral component, was used to create the DECB variable. In contrast, concerns related to eating, shape, and weight, which are considered cognitive subscales, were excluded (Wyssen, Bryjova, et al., 2016). However, TSF-B and body dissatisfaction show strong correlations (total: $r = 0.75$ and $r = 0.78$) with DECB (see table 5-7, supplementary material).

Moreover, it should be noted that the *definition of DECB* and the *instruments used to measure* them vary among different studies (Foster et al., 2024; Ruisoto et al., 2015), which partially complicates the comparability of study results. As previously mentioned, research on DECB in young males is limited, and the assessment instruments have been primarily developed and validated for girls and women (Ruisoto et al., 2015). Our study included a range of DECB, such as dietary restraint, binge eating, loss of control eating, and compensatory behaviors (e.g., excessive exercise, purging, and the use of laxatives; (Wyssen, Bryjova, et al., 2016)). This corresponds with other research that has similarly assessed DECB, demonstrating that various features of DECB are commonly observed in young non-clinical samples (Cosh et al., 2023; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024). However, to align with prevalent thin- or muscular-/athletic-ideals, previous studies have identified gender differences in the application of DECB (Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015). Due to the higher pressure on females to be thin, they are more likely to engage in DECB to reduce weight (Cunningham et al., 2022; Lucibello et al., 2024; Wyssen, Bryjova, et al., 2016). Conversely, young males, even when dissatisfied with their bodies, may abstain from dietary restraint and

instead engage in alternative DECB focused on increasing muscular volume and leanness (Klimek et al., 2018; Nagata et al., 2022; Vuong et al., 2021). Therefore, future research should *include additional DECB items* that are crucial for muscle building or leanness, such as high-protein intake, strength training, weightlifting, cycling of bulking and cutting phases, and the use of muscle-enhancing substances (Lucibello et al., 2024; Nagata et al., 2022).

When analyzing mediation models, care must be taken when attempting to interpret the different pathways causally, as doing so necessitates numerous assumptions, including some that are particularly strict. These assumptions encompass directional pathways, the reliability of the mediators involved, the lack of confounding factors (i.e., all necessary covariates have been collected and included in the model), and the absence of interaction effects (i.e. the mediators' role on the outcome does not vary across different levels of the predictor). In the case of cross-sectional data, where the predictor variable has not been obtained via random assignment, such assumptions, especially causal precedence, cannot be evaluate.

Additionally, employing *ecological momentary assessment* to investigate this path model of DECB in participants' natural environments could be beneficial (Peschel, Fürtjes, et al., 2024; Peschel, Sigrist, et al., 2024; Sifre et al., 2024). This approach may uncover how contextual and temporal factors affect these relationships. For instance, recent studies have indicated a noticeable increase in DECB during periods of examination stress in college students (Sifre et al., 2024), which is particularly relevant since most of our participants are either university or senior high school students (see table 1). Moreover, exposure to appearance-ideals on social media can increase cognitive distortions, body dissatisfaction, and subsequently DECB (Castellanos Silva & Steins, 2023; Munsch, Messerli-Bürgy, et al., 2021). Using real-time, repeated sampling will minimize recall bias common in retrospective questionnaire-based surveys, thus offering a more accurate measurement of experiences, cognitions, and behaviors in the daily lives of young people. While this study focused on cross-sectional associations, conducting *longitudinal studies* to explore the stability of the path model of DECB and the postulated sequence of the mediators would be highly beneficial. This would help clarify whether the included variables are indeed associated with a heightened risk of developing sub-threshold/threshold eating disorders in young people from the general population.

We tested a *reduced version of the path model of DECB* from our previous study (Mueller et al., 2025) in a mixed-gender sample, incorporating only those mediators that prior studies had already identified as gender-specific in eating disorder psychopathology. We excluded cognitive internalization of appearance-ideals as a m1 mediator due to the high correlation with TSF-B, identified in the previous study (Mueller et al., 2025). Similarly, we removed

social anxiety symptoms because of their significant overlap with negative mood and partially overlapping pathology (Mueller et al., 2025). Additionally, muscle dysmorphic symptoms were excluded as our study did not specifically target DECB related to increasing muscular volume or leanness. Given that the direct effect (dir) in the present study was more pronounced in males (see table 2), may reflect the presence of additional potential unmeasured mediators, such as dissatisfaction with muscularity (Morin & Meilleur, 2024; Nagata et al., 2022; Ruisoto et al., 2015; Wyssen, Bryjova, et al., 2016). Future research should aim to test comprehensive full path model of DECB, including leanness- and muscle-enhancing DECB (Lucibello et al., 2024; Nagata et al., 2022) in a mixed-gender sample with an increased number of male participants to determine if the results can be replicated.

Theoretical and clinical implications

The findings of this study highlight the critical need to focus on DECB in future research, given their high prevalence during adolescence and early adulthood (Peschel, Sigrist, et al., 2024; Peter et al., 2023). If left unaddressed, they may progress to the development of subthreshold/threshold eating disorders and other mental health problems, incurring substantial individual and societal costs (Glazer et al., 2019).

Theoretical implications: The current version of the *CBT-E model* suggests that the over-evaluation of weight and shape (referred to as body dissatisfaction), ERD, interpersonal difficulties, perfectionism, and low self-esteem drive eating disorder psychopathology, including DECB (Trompeter et al., 2021) especially in females. Building upon previous research, this study aimed to examine the CBT-E model in both genders and to enhance the model by exploring how ERD influences DECB by incorporating two sets of serially linked key mediators within a comprehensive path model of DECB. The findings corroborate those of Trompeter et al. (Trompeter et al., 2021), identifying ERD as a significant predictor independent of gender. However, this study further revealed that the impact of ERD on DECB is predominantly mediated through body-related cognitive distortions, either alone or in conjunction with body dissatisfaction in both females and males. If replicated, this indicates that the current CBT-E model could be enhanced by incorporating this type of cognitive information processing. Such an inclusion appears justified, given that the serially linked mediators in the path model of DECB demonstrate how TSF-B amplifies body dissatisfaction in our cross-sectional study. Interventions or experimental trials could help determine whether altering these body-related cognitive

distortions can mitigate the impact of emotion regulation difficulties on eating disorder pathology, particularly among young people with compromised emotion regulation abilities. Based on our findings, we can assume that the core associations among factors such as ERD, body-related cognitive distortions, body dissatisfaction, negative mood, and BMI are similar across genders but more pronounced in young females (see table 2). Nevertheless, the CBT-E model should consider potential gender differences in appearance-ideals, such as the muscular-/athletic-ideal commonly observed in males, as they also differently affect the eating behaviors of young people (Hansson & Schmidt, 2025; Klimek et al., 2018; Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015). Future research should continue to explore gender-specific mediators that link ERD to eating disorder pathology, especially in young males.

Clinical implications: To mitigate the impact of DECB on the mental health of young people, early detection and the implementation of initial prevention and targeted interventions are crucial (cf. recommendations from national guidelines; (Herpertz et al., 2011)). Thus, the findings from our study, which identify TSF-B and body dissatisfaction as key mediators between ERD and DECB in young people, could significantly enhance the development of more effective prevention and intervention programs by raising clinicians' awareness of these mediators' roles. If future research including both females and males diagnosed with different types of eating disorders confirms these results, they could be included in clinical practices such as *Integrative Cognitive-Affective Therapy*, which already recognizes ERD as a critical element of DECB (Peterson et al., 2020; S. A. Wonderlich et al., 2014). Young people struggling to regulate their maladaptive emotions may be particularly vulnerable to body-related distorted information processing. Such information processing remains underexplored and infrequently addressed in prevention and treatment efforts. Implementing training that helps identify and correct this skewed thinking could be crucial for understanding its effects on body dissatisfaction and subsequent DECB. Therefore, future therapeutic approaches could target TSF-B by integrating strategies like exposure to triggers, identifying body-related cognitive distortions through tasks like 'thinking out aloud,' and corrective interventions to detach from those (Wyssen et al., 2020). Moreover, promoting *body appreciation* from childhood can serve as a protective factor against the development of body dissatisfaction and DECB. Recent studies highlight that fostering body appreciation can prevent the persistence of DECB into adulthood (Foster et al., 2024; Hansson & Schmidt, 2025).

Conclusion

In conclusion, this study is the first to explore the mediating mechanisms between ERD and DECB within a newly developed path model for DECB in a sample of adolescents and young adults to assess whether these paths are gender-specific. Across both genders the results highlighted body-related cognitive distortions (TSF-B), either alone, or in conjunction with body dissatisfaction, as key mediators. Notably, the pathway linking ERD through TSF-B and body dissatisfaction to DECB was substantially stronger in females than in males, which underscores the necessity to challenge information processing in prevention and intervention programs and refine theoretical models. Nevertheless, the path model of DECB indicated little evidence for gender-specific differences in the link between ERD and DECB, although young males in the sample exhibited lower overall vulnerability to DECB and psychopathology. Ultimately, this research contributes to the body of knowledge on the development and maintenance of sub-threshold and threshold eating disorders, emphasizing the critical role of gender-specific approaches.

Supplementary Material

TABLE 3 | Composition of the DECB outcome measure

English version	German version
Item 1 (EDE-Q8, restrained eating): Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	Item 1 (EDE-Q8, gezügeltes Essverhalten): Hast Du bewusst versucht, die Nahrungsmenge, die Du gegessen hast, zu begrenzen, um Deine Figur oder Dein Gewicht zu beeinflussen (unabhängig davon, ob es Dir tatsächlich gelungen ist)?
Item 2 (EDE-Q8, avoidance of foods): Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	Item 2 (EDE-Q8, Vermeidung von Nahrungsmitteln): Hast Du versucht, Nahrungsmittel, die Du magst, von Deiner Ernährung auszuschliessen, um Deine Figur oder Dein Gewicht zu beeinflussen (unabhängig davon, ob es Dir tatsächlich gelungen ist)?
Item 13 (EDE-Q): Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)?	Item 13 (EDE-Q): Wie oft hast Du während der letzten 28 Tage (vier Wochen) eine Nahrungsmenge gegessen, die andere Menschen als ungewöhnlich gross ansehen würden?
Item 14 (EDE-Q): On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?	Item 14 (EDE-Q): In wie vielen dieser Situationen, in denen Du zu viel gegessen hast, hattest Du in den letzten 28 Tagen (vier Wochen) das Gefühl, die Kontrolle über Dein Essverhalten verloren zu haben (während des Essens)?
Item 15 (EDE-Q): Over the past 28 days, on how many days have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?	Item 15 (EDE-Q): An wie vielen der letzten 28 Tage (vier Wochen) ist es vorgekommen, dass Du eine ungewöhnlich grosse Nahrungsmenge gegessen hast und das Gefühl hattest, die Kontrolle über Dein Essverhalten verloren zu haben?
Items 16–18 (combined into one variable): Over the past 28 days, how many times have you vomit (item 16), taken laxatives (item 17) or exercised in a “driven” or “compulsive” way (item 18) as a means of controlling your shape or weight?	Items 16–18 (combined into one variable): Wie oft hast Du während der letzten 28 Tage (vier Wochen) Erbrechen selbst herbeigeführt (Item 16), Abführmittel eingenommen (Item 17) oder zwanghaft Sport getrieben (Item 18) um Deine Figur oder Dein Gewicht zu kontrollieren?

Note. For the outcome measure of this study, a new variable was created to assess DECB, following the approach established by Wyssen et al. (Wyssen, Coelho, et al., 2016). The DECB variable involves the behavioral subscale restrained eating from the EDE-Q8 (items 1-2; (Kliem et al., 2016)) and four additional behavioral items from the original EDE-Q (items: 13-18; (Hilbert & Tuschen-Caffier, 2016)).

TABLE 4 | Partitioning of the total effect between ERD and DECB into the different indirect effects and the direct effect. Estimates based on data without outliers.

Defined Parameter	b	SE	z	p	β
total (all)	0.956	0.059	16.173	0.000	0.514
total (female)	0.931	0.064	14.519	0.000	0.505
total (male)	0.658	0.179	3.669	0.000	0.326
dir (all)	0.102	0.060	1.703	0.089	0.055
dir (female)	0.127	0.064	1.979	0.048	0.069
dir (male)	-0.143	0.176	-0.815	0.415	-0.071
ind_tot (all)	0.853	0.065	13.185	0.000	0.459
ind_tot (female)	0.804	0.069	11.625	0.000	0.436
ind_tot (male)	0.801	0.185	4.340	0.000	0.397
indTT (total)	0.411	0.046	8.855	0.000	0.221
indTT (female)	0.417	0.053	7.940	0.000	0.226
indTT (male)	0.237	0.087	2.712	0.007	0.117
indT_ (total)	0.349	0.061	5.751	0.000	0.188
indT_ (female)	0.310	0.065	4.730	0.000	0.168
indT_ (male)	0.483	0.168	2.876	0.004	0.239
ind_T (total)	0.094	0.027	3.472	0.001	0.051
ind_T (female)	0.077	0.028	2.763	0.006	0.042
ind_T (male)	0.081	0.062	1.314	0.189	0.040
ind1 (total)	0.321	0.036	9.026	0.000	0.173
ind1 (female)	0.346	0.042	8.146	0.000	0.188
ind1 (male)	0.116	0.046	2.545	0.011	0.058
ind2 (total)	0.016	0.006	2.682	0.007	0.009
ind2 (female)	0.019	0.007	2.631	0.009	0.010
ind2 (male)	0.034	0.021	1.608	0.108	0.017
ind3 (total)	0.073	0.021	3.542	0.000	0.039
ind3 (female)	0.052	0.021	2.521	0.012	0.028
ind3 (male)	0.087	0.050	1.750	0.080	0.043
ind1_ (total)	0.288	0.041	7.089	0.000	0.155
ind1_ (female)	0.259	0.046	5.683	0.000	0.141
ind1_ (male)	0.297	0.092	3.243	0.001	0.147
ind2_ (total)	0.005	0.005	1.085	0.278	0.003
ind2_ (female)	0.002	0.005	0.292	0.771	0.001
ind2_ (male)	0.070	0.043	1.609	0.108	0.034
ind3_ (total)	0.056	0.046	1.222	0.222	0.030
ind3_ (female)	0.049	0.048	1.027	0.304	0.027
ind3_ (male)	0.116	0.132	0.882	0.378	0.058

Note. **total** = total effect between predictor and outcome; **dir** = direct effect for the association between predictor and outcome; **ind_tot** = sum of all indirect effects (total minus dir); **indTT** = total indirect effect running via both mediators m1 and m2; **indT_** = total indirect effect running via m1 mediators and then directly to the outcome (omitting the m2 mediator); **ind_T** = total indirect effect running from the predictor directly to the m2 mediator (omitting m1 mediators) and then to the outcome; **ind1 to ind3** = indirect effect via both mediators m11 and m2, m12 and m2, and m13 and m2, respectively; **ind1_ to ind3_** = indirect effect via m1 mediators m11, m12, and m13, respectively (omitting the m2 mediator).

TABLE 5 | Correlation table of all variables in the path model (total)

	Sexual orientation (heterosexual)	Sexual orientation (homosexual)	Sexual orientation (bisexual)	Covid (during/after restrictions)	DERS-SF (total score)	TSF-B-Con (concept subscale)	BMI (kg/m ²)	BDI-FS (total score)	BSQ-8C (total score)	DECB (total score)
Sexual orientation (heterosexual)	1.00	-0.39	-0.76	-0.12	-0.23	-0.11	-0.06	-0.22	-0.15	-0.12
Sexual orientation (homosexual)	-0.39	1.00	-0.08	0.06	0.10	0.12	0.00	0.11	0.08	0.09
Sexual orientation (bisexual)	-0.76	-0.08	1.00	0.08	0.21	0.08	0.04	0.19	0.12	0.07
Covid (during/after restrictions)	-0.12	0.06	0.08	1.00	0.22	0.22	0.13	0.23	0.23	0.26
DERS-SF (total score)	-0.23	0.10	0.21	0.22	1.00	0.52	0.14	0.77	0.57	0.53
TSF-B-Con (concept subscale)	-0.11	0.12	0.08	0.22	0.52	1.00	0.29	0.54	0.84	0.75
BMI (kg/m ²)	-0.06	0.00	0.04	0.13	0.14	0.29	1.00	0.15	0.40	0.30
BDI-FS (total score)	-0.22	0.11	0.19	0.23	0.77	0.54	0.15	1.00	0.60	0.54
BSQ-8C (total score)	-0.15	0.08	0.12	0.23	0.57	0.84	0.40	0.60	1.00	0.78
DECB (total score)	-0.12	0.09	0.07	0.26	0.53	0.75	0.30	0.54	0.78	1.00

Note. Pearson correlations around ± 0.10 are considered small, around ± 0.30 moderate, and ± 0.50 or higher strong. DERS-SF = Emotion Regulation Difficulties short-form; TSF-B-Con = Thought-Shape Fusion Body Trait Questionnaire; BMI = Body mass index; BDI-FS = Beck Depression Inventory Fast Screening; BSQ-8C = Body Shape Questionnaire; DECB = Disturbed Eating and Compensatory Behavior. The DECB variable involves the subscale restrained eating from the EDE-Q8 (items 1-2; (Kliem et al., 2016)) and four additional items from the EDE-Q (items: 15-18; (Hilbert & Tuschen-Caffier, 2016)).

TABLE 6 | Correlation table of all variables in the path model (female)

	Sexual orientation (heterosexual)	Sexual orientation (homosexual)	Sexual orientation (bisexual)	Covid (during/after restrictions)	DERS-SF (total score)	TSF-B-Con (concept subscale)	BMI (kg/m ²)	BDI-FS (total score)	BSQ-8C (total score)	DECB (total score)
Sexual orientation (hetero- sexual)	1.00	-0.31	-0.79	-0.13	-0.21	-0.08	-0.05	-0.20	-0.09	-0.09
Sexual orientation (homo- sexual)	-0.31	1.00	-0.07	0.06	0.14	0.11	-0.01	0.14	0.08	0.10
Sexual orientation (bisex- ual)	-0.79	-0.07	1.00	0.09	0.19	0.06	0.04	0.17	0.08	0.04
Covid (during/after re- strictions)	-0.13	0.06	0.09	1.00	0.21	0.24	0.16	0.24	0.26	0.27
DERS-SF (total score)	-0.21	0.14	0.19	0.21	1.00	0.53	0.14	0.76	0.54	0.52
TSF-B-Con (concept sub- scale)	-0.08	0.11	0.06	0.24	0.53	1.00	0.29	0.54	0.87	0.76
BMI (kg/m ²)	-0.05	-0.01	0.04	0.16	0.14	0.29	1.00	0.15	0.42	0.29
BDI-FS (total score)	-0.20	0.14	0.17	0.24	0.76	0.54	0.15	1.00	0.57	0.52
BSQ-8C (total score)	-0.09	0.08	0.08	0.26	0.54	0.87	0.42	0.57	1.00	0.79
DECB (total score)	-0.09	0.10	0.04	0.27	0.52	0.76	0.29	0.52	0.79	1.00

Note. DERS-SF = Emotion Regulation Difficulties short-form; TSF-B-Con = Thought-Shape Fusion Body Trait Questionnaire; BMI = Body mass index; BDI-FS = Beck Depression Inventory Fast Screening; BSQ-8C = Body Shape Questionnaire; DECB = Disturbed Eating and Compensatory Behavior. The DECB variable involves the subscale restrained eating from the EDE-Q8 (items 1-2; Kliem et al., 2016) and four additional items from the EDE-Q (items: 15-18; Hilbert & Tuschen-Caffier, 2016).

TABLE 7 | Correlation table of all variables in the path model (male)

	Sexual orientation (heterosexual)	Sexual orientation (homosexual)	Sexual orientation (bisexual)	Covid (during/after restrictions)	DERS-SF (total score)	TSF-B-Con (concept subscale)	BMI (kg/m ²)	BDI-FS (total score)	BSQ-8C (total score)	DECB (total score)
Sexual orientation (hetero- sexual)	1.00	−0.84	−0.42	−0.07	−0.20	−0.27	−0.12	−0.22	−0.36	−0.18
Sexual orientation (homo- sexual)	−0.84	1.00	−0.05	0.07	0.13	0.32	0.05	0.17	0.31	0.23
Sexual orientation (bisex- ual)	−0.42	−0.05	1.00	−0.02	0.13	0.03	0.16	0.11	0.21	−0.02
Covid (during/after re- strictions)	−0.07	0.07	−0.02	1.00	0.26	0.07	−0.04	0.17	0.10	0.19
DERS-SF (total score)	−0.20	0.13	0.13	0.26	1.00	0.29	0.16	0.73	0.46	0.40
TSF-B-Con (concept sub- scale)	−0.27	0.32	0.03	0.07	0.29	1.00	0.33	0.39	0.65	0.58
BMI (kg/m ²)	−0.12	0.05	0.16	−0.04	0.16	0.33	1.00	.22	0.49	0.40
BDI-FS (total score)	−0.22	0.17	0.11	0.17	0.73	0.39	0.22	1.00	0.55	0.43
BSQ-8C (total score)	−0.36	0.31	0.21	0.10	0.46	0.65	0.49	0.55	1.00	0.63
DECB (total score)	−0.18	0.23	−0.02	0.19	0.40	0.58	0.40	0.43	0.63	1.00

Note. DERS-SF = Emotion Regulation Difficulties short-form; TSF-B-Con = Thought-Shape Fusion Body Trait Questionnaire; BMI = Body mass index; BDI-FS = Beck Depression Inventory Fast Screening; BSQ-8C = Body Shape Questionnaire; DECB = Disturbed Eating and Compensatory Behavior. The DECB variable involves the subscale restrained eating from the EDE-Q8 (items 1-2; Kliem et al., 2016) and four additional items from the EDE-Q (items: 15-18; Hilbert & Tuschen-Caffier, 2016).

General discussion

This general discussion aims to summarize and integrate the main findings from the three publications presented in this dissertation by first discussing the key results in relation to existing literature. Subsequently, the discussion addresses recommendations for future research and key limitations, especially regarding the study sample and the path model of disturbed eating introduced in this dissertation. Finally, the discussion concludes with an overview of the theoretical and clinical implications derived from the findings.

Publication I: Psychological correlates of body dissatisfaction in Swiss youth over a one-year study-period

Young people often experience pronounced negative perceptions and attitudes towards their weight and shape, known as body dissatisfaction, which has been recognized as a critical public health concern (S. A. McLean et al., 2022). While body dissatisfaction has long been prevalent among young females, it is increasingly observed among young males (Purton et al., 2019). However, there is a significant gender difference in the direction of body dissatisfaction: while females often feel pressured to be thin, males' concerns tend to be two-dimensional, revolving around either increasing muscularity and/or achieving leanness, with less focus on weight loss (Hansson & Schmidt, 2025; Klimek et al., 2018; Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015). Also, an increasing number of young females are reporting the desire to be more muscular (Cunningham et al., 2019; Girard et al., 2018). Research indicates that high levels of body dissatisfaction significantly increase the risk of both subthreshold and threshold eating disorders (Stice & Van Ryzin, 2019; Yamamiya & Stice, 2024). Considering this, it is essential to further investigate the mechanisms that contribute to the development and persistence of body dissatisfaction in young people, which is influenced by a variety of biopsychosocial factors (Cafri et al., 2005; Rodgers et al., 2014, 2020). Yet, a significant gap remains in understanding how psychological factors specifically contribute to body dissatisfaction. Therefore, the **first publication** aimed to bridge this gap by examining the impact of *emotion regulation difficulties* and *appearance-based rejection sensitivity* on *body dissatisfaction* and *muscle dysmorphic symptoms*. The study was conducted through an online-questionnaire, cross-sectionally at two time points one year apart, within a general youth population ($N = 605$, 80% female). In response to evolving appearance-ideals, this research broadens the traditional focus

from weight and shape to also include concerns about muscularity and leanness. To fully understand how these variables evolve over the course of a year, we examined both absolute and relative level stability.

On average, our participants showed mild symptoms of body dissatisfaction, even though the majority had a healthy weight. This aligns with previous research that highlights body dissatisfaction as normative discontent during adolescence and early adulthood in the general population, showing that even young people of healthy weight experience concerns about their weight and shape (Bucchianeri et al., 2013; Reel et al., 2015; Schuck et al., 2018; Wang et al., 2019). A significant positive association was observed between body dissatisfaction and both psychological factors (emotion regulation difficulties, appearance-based rejection sensitivity) at both measurement points. The effect sizes for emotion regulation difficulties ranged from medium to large at the initial assessment and decreased to small one year later. In contrast, the effect sizes for appearance-based rejection sensitivity remained medium at both waves. These results are consistent with previous research, highlighting the significant role of emotion regulation difficulties in the onset and maintenance of body dissatisfaction among adolescents and young adults (Gardner et al., 2021; Hansson et al., 2016; Morin & Meilleur, 2024; Sim & Zeman, 2005). Moreover, our findings add to previous research underlining that the tendency to feel rejected regarding one's own appearance may heighten the vulnerability to develop and maintain body dissatisfaction in youth (Calogero et al., 2010; Park et al., 2009; J. Schmidt & Martin, 2019).

However, the strength of these associations varied between the two measurement points, suggesting developmental changes over the course of the one-year study period. Previous research has established that adolescence and early adulthood are periods marked by significant physical, social, cognitive, and emotional changes (Reel et al., 2015; Sawyer et al., 2018). Specifically, adolescence is characterized by an increasing need to regulate affect and behavior in line with long-term goals and consequences (Steinberg, 2005). The differential maturation of the developing brain, which can continue into early adulthood, involves emotions, cognition, and behavior. Therefore, this developmental phase is often marked by a heightened vulnerability and adjustment challenges, potentially leading to the onset of mental health impairments, including eating disorders (Reel et al., 2015; Sawyer et al., 2018; Steinberg, 2005).

Currently, understanding of the mechanisms linked to muscle dysmorphic symptoms remains limited, as the most commonly used questionnaires often overlook dissatisfaction with and the drive for muscularity and leanness. However, recent studies indicate an emerging trend

towards leaner, toned, and more muscular appearance-ideals among young females and males (Cunningham et al., 2019; Girard et al., 2018; Mitchison et al., 2022). This highlights the need for future research to incorporate more comprehensive measures that reflect these evolving body image concerns as central aspects of body dissatisfaction. The present study is one of the first to examine muscle dysmorphic symptoms in a general youth sample, whereas previous research has primarily focused on adult males involved in bodybuilding or competitive sports (González-Martí et al., 2014). In our study, we observed a generally low prevalence of muscle dysmorphic symptoms. However, it should be noted, that our sample primarily consisted of young females, which may have influenced the manifestation of these symptoms. According to a recent study, the currently recommended cutoff scores for the Muscle Dysmorphic Disorder Inventory (MDDI; Hildebrandt et al., 2004) may not be appropriate for females and therefore require adjustment (Zeeck et al., 2018b). Contrary to previous studies reporting an increasing tendency among young females to pursue the muscle-/athletic-ideal (Cunningham et al., 2019; Girard et al., 2018), our findings suggest that the thin-ideal continues to be more prevalent in our sample. However, it is important to consider that, despite seeming contradictory, the internalization of both thin- and muscular-/athletic-ideals can coexist among young females (Wagner et al., 2022). This highlights the potential need for new assessment tools that capture concerns related to weight, shape, and muscularity, while also accounting for nuanced gender differences in appearance-ideals. For instance, males tend to strive for greater muscle mass, whereas females are more likely to pursue a lean, athletic physique.

Our results identified a significant positive association between muscle dysmorphic symptoms and emotion dysregulation across both assessments, though the effect sizes were modest. Despite this, our findings add valuable insight to the limited body of research that incorporates concerns about muscularity. These studies have shown that greater difficulties in emotion regulation are linked to heightened dissatisfaction with one's own muscularity and leanness (Morin & Meilleur, 2024). The limited influence of emotion regulation difficulties on muscle dysmorphic symptoms observed in our study may be attributed to differences in sampling strategy. While previous research (J. Schmidt & Martin, 2019) primarily focused on adult people with known vulnerabilities (e.g., body dysmorphia, bodybuilding, competitive sport), our study recruited young people from the general population. As a result, earlier findings may reflect a sampling bias, which could explain the lower symptom levels and small effect sizes observed in our data, while also limiting comparability. Nonetheless, this underscores the importance of including muscle dysmorphic symptoms in future studies targeting the general youth population in order to provide a more comprehensive picture of body dissatisfaction.

To gain a deeper understanding of how emotion regulation difficulties, appearance-based rejection sensitivity, body dissatisfaction, and muscle dysmorphic symptoms develop over a one-year period, we examined both *absolute and relative level stability*. Absolute level stability refers to whether the average scores of a characteristic change or stay the same over time – in this case, over one year. In contrast, relative level stability looks at how consistent peoples' positions within a group remain over time – meaning whether those who scored high (or low) at the beginning still scored high (or low) after one year (Newsom, 2023). We observed high absolute and relative level stabilities for all variables involved across the one-year study period. However, the relative level stability for appearance-based rejection sensitivity was comparatively low, indicating greater individual fluctuations over the one-year period. This may be explained by the contextual nature of appearance-based rejection, which often occurs in peer-related settings, particularly in the context of victimization experiences (Lavell et al., 2014; J. Schmidt & Martin, 2019). Moreover, these experiences may have been less frequent during the COVID-19 pandemic, as social restrictions such as homeschooling limited in-person interactions. Supporting this, a study conducted during the pandemic reported significantly reduced rates of bullying (except for cyberbullying) at that time (Vaillancourt et al., 2021).

In conclusion, these findings from a mixed-gender general sample of adolescents and young adults highlight the relevance of emotion regulation difficulties and appearance-based rejection sensitivity in body dissatisfaction – whether focused on concerns about weight, shape, or muscularity – over a one-year period. These findings align with previous research, emphasizing the predictive importance of emotion regulation difficulties and appearance-related rejection sensitivity in the development and persistence of body dissatisfaction (Cunningham, Szabo, et al., 2020a; Hansson et al., 2016).

Publication II: A Path Model Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behavior in Young Females

DECB continue to rise among young people, with elevated levels during adolescence often persisting into early adulthood and contributing to the onset of both subthreshold and threshold eating disorders (Foster et al., 2024; Glazer et al., 2019; Yamamiya et al., 2023). These behaviors are further linked to a range of physical and mental health impairments, including unhealthy body weight, low self-esteem, and depression, highlighting their considerable impact on young people's quality of life (Loose et al., 2023; Loth et al., 2014; Stice et al., 2013). Thus, *DECB* represent a critical public health concern, and underscore the need to better understand

the underlying mechanisms driving their development and persistence (Cosh et al., 2023; Glazer et al., 2019; López-Gil et al., 2023; Peschel, Sigrist, et al., 2024; Schuck et al., 2018). Among these, *emotion regulation difficulties* have consistently emerged as a key transdiagnostic risk factor in both the onset and maintenance of DECB (A.-B. Prefit et al., 2019; Trompeter et al., 2021).

Building on the enhancements Trompeter et al. (2021) introduced to the original CBT-E Model (Fairburn et al., 2003), the ***second publication*** aims to further delineate *multiple mediating pathways* (cognitive, physiological, psychological, body image-related) linking emotion regulation difficulties and DECB within a comprehensive *path model*. In light of the increasing prevalence of DECB among young females over the past decade, gaining a deeper understanding of the complex interplay between these factors is essential. Such insights are not only theoretically valuable but also essential for developing targeted and effective interventions that address DECB and its underlying mechanisms, ultimately reducing the risk of subthreshold and threshold eating disorders.

The path model integrates two sets of serially linked mediators: The *first set (m1)* includes cognitive mediators, such as the *internalization of appearance-ideals* and *body-related cognitive distortions*; physiological mediators like *body mass index*; and psychological mediators including *negative mood* and *social anxiety symptoms*. The *second set (m2)* focuses on body image-related mediators, specifically concerns about weight, shape, muscularity, and leanness (referred to as *body dissatisfaction*). The deliberate ordering of these mediators is crucial, as it establishes body dissatisfaction as a mediator whose vulnerability is heightened by the preceding cognitive, physiological, and psychological mediators. With multiple mediators arranged both serially and in parallel, this model allows for the examination of various *path coefficients*, highlighting the critical role these mediators play in linking emotion regulation difficulties to DECB. The second publication aims to provide a detailed analysis of these paths to understand how each mediator influences the overall impact of emotion regulation difficulties on DECB. Therefore, a large sample of young females ($N = 627$) from the general population was recruited, contrasting with other studies that have primarily focused on at-risk and/or older samples. Although females had a healthy BMI, they reported moderate mental health impairments and exhibited elevated levels of eating disorder pathology, along with significant concerns regarding body weight and shape.

Young female's difficulties in coping with emotions were significantly associated with disturbed eating. This is consistent with previous research (Leppanen et al., 2022; Mikhail et al., 2024; Peschel, Fürtjes, et al., 2024; A.-B. Prefit et al., 2019; Trompeter et al., 2021) and aligns with therapeutic models such as Integrative Cognitive-Affective Therapy, which identifies emotion regulation difficulties as a central component of DECB (Peterson et al., 2020; S. A. Wonderlich et al., 2014). Yet, the effect of emotion regulation difficulties on DECB seems to operate primarily through the mediators outlined in the path model. Therefore, addressing emotion regulation difficulties alone is not adequate for understanding or treating disturbed eating. Thus, we analyzed whether the relationship between emotion regulation difficulties and DECB could be attributed to the combined influence of both sets of mediators or primarily to one set. Our findings revealed that both sets of mediators together (*m1: internalization of appearance-ideals, cognitive distortions, body mass index, negative mood, social anxiety symptoms; m2: body dissatisfaction, muscle dysmorphic symptoms*) account for a considerable proportion of the impact of emotion regulation difficulties on DECB. Focusing only on the first set of mediators (*m1*), we still observed a considerable effect on DECB, though the impact was somewhat reduced. On the other hand, the influence from only the second mediator set (*m2*), was much smaller. However, the mediating effect of body dissatisfaction was significantly stronger than that of muscle dysmorphic symptoms alone. This suggests that, in our female sample, dissatisfaction with one's body plays a more central role in the development of DECB than muscularity-related concerns. The substantial difference in effect sizes indicates that body dissatisfaction may be more directly or strongly linked to DECB in this sample. Also, previous longitudinal studies have identified dissatisfaction with one's own body as one of the major influences fostering DECB (Stice et al., 2017), highlighting body dissatisfaction as a critical public health concern among young females (S. A. McLean et al., 2022). Especially females with elevated levels of emotion regulation difficulties often exhibit increased levels of body dissatisfaction (Mueller et al., 2024), which frequently leads to a higher incidence of DECB (Hughes & Gullone, 2011a; Lucibello et al., 2024). On average, female participants in our study reported moderate to high levels of body dissatisfaction, despite the majority having a healthy body weight. This may reflect a phase of 'normative discontent' commonly observed in young females from the general population, suggesting that internalization of the culturally endorsed thin-ideal is prevalent and has a notable impact on DECB. In contrast, muscle dysmorphic symptoms were relatively low, indicating that the aspiration toward a muscular- or athletic-ideal is less common among young females and exerts a weaker influence on disturbed eating behaviors. This is in line with previous research showing that females are more likely to adopt

weight-loss strategies rather than engage in behaviors aimed at increasing muscularity (Cunningham et al., 2022; Nagata et al., 2022; Wyssen, Bryjova, et al., 2016).

Within the set of early mechanisms, the paths involving body-related cognitive distortions either alone or in conjunction with body dissatisfaction consistently show stronger effects compared to other mediators, underscoring the significant influence of *cognitive mechanisms* on DECB. Findings are also consistent with other prior research, highlighting that body-related cognitive distortions are a common phenomenon especially in the daily lives of young females, who frequently encounter unrealistic appearance-ideals, particularly on social media (Dubois et al., 2016; Munsch, Messerli-Bürge, et al., 2021; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016; Wyssen et al., 2018). Such threatening cognitions (e.g., "I want to limit my eating after imagining slim people") will heighten DECB, especially among young females who also exhibit higher dissatisfaction with their bodies (Dubois et al., 2016; Wyssen et al., 2020). Therefore, prevention programs should reduce perceived pressure to be thin and pursuit of the thin-ideal among young females, as this may help decrease body dissatisfaction, DECB, and the risk of developing eating disorder pathology (Yamamiya & Stice, 2024). Such programs could, for example, promote a more critical and sensitive engagement with image-based social media.

Publication III: Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behaviors in Adolescents and Young Adults: A Path Model Analysis

Young males are notably underrepresented in research on eating disorder pathology, despite a significant number engaging in disturbed eating (Rubo et al., 2020; Schuck et al., 2018; Wyssen, Bryjova, et al., 2016). Considering that gender significantly influences the persistence, etiology, and manifestation of DECB (Hansson et al., 2016; Klimek et al., 2018; Nagata et al., 2020), greater attention for this group is warranted in future studies (Foster et al., 2024; Hansson & Schmidt, 2025; Klimek et al., 2018). Moreover, as most current treatment approaches are primarily derived from studies involving female participants (Murray et al., 2017), including young males is crucial to enhance our understanding of how eating disorder pathology develops and maintains in males, considering potential differences in etiological mechanisms compared to females. In addition, early detection and intervention of DECB in both genders, alongside a comprehensive understanding of its contributing factors, are crucial for reducing the long-term consequences of subthreshold/threshold eating disorders (Trompeter, Bussey,

Forbes, et al., 2022; Turel et al., 2018). This dissertation seeks to contribute to this growing body of knowledge.

Therefore, the *third publication* aims to investigate the multiple mediating mechanisms by which emotion regulation difficulties influence DECB in a mixed-gender sample ($N = 803$, 83% female) and specify if these mechanisms differ between genders. This is of particularly interest, as previous research has highlighted gender-specific differences in body-related cognitive distortions (Dubois et al., 2016) and body dissatisfaction (S. A. McLean et al., 2022; Widmer Howald et al., 2018) and indicated that females are more likely to use DECB to lose weight, whereas males tend to engage in muscularity-enhancing behaviors (S. A. McLean et al., 2022; Nagata et al., 2022; Wyssen, Bryjova, et al., 2016). Hence, we *refined* the path model of disturbed eating, previously tested on young females in the second publication, to accommodate the lower participation rate of males. This required simplifying the original path model by excluding some mediators to effectively investigate gender differences. We excluded cognitive internalization of appearance-ideals due to its high correlation with body-related cognitive distortions. Similarly, we removed social anxiety symptoms because of their significant overlap with negative mood and partially overlapping pathology. Additionally, muscle dysmorphic symptoms were excluded as our study did not specifically target DECB related to increasing muscular volume or leanness. The refined path model of disturbed eating integrates two sets of serially linked mediators: The *first set* ($m1$), covering cognitive (*body-related cognitive distortions*), physiological (*body mass index*), and psychological (*negative mood*) factors; and the *second set* ($m2$), focusing on a body-image-related factor (*body dissatisfaction*). This study was the first to determine the relative importance of these mediators and the paths to which they are linked, specifically investigating whether these paths differ between young females and males.

In our mixed-gender sample of adolescence and young adults ($N = 803$, 83% female), difficulties in coping with emotions were significantly associated with disturbed eating, which aligns with prior research (Leppanen et al., 2022; Mikhail et al., 2024; Peschel, Fürtjes, et al., 2024; A.-B. Prefit et al., 2019; Trompeter et al., 2021). However, our results suggest that the effect of emotion regulation difficulties on DECB is largely mediated by the variables included in the path model. Specifically, we analyzed whether the relationship between emotion regulation difficulties and DECB could be attributed to the combined influence of both sets of mediators or primarily to one set. Our findings revealed that both sets of mediators together ($m1$:

body-related cognitive distortions, BMI, negative mood, and m2: body dissatisfaction) account for a considerable proportion of the impact of emotion regulation difficulties on DECB.

Additionally, when we only focused on the first set of mediators (m1), it still had a notable influence on DECB, although to a lesser extent. On the other hand, the influence from only the second mediator set (m2), was much smaller, indicating a comparatively small mediating influence through body dissatisfaction alone. Despite its established relevance, as also shown in the first publication (Mueller et al., 2024), body dissatisfaction on its own appears to exert a less pronounced influence compared to the m1 mediators. This may be due to its more secondary or indirect connection to emotion regulation difficulties in our mixed-gender sample, resulting in a comparatively small contribution to DECB. Moreover, these findings contrast with earlier research such as Stice's Dual Pathway Model (Stice, 2001), which emphasizes body dissatisfaction as a primary driver of DECB (e.g., binge eating, bulimic symptoms), via two mediating pathways: restraint and negative affect (Stice, 2001; Stice & Van Ryzin, 2019). Our results indicate the potential of a shift in focus and to include the pivotal role of earlier mediating mechanisms (m1), such as body-related cognitive distortions, BMI and negative mood in the development of DECB. In other words, if replicated, our findings might imply that the cognitive processing style, combined with observable physical traits like BMI and current mood, might represent a psychopathological feature, which increases vulnerability to body dissatisfaction in young people. If these results can be confirmed in future studies, this may provide a rationale for extending existing theoretical models, such as the CBT-E Model (Trompeter et al., 2021) or the Dual Pathway Model (Stice, 2001), by integrating multiple mediators.

Within the set of early mechanisms, cognitive processes such as body-related cognitive distortions had the largest impact regarding the association between emotion regulation difficulties and DECB, alone and in conjunction with body dissatisfaction. These results align closely with those from the second publication, where we investigated a similar path model for DECB focused exclusively on young females. As was also found in the female sample of the second publication, body-related cognitive distortions emerged as a central mechanism in the mixed-gender group, further underscoring their relevance in the context of DECB.

Although previous cross-sectional and longitudinal studies have identified body dissatisfaction as a major influence fostering DECB (Lucibello et al., 2024; S. A. McLean et al., 2022; Nagata et al., 2022; Schuck et al., 2018), our findings indicate that its impact might be amplified when combined with other m1 mediators, such as body-related cognitive distortions. Future studies should investigate whether the influence of emotion regulation difficulties mediated via cognitive information processing such as body-related cognitive distortions might

represent a transdiagnostic feature impairing mental health, which has partially been shown in obsessive compulsive disorders (Kim & Lee, 2020) and whether this interaction is even more pronounced in young people with eating or other mental disorders.

Moreover, the third publication aimed to investigate whether the pathways between emotion regulation difficulties and DECB differ across genders. In our sample, a notable *gender difference* emerged in the pathway from emotion regulation difficulties through body-related cognitive distortions (m1 mediator) and body dissatisfaction (m2 mediator) to DECB. This pathway was significantly stronger for females compared to males. These findings suggest that, in females, emotion regulation difficulties are more strongly linked to DECB through body-related cognitive distortions and body dissatisfaction. This indicates that cognitive distortions (e.g., "Thinking about giving up my thin-ideal makes me want to exercise") may serve as a key mechanism through which emotional dysregulation contribute to DECB (e.g., restriction, purging) in young females. In contrast, this pathway appears to be less pronounced in males, implying that other mediating factors, such as performance pressure or muscle dysmorphic symptoms, might play a more central role in the development of DECB in this group and should therefore be investigated as potential additional mediators in future research.

Recommendations for future studies and limitations

When evaluating the findings of this dissertation, it is crucial to acknowledge its various strengths and limitations, and to outline recommendations for future research.

In our sample females demonstrated higher levels of body-related cognitive distortions, compared to males, a finding consistent with previous research (Dubois et al., 2016; Wyssen, Bryjova, et al., 2016; Wyssen, Coelho, et al., 2016). Although most young people in our sample maintained a healthy BMI, females still expressed substantial concerns about their weight and shape, while males predominantly exhibited minimal body dissatisfaction. This may be attributed to the physiological changes during puberty, where especially girls often experience rapid increases in weight and body fat, particularly in areas such as the waist, hips, and thighs, moving them away from the culturally endorsed thin-ideal, heightening their perception of body dissatisfaction (Bucchianeri et al., 2013). A 10-year longitudinal study among young females found that body dissatisfaction increased from middle to high school and intensified further into early adulthood, parallel with increases in BMI (Bucchianeri et al., 2013). Conversely, those with a reduced BMI during this period reported less body dissatisfaction. Meanwhile,

young males develop closer to the thin-ideal through puberty, primarily due to naturally increased muscle mass (Cash & Smolak, 2011; Ricciardelli & Yager, 2015).

However, there is a significant *gender difference* in the direction of body dissatisfaction: while females often feel pressured to be thin, males' concerns tend to be two-dimensional, revolving around either increasing muscularity and/or achieving leanness, with less focus on weight loss (Hansson & Schmidt, 2025; Klimek et al., 2018; Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015). Driven by the desire to conform to a specific thin-ideal, females may experience more body-related cognitive distortions and, as a result, frequently engage in weight-loss oriented DECB, such as fasting, skipping meals, or purging (Lafrance Robinson et al., 2014; S. A. McLean et al., 2022; Mohorić et al., 2023; Ruisoto et al., 2015; Sifre et al., 2024). Conversely, males might more often focus on exercise to control their weight or increase their weight to gain muscular volume, aiming to align with the muscular-/athletic-ideal (Morin & Meilleur, 2024; Nagata et al., 2022; Ruisoto et al., 2015; Wyssen, Bryjova, et al., 2016). In our study, young females more frequently engaged in weight-loss oriented DECB than males, such as restrained eating or compensatory behaviors like purging. Similarly, other studies have found that young females, regardless of their BMI, engage more often in weight-loss oriented DECB (Lucibello et al., 2024; Nagata et al., 2022). Previous research suggests that the tendency to engage in weight-loss oriented DECB when dissatisfied with one's own body may indicate a vulnerability to the future development of eating disorders (Machado et al., 2020; Stice et al., 2017). 31% of female participants in our sample exhibited elevated levels of eating disorder pathology (Machado et al., 2020), in contrast to only 7% of male participants. This highlights a significant gender difference in the vulnerability of eating disorder symptoms among young people. In addition, it should be noted that muscularity-oriented DECB may be as prevalent in males as eating disorders are in females (Compte et al., 2015; Klimek et al., 2018). This underscores the importance of examining muscularity-oriented DECB in future studies, as they have not yet been included in our current path model.

Moreover, elevated levels of emotion regulation difficulties in young people often correlate with increased body dissatisfaction (Cunningham, Szabo, et al., 2020; Hansson et al., 2016), leading to a higher incidence of DECB (Bornioli et al., 2019; Hughes & Gullone, 2011a; Lucibello et al., 2024). In our study, young males reported considerably fewer difficulties coping with emotions than young females, particularly in accepting emotional responses and accessing emotion regulation strategies. This gender difference might be linked to the generally lower self-reports of impaired mental health among males in the general population (Peter et

al., 2023; Ravens-Sieberer et al., 2022). Also, within our sample, young males reported only mild distress and minimal depressive symptoms. Moreover, these differences might contribute to the higher incidence of DECB in young females, as numerous cross-sectional and longitudinal studies have consistently demonstrated associations between maladaptive emotion regulation and disturbed eating symptoms (A.-B. Prefit et al., 2019).

This further raises the question of whether it is generally more difficult for young females to attain the culturally endorsed appearance-ideals (flat stomach vs. increases in body fat during puberty) than it is for young males (sixpack vs. increases in muscle mass during puberty). In order to reduce body fat, young females often need to adopt highly restrictive eating behaviors or engage in excessive physical activity. Since weight-loss oriented DECB are more strongly associated with eating disorder pathology, it is worth considering whether these rigid behaviors may also help explain the higher levels of general psychopathology observed in the young females in our sample. Furthermore, weight-loss oriented DECB are often socially isolating. Dieting may prevent people from participating in shared meals, leading to social exclusion. In contrast, the types of DECB more commonly seen in males are frequently tied to social contexts, such as working out together at the gym. Additionally, weight itself often plays a less central role; instead, muscle building is typically aimed at enhancing physical performance. Moreover, cutting phases following bulking, intended to achieve a leaner physique, are typically shorter in duration than the prolonged dieting periods often observed in young females. As a result, they may have a less detrimental impact on psychological well-being. Moreover, research indicates that males tend to experience less distress related to binge eating and are more likely to report episodes of overeating without a sense of loss of control, which is more commonly reported by females and considered a key correlate of psychological distress (Mohler-Kuo et al., 2016; Murray et al., 2017).

To enhance the external validity and allow for broader generalization of our findings, replicating our study with a more diverse sample would be beneficial. Currently, most of the young participants were either university or high school students. Furthermore, males were underrepresented, a trend consistent with previous mental health research (Ellis et al., 2014; Ryan et al., 2019). Additionally, the BMI did not vary much among the participants, as most of them were within normal BMI range. However, both higher and lower BMI have been associated with increased DECB and body dissatisfaction among young people in various cross-sectional and longitudinal studies (Blundell et al., 2024; Meschberger-Annweiler et al., 2024; Morin & Meilleur, 2024; Sarrar et al., 2020).

Future research should consider differentiating between diverse sexual orientations (e.g., hetero-, homo-, bisexual), as existing evidence suggests that body dissatisfaction and associated DECB may manifest differently across these groups. For instance, homosexual male adolescents and young adults have been found to report higher levels of body dissatisfaction and a stronger drive for both thinness and muscularity (Cella et al., 2010; Jankowski et al., 2014). Findings regarding lesbian adolescents and young adults have been more mixed (Henn et al., 2019; Parker & Harriger, 2020b).

These sampling limitations are particularly relevant in light of recent developments in eating disorder research. Over the past two decades, there has been a growing recognition that subthreshold and threshold eating disorders affect a far more diverse range of people than previously assumed (Hay et al., 2023). They are no longer seen as conditions exclusive to highly educated young females from Western backgrounds but have been increasingly documented among people from lower-income groups, various ethnicities, and diverse sexual orientations (e.g., Calzo et al., 2017; Hazzard et al., 2020). Furthermore, recent findings point to a rising prevalence of eating disorders among young males (Limbers et al., 2018; Murray et al., 2017; Rubo et al., 2020). However, the pathology of eating disorders and their epidemiological risk factors remain understudied in these groups as well as in the general youth population (Hay et al., 2023). Including diverse study groups in terms of education, gender, sexual orientation, age and weight status is crucial as it ensures that these groups also benefit from mental health research and that prevention and psychotherapy are tailored to their specific needs. Therefore, future studies must continue to investigate innovative strategies to attract and retain a more varied participant pool.

Despite extensive recruitment efforts through social media campaigns, school and university visits, and by simplifying the participation process (e.g., online registration, short-form questionnaires), our sample remained relatively homogeneous. As part of the i-BEAT study, recruitment was primarily conducted online but also included in-person visits to schools and universities. These visits served not only to recruit participants but also to raise awareness about eating disorders and disturbed eating among young people. The aim was to reduce the stigmatization of mental health impairments, particularly conditions such as binge eating disorder, and to promote access to mental health support services, as the study was embedded within a broader treatment context. However, due to the COVID-19 pandemic, in-person visits had to be suspended for an extended period. Originally, we had planned to recruit at various schools in order to obtain a more diverse sample in terms of educational background, socioeconomic status, and gender. These plans could not be fully realized, and recruitment primarily relied on

our study website, Instagram, and flyers. As a result, it is likely that certain groups were not sufficiently reached, which may have contributed to the relative homogeneity of our sample.

Drawing on the enhancements Trompeter et al. (2021) introduced to the original CBT-E Model (Fairburn et al., 2003), this dissertation aims to further delineate the mediating pathways linking emotion regulation difficulties and disturbed eating within a comprehensive path model. With the inclusion of multiple mediators arranged both *serially* and in *parallel*, this path model further allows for the examination of various pathways, highlighting how these multiple mediators play a critical role in linking emotion regulation difficulties to DECB. Therefore, the path model of disturbed eating addresses a notable *research gap*, as previous studies have not investigated such a comprehensive path model within a mixed-gender sample of adolescents and young adults from the general population. In addition, this path model facilitates the recommended specification of existing etiological modes (cf. Yamamiya & Stice, 2024) and offers the potential to develop targeted, effective prevention strategies and interventions that could reduce the future onset of subthreshold/threshold eating disorders.

Given these advantages, it is equally important to consider the limitations of the path model. We included a variety of DECB, such as dietary restraint, binge eating, loss of control eating, excessive exercise, and purging (Wyssen, Bryjova, et al., 2016). However, to align with prevalent thin- or muscular-/athletic-ideals, previous studies have identified gender differences in the application of DECB (Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015). Due to the higher pressure on females to be thin, they are more likely to engage in DECB to reduce weight (Cunningham et al., 2022; Lucibello et al., 2024; Wyssen, Bryjova, et al., 2016). Conversely, young males, even when dissatisfied with their bodies, may abstain from dietary restraint and instead engage in alternative DECB focused on increasing muscular volume and leanness (Klimek et al., 2018; Nagata et al., 2022; Vuong et al., 2021). Therefore, future research should include additional DECB items in the path model that are crucial for muscle building or leanness, such as high-protein intake, strength training, weightlifting, cycling of bulking and cutting phases, and the use of muscle-enhancing substances (Lucibello et al., 2024; Nagata et al., 2022).

The current path model includes cognitive, physiological, psychological, and body-related mediators. In future research, it may be beneficial to expand the model by incorporating social mediators as well. As demonstrated in the first publication (Mueller et al., 2024), many adolescents and young adults report high levels of concern about appearance-based rejection. According to the Tripartite Model (Roberts et al., 2022), young people with heightened appearance-based rejection sensitivity may be especially sensitive to appearance-related pressures

from social media, family, and peers. This can lead to body dissatisfaction and eating concerns by promoting the internalization of appearance-ideals and encouraging social comparison. Including such social mediators in future path models could offer valuable insights into the interpersonal dimensions of DECB and further enhance our understanding of its underlying mechanisms.

Future research should aim to test a comprehensive path model that includes leanness- and muscle-enhancing DECB, while also considering the integration of additional social mediators. To improve generalizability and assess the replicability of findings, the model should be examined in more diverse samples, including more males and people from varied social and cultural backgrounds. Moreover, future studies should evaluate the model in adult and clinical populations, particularly among (young) people diagnosed with eating disorders, to determine its broader applicability across different samples.

Additionally, employing ecological momentary assessment to investigate this path model of DECB in participants' natural environments could be beneficial (Peschel, Fürtjes, et al., 2024; Peschel, Sigrist, et al., 2024; Sifre et al., 2024). This approach may uncover how contextual and temporal factors affect these relationships. For instance, recent studies have indicated a noticeable increase in DECB during periods of examination stress in college students (Sifre et al., 2024), which is particularly relevant since most of our participants are either university or senior high school students. Moreover, exposure to appearance-ideals on social media can increase cognitive distortions, body dissatisfaction, and subsequently DECB (Castellanos Silva & Steins, 2023; Munsch, Messerli-Bürgy, et al., 2021). Using real-time, repeated sampling will minimize recall bias common in retrospective questionnaire-based surveys, thus offering a more accurate measurement of experiences, cognitions, and behaviors in the daily lives of young people. While this study focused on cross-sectional associations, conducting *longitudinal studies* to investigate the stability of the path model of DECB and the postulated sequence of the mediators would be highly beneficial. This would help clarify whether the included variables are indeed associated with a heightened risk of developing subthreshold/threshold eating disorders in young people from the general population.

Theoretical and clinical implications

The findings of this dissertation highlight the critical need to focus on DECB in future research, given their high prevalence during adolescence and early adulthood (Peschel, Sigrist, et al., 2024; Peter et al., 2023). If left unaddressed, they may progress to the development of sub-threshold/threshold eating disorders and other mental health impairments, incurring substantial individual and societal costs (Glazer et al., 2019).

Theoretical implications

The current version of the CBT-E Model suggests that the over-evaluation of weight and shape (referred to as body dissatisfaction), emotion regulation difficulties, interpersonal difficulties, perfectionism, and low self-esteem drive eating disorder pathology, including DECB (Trompeter et al., 2021) especially in females. Building upon previous research, this study aimed to examine the CBT-E Model in both genders and to enhance the model by investigating how emotion regulation difficulties influence DECB by incorporating two sets of serially linked key mediators within a comprehensive path model of disturbed eating. The findings corroborate those of Trompeter et al. (2021), identifying emotion regulation difficulties as a significant predictor independent of gender. However, this study further revealed that the impact of ERD on DECB is predominantly mediated through body-related cognitive distortions, either alone or in conjunction with body dissatisfaction in both females and males. If replicated, this indicates that the current CBT-E Model could be enhanced by incorporating this type of cognitive information processing. Such an inclusion appears justified, given that the serially linked mediators in the path model of DECB demonstrate how body-related cognitive distortions amplifies body dissatisfaction in a cross-sectional study. Interventions or experimental trials could help determine whether altering these body-related cognitive distortions can mitigate the impact of emotion regulation difficulties on eating disorder pathology, particularly among young people with compromised emotion regulation abilities. Based on our findings, we can assume that the core associations among factors such as emotion regulation difficulties, body-related cognitive distortions, body dissatisfaction, negative mood, and BMI are similar across genders but more pronounced in young females. Nevertheless, the CBT-E Model should consider potential gender differences in appearance-ideals, such as the muscular-/athletic-ideal commonly observed in males, as they also differently affect the eating behaviors of young people (Hansson & Schmidt, 2025; Klimek et al., 2018; Lucibello et al., 2024; Nagata et al., 2022; Ruisoto et al., 2015; Nagata et al., 2022; Ruisoto et al., 2015). Future research should continue to

investigate gender-specific mediators that link emotion regulation difficulties to eating disorder pathology, especially in young males.

Clinical implications

To mitigate the impact of DECB on the mental health of young people, early detection and the implementation of initial prevention and targeted interventions are crucial (cf. recommendations from national guidelines; Herpertz et al., 2011). Thus, the findings from our study, which identify body-related cognitive distortions and body dissatisfaction as key mediators between emotion regulation difficulties and DECB in young people, could significantly enhance the development of more effective prevention and intervention programs by raising clinicians' awareness of these mediators' roles. If future research including both females and males diagnosed with different types of eating disorders confirms these results, they could be included in clinical practices such as Integrative Cognitive-Affective Therapy, which already recognizes emotion regulation difficulties as a critical element of DECB (Peterson et al., 2020; Wonderlich et al., 2014). Young people struggling to regulate their maladaptive emotions may be particularly vulnerable to body-related distorted information processing. Such information processing remains underexplored and infrequently addressed in prevention and treatment efforts. Implementing training that helps identify and correct this skewed thinking could be crucial for understanding its effects on body dissatisfaction and subsequent DECB. Therefore, future therapeutic approaches could target body-related cognitive distortions by integrating strategies like exposure to triggers, identifying body-related cognitive distortions through tasks like 'thinking out aloud,' and corrective interventions to detach from those (cf. Wyssen et al., 2020). Moreover, promoting body appreciation from childhood can serve as a protective factor against the development of body dissatisfaction and DECB. Recent studies highlight that fostering body appreciation can prevent the persistence of DECB into adulthood (Foster et al., 2024; Hansson & Schmidt, 2025).

Conclusion

Publication 1 underlines the punctual and potentially longer-lasting cross-sectional associations between emotion regulation difficulties, appearance-based rejection sensitivity and concerns about shape, weight, and muscularity across two assessment points one year apart. These findings highlight the importance of developing and validating prevention and treatment modules that strengthen emotion regulation competences and address subjective appearance-related rejection sensitivity at a young age. Future research incorporating ecological momentary assessment and evaluating the effectiveness of corresponding treatment modules will further enhance our understanding of the stability and role of these processes.

Building upon this, **publication 2** is the first to investigate multiple mediators within a path model analyzing the relationship between emotion regulation difficulties and DECB in a large female sample. The identification of body-related cognitive distortions and body dissatisfaction as key mediators underscores the necessity to challenge dysfunctional information processing within prevention and intervention programs and to refine existing theoretical models. This study thereby contributes meaningfully to the literature on the development and maintenance of subthreshold and threshold eating disorders.

Publication 3 extended this path model to a mixed-gender sample and examined whether the mediating pathways between emotion regulation difficulties and DECB differ by gender. Across both genders, body-related cognitive distortions, either alone or in conjunction with body dissatisfaction, emerged as a key mediator. Notably, the pathway from emotion regulation difficulties through body-related cognitive distortions and body dissatisfaction to DECB was substantially stronger in females than in males, which underscores the necessity to challenge information processing in prevention and intervention programs and refine theoretical models. Nevertheless, our path model of DECB demonstrates that the link between emotional dysregulation and DECB is not gender-specific, although the findings revealed that young males in our sample exhibited a lower vulnerability to DECB and psychopathology per se. Ultimately, this research contributes to the body of knowledge on the development and maintenance of subthreshold and threshold eating disorders, emphasizing the critical role of gender-specific approaches.

Returning to the title of this dissertation, the three empirical studies demonstrated that multiple mediators play a crucial role in linking emotion regulation difficulties to disturbed eating. This underscores the importance of continuing to investigate and consider these mediating mechanisms in future research and therapeutic approaches.

References

- Aanesen, F., Meland, E., & Torp, S. (2017). Gender differences in subjective health complaints in adolescence: The roles of self-esteem, stress from schoolwork and body dissatisfaction. *Scandinavian Journal of Public Health*, 45(4), 389–396.
<https://doi.org/10.1177/1403494817690940>
- Alcaraz-Ibáñez, M., Paterna, A., & Griffiths, M. D. (2023). Social physical anxiety and eating disorders: A systematic review and meta-analysis. *Body Image*, 45, 133–141.
<https://doi.org/10.1016/j.bodyim.2023.02.008>
- Aldao, A., Gee, D. G., De Los Reyes, A., & Seager, I. (2016). Emotion regulation as a trans-diagnostic factor in the development of internalizing and externalizing psychopathology: Current and future directions. *Development and Psychopathology*, 28(4pt1), 927–946.
<https://doi.org/10.1017/S0954579416000638>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.). American Psychiatric Association.
- Anderson, L. K., Claudat, K., Cusack, A., Brown, T. A., Trim, J., Rockwell, R., Nakamura, T., Gomez, L., & Kaye, W. H. (2018). Differences in emotion regulation difficulties among adults and adolescents across eating disorder diagnoses. *Journal of Clinical Psychology*, 74(10), 1867–1873. <https://doi.org/10.1002/jclp.22638>
- Andrews, J. L., Ahmed, S. P., & Blakemore, S.-J. (2021). Navigating the Social Environment in Adolescence: The Role of Social Brain Development. *Biological Psychiatry*, 89(2), 109–118. <https://doi.org/10.1016/j.biopsych.2020.09.012>
- Anttila, K., Anttila, M., Kurki, M., & Välimäki, M. (2017). Social relationships among adolescents as described in an electronic diary: a mixed methods study. *Patient Preference and Adherence*, Volume 11, 343–352. <https://doi.org/10.2147/PPA.S126327>
- Aparicio-Martinez, P., Perea-Moreno, A.-J., Martinez-Jimenez, M. P., Redel-Macías, M. D., Pagliari, C., & Vaquero-Abellan, M. (2019). Social Media, Thin-Ideal, Body Dissatisfaction and Disordered Eating Attitudes: An Exploratory Analysis. *International Journal of Environmental Research and Public Health*, 16(21), 4177.
<https://doi.org/10.3390/ijerph16214177>
- Arji, M., Borjali, A., Sohrabi, F., & Farrokhi, N. A. (2016). Role of Perfectionism and Body Image in the Prediction of Body Dysmorphic Disorder Symptoms. *Avicenna Journal of Neuro Psych Physiology*, 3(3). <https://doi.org/10.5812/ajnpp.42560>
- Baceviciene, M., & Jankauskiene, R. (2021). Changes in sociocultural attitudes towards appearance, body image, eating attitudes and behaviours, physical activity, and quality of life in students before and during COVID-19 lockdown. *Appetite*, 166, 105452.
<https://doi.org/10.1016/j.appet.2021.105452>
- Bach, M., Bach, D., de Zwaan, M., Serim, M., & Böhmer, F. (1996). [Validation of the German version of the 20-item Toronto Alexithymia Scale in normal persons and psychiatric patients]. *Psychotherapie, Psychosomatik, Medizinische Psychologie*, 46(1), 23–28.
- Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia scale—I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research*, 38(1), 23–32. [https://doi.org/10.1016/0022-3999\(94\)90005-1](https://doi.org/10.1016/0022-3999(94)90005-1)
- Balzan, R. P., Gilder, M., Nancarrow, T., Mavrangelos, T., & Wade, T. D. (2022). Hasty decision-making in individuals at higher risk of developing an eating disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, 75, 101717.
<https://doi.org/10.1016/j.jbtep.2021.101717>
- Bankoff, S. M., & Pantalone, D. W. (2014). Patterns of Disordered Eating Behavior in Women by Sexual Orientation: A Review of the Literature. *Eating Disorders*, 22(3), 261–274. <https://doi.org/10.1080/10640266.2014.890458>

- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182. <https://doi.org/10.1037/0022-3514.51.6.1173>
- Beck, A. T., Steer, R. A., & Brown, G. K. (2012). BDI – FastScreen for Medical Patients. In *PsycTESTS Dataset*. <https://doi.org/10.1037/t14984-000>
- Bijsterbosch, J. M., van den Brink, F., Vollmann, M., Boelen, P. A., & Sternheim, L. C. (2020). Understanding Relations Between Intolerance of Uncertainty, Social Anxiety, and Body Dissatisfaction in Women. *Journal of Nervous & Mental Disease*, 208(10), 833–835. <https://doi.org/10.1097/NMD.0000000000001208>
- Blundell, E., De Stavola, B. L., Kellock, M. D., Kelly, Y., Lewis, G., McMunn, A., Nicholls, D., Patalay, P., & Solmi, F. (2024). Longitudinal pathways between childhood BMI, body dissatisfaction, and adolescent depression: an observational study using the UK Millennium Cohort Study. *The Lancet Psychiatry*, 11(1), 47–55. [https://doi.org/10.1016/S2215-0366\(23\)00365-6](https://doi.org/10.1016/S2215-0366(23)00365-6)
- Borch, C., Hyde, A., & Cillessen, A. H. N. (2011). The role of attractiveness and aggression in high school popularity. *Social Psychology of Education*, 14(1), 23–39. <https://doi.org/10.1007/s11218-010-9131-1>
- Bornioli, A., Lewis-Smith, H., Smith, A., Slater, A., & Bray, I. (2019). Adolescent body dissatisfaction and disordered eating: Predictors of later risky health behaviours. *Social Science & Medicine*, 238, 112458. <https://doi.org/10.1016/j.socscimed.2019.112458>
- Bowker, J. C., Thomas, K. K., Spencer, S. V., & Park, L. E. (2013). Examining Appearance-Based Rejection Sensitivity During Early Adolescence. *Journal of Research on Adolescence*, 23(2), 375–388. <https://doi.org/10.1111/jora.12003>
- Bozsik, F., Whisenhunt, B. L., Hudson, D. L., Bennett, B., & Lundgren, J. D. (2018). Thin Is In? Think Again: The Rising Importance of Muscularity in the Thin Ideal Female Body. *Sex Roles*, 79(9–10), 609–615. <https://doi.org/10.1007/s11199-017-0886-0>
- Brechan, I., & Kvale, I. L. (2015). Relationship between body dissatisfaction and disordered eating: Mediating role of self-esteem and depression. *Eating Behaviors*, 17, 49–58. <https://doi.org/10.1016/j.eatbeh.2014.12.008>
- Breton, É., Juster, R., & Boer, L. (2023). Gender and sex in eating disorders: A narrative review of the current state of knowledge, research gaps, and recommendations. *Brain and Behavior*, 13(4). <https://doi.org/10.1002/brb3.2871>
- Bucchianeri, M. M., Arikian, A. J., Hannan, P. J., Eisenberg, M. E., & Neumark-Sztainer, D. (2013). Body dissatisfaction from adolescence to young adulthood: Findings from a 10-year longitudinal study. *Body Image*, 10(1), 1–7. <https://doi.org/10.1016/j.bodyim.2012.09.001>
- Burton, A. L., & Abbott, M. J. (2019). Processes and pathways to binge eating: development of an integrated cognitive and behavioural model of binge eating. *Journal of Eating Disorders*, 7(1), 18. <https://doi.org/10.1186/s40337-019-0248-0>
- Cafri, G., Yamamiya, Y., Brannick, M., & Thompson, J. K. (2005). The influence of socio-cultural factors on body image: A meta-analysis. *Clinical Psychology: Science and Practice*, 12(4), 421–433. <https://doi.org/10.1093/clipsy.bpi053>
- Calogero, R. M., Park, L. E., Rahemtulla, Z. K., & Williams, K. C. D. (2010). Predicting excessive body image concerns among British university students: The unique role of Appearance-based Rejection Sensitivity. *Body Image*, 7(1), 78–81. <https://doi.org/10.1016/j.bodyim.2009.09.005>
- Calzo, J. P., Blashill, A. J., Brown, T. A., & Argenal, R. L. (2017). Eating Disorders and Disordered Weight and Shape Control Behaviors in Sexual Minority Populations. *Current Psychiatry Reports*, 19(8), 49. <https://doi.org/10.1007/s11920-017-0801-y>

- Cardi, V., Matteo, R. Di, Corfield, F., & Treasure, J. (2013). Social reward and rejection sensitivity in eating disorders: An investigation of attentional bias and early experiences. *The World Journal of Biological Psychiatry*, 14(8), 622–633. <https://doi.org/10.3109/15622975.2012.665479>
- Casagrande, M., Boncompagni, I., Forte, G., Guarino, A., & Favieri, F. (2020). Emotion and overeating behavior: effects of alexithymia and emotional regulation on overweight and obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, 25(5), 1333–1345. <https://doi.org/10.1007/s40519-019-00767-9>
- Cash, T. F., Santos, M. T., & Williams, E. F. (2005). Coping with body-image threats and challenges: validation of the Body Image Coping Strategies Inventory. *Journal of Psychosomatic Research*, 58(2), 190–199. <https://doi.org/10.1016/j.jpsychores.2004.07.008>
- Cash, T. F., & Smolak, L. (2011). *Body image: A handbook of science, practice, and prevention* (2nd ed.). Guildford Press.
- Castellanos Silva, R., & Steins, G. (2023). Social media and body dissatisfaction in young adults: An experimental investigation of the effects of different image content and influencing constructs. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1037932>
- Cella, S., Iannaccone, M., Ascione, R., & Cotrufo, P. (2010). Body dissatisfaction, abnormal eating behaviours and eating disorder attitude in homo-and heterosexuals. *Eating Weight Disord.*, 15, 180–185.
- Cheng, D., & Wei, M. (2022). Modified Dual Pathway Model for Binge Eating: The Role of Emotion Dysregulation. *The Counseling Psychologist*, 50(4), 536–560. <https://doi.org/10.1177/00110000221077936>
- Chu, J., Ganson, K. T., Vittinghoff, E., Mitchison, D., Hay, P., Tabler, J., Rodgers, R. F., Murray, S. B., & Nagata, J. M. (2021). Weight Goals, Disordered Eating Behaviors, and BMI Trajectories in US Young Adults. *Journal of General Internal Medicine*, 36(9), 2622–2630. <https://doi.org/10.1007/s11606-021-06702-y>
- Coelho, J. S., Baeyens, C., Purdon, C., Shafran, R., Roulin, J., & Bouvard, M. (2013). Assessment of thought–shape fusion: Initial validation of a short version of the trait thought–shape fusion scale. *International Journal of Eating Disorders*, 46(1), 77–85. <https://doi.org/10.1002/eat.22038>
- Coelho, J. S., Ouellet-Courtois, C., Purdon, C., & Steiger, H. (2015). Susceptibility to cognitive distortions: the role of eating pathology. *Journal of Eating Disorders*, 3(1), 31. <https://doi.org/10.1186/s40337-015-0068-9>
- Compte, E. J., Sepulveda, A. R., & Torrente, F. (2015). A two-stage epidemiological study of eating disorders and muscle dysmorphia in male university students in <sc>B</sc>uenos <sc>A</sc>ires. *International Journal of Eating Disorders*, 48(8), 1092–1101. <https://doi.org/10.1002/eat.22448>
- Cosh, S. M., Eshkevari, E., McNeil, D. G., & Tully, P. J. (2023). Classifying excessive exercise: Examining the relationship between compulsive exercise with obsessive-compulsive disorder symptoms and disordered eating symptoms. *European Eating Disorders Review*, 31(6), 769–780. <https://doi.org/10.1002/erv.3002>
- Cunningham, M. L., Griffiths, S., Baillie, A., & Murray, S. B. (2018). Emotion dysregulation moderates the link between perfectionism and dysmorphic appearance concern. *Psychology of Men & Masculinity*, 19(1), 59–68. <https://doi.org/10.1037/men0000082>
- Cunningham, M. L., Pinkus, R. T., Lavender, J. M., Rodgers, R. F., Mitchison, D., Trompetter, N., Ganson, K. T., Nagata, J. M., Szabo, M., Murray, S. B., & Griffiths, S. (2022). The ‘not-so-healthy’ appearance pursuit? Disentangling unique associations of female drive for toned muscularity with disordered eating and compulsive exercise. *Body Image*, 42, 276–286. <https://doi.org/10.1016/j.bodyim.2022.06.002>

- Cunningham, M. L., Rodgers, R. F., Lavender, J. M., Nagata, J. M., Frederick, D., Szabo, M., & Murray, S. B. (2020). 'Big boys don't cry': Examining the indirect pathway of masculinity discrepancy stress and muscle dysmorphia symptomatology through dimensions of emotion dysregulation. *Body Image*, 34, 209–214. <https://doi.org/10.1016/j.bodyim.2020.05.014>
- Cunningham, M. L., Szabo, M., Kambanis, P. E., Murray, S. B., Thomas, J. J., Eddy, K. T., Franko, D. L., & Griffiths, S. (2019). Negative psychological correlates of the pursuit of muscularity among women. *International Journal of Eating Disorders*, 52(11), 1326–1331. <https://doi.org/10.1002/eat.23178>
- Cunningham, M. L., Szabo, M., Rodgers, R. F., Franko, D. L., Eddy, K. T., Thomas, J. J., Murray, S. B., & Griffiths, S. (2020a). An investigation of distress tolerance and difficulties in emotion regulation in the drive for muscularity among women. *Body Image*, 33, 207–213. <https://doi.org/10.1016/j.bodyim.2020.03.004>
- Cunningham, M. L., Szabo, M., Rodgers, R. F., Franko, D. L., Eddy, K. T., Thomas, J. J., Murray, S. B., & Griffiths, S. (2020b). An investigation of distress tolerance and difficulties in emotion regulation in the drive for muscularity among women. *Body Image*, 33, 207–213. <https://doi.org/10.1016/j.bodyim.2020.03.004>
- Dahill, L. M., Touyz, S., Morrison, N. M. V., & Hay, P. (2021). Parental appearance teasing in adolescence and associations with eating problems: a systematic review. *BMC Public Health*, 21(1), 450. <https://doi.org/10.1186/s12889-021-10416-5>
- Dakanalis, A., Favagrossa, L., Clerici, M., Prunas, A., Colmegna, F., Zanetti, M. A., & Riva, G. (2015). Body Dissatisfaction and Eating Disorder Symptomatology: A Latent Structural Equation Modeling Analysis of Moderating Variables in 18-to-28-Year-Old Males. *The Journal of Psychology*, 149(1), 85–112. <https://doi.org/10.1080/00223980.2013.842141>
- Dakanalis, A., Timko, C. A., Clerici, M., Zanetti, M. A., & Riva, G. (2014). Comprehensive examination of the trans-diagnostic cognitive behavioral model of eating disorders in males. *Eating Behaviors*, 15(1), 63–67. <https://doi.org/10.1016/j.eatbeh.2013.10.003>
- De Paoli, T., Fuller-Tyszkiewicz, M., Halliwell, E., Puccio, F., & Krug, I. (2017). Social Rank and Rejection Sensitivity as Mediators of the Relationship between Insecure Attachment and Disordered Eating. *European Eating Disorders Review*, 25(6), 469–478. <https://doi.org/10.1002/erv.2537>
- Della Longa, N. M., & De Young, K. P. (2018). Experiential avoidance, eating expectancies, and binge eating: A preliminary test of an adaption of the Acquired Preparedness model of eating disorder risk. *Appetite*, 120, 423–430. <https://doi.org/10.1016/j.appet.2017.09.022>
- Densham, K., Webb, H. J., Zimmer-Gembeck, M. J., Nesdale, D., & Downey, G. (2017). Early adolescents' body dysmorphic symptoms as compensatory responses to parental appearance messages and appearance-based rejection sensitivity. *Body Image*, 23, 162–170. <https://doi.org/10.1016/j.bodyim.2017.09.005>
- Donahue, J. M., Reilly, E. E., Anderson, L. M., Scharmer, C., & Anderson, D. A. (2018). Evaluating Associations Between Perfectionism, Emotion Regulation, and Eating Disorder Symptoms in a Mixed-Gender Sample. *Journal of Nervous & Mental Disease*, 206(11), 900–904. <https://doi.org/10.1097/NMD.0000000000000895>
- Douglas, V., & Varnado-Sullivan, P. (2016). Weight stigmatization, internalization, and eating disorder symptoms: The role of emotion dysregulation. *Stigma and Health*, 1(3), 166–175. <https://doi.org/10.1037/sah0000029>
- Dubois, J. S., Altieri, T., & Schembri, A. (2016). Thinking yourself fat: The perceived relationship between thoughts and body shape. *Clinical Psychologist*, 20(2), 59–67. <https://doi.org/10.1111/cp.12015>

- Dworschak, C., Polack, R. G., Winschel, J., Joormann, J., & Kober, H. (2023). Emotion regulation and disordered eating behaviour in youths: Two daily-diary studies. *European Eating Disorders Review*, 31(5), 655–669. <https://doi.org/10.1002/erv.2993>
- Edwards, C., Tod, D., Molnar, G., & Markland, D. (2016). Predicting muscularity-related behavior, emotions, and cognitions in men: The role of psychological need thwarting, drive for muscularity, and mesomorphic internalization. *Body Image*, 18, 108–112. <https://doi.org/10.1016/j.bodyim.2016.06.005>
- Eisenberg, M. E., Neumark-Sztainer, D., & Paxton, S. J. (2006). Five-year change in body satisfaction among adolescents. *Journal of Psychosomatic Research*, 61(4), 521–527. <https://doi.org/10.1016/j.jpsychores.2006.05.007>
- Ellis, L. A., McCabe, K. L., Rahilly, K. A., Nicholas, M. A., Davenport, T. A., Burns, J. M., & Hickie, I. B. (2014). Encouraging young men's participation in mental health research and treatment: perspectives in our technological age. *Clinical Investigation*, 4(10), 881–888. <https://doi.org/10.4155/cli.14.61>
- Ernst, V., Bürger, A., & Hammerle, F. (2017). Prevalence and severity of eating disorders: A comparison of DSM-IV and DSM-5 among German adolescents. *International Journal of Eating Disorders*, 50(11), 1255–1263. <https://doi.org/10.1002/eat.22780>
- Evans, C., & Dolan, B. (1993). Body shape questionnaire: Derivation of shortened “alternate forms.” *International Journal of Eating Disorders*, 13(3), 315–321. [https://doi.org/10.1002/1098-108X\(199304\)13:3<315::AID-EAT2260130310>3.0.CO;2-3](https://doi.org/10.1002/1098-108X(199304)13:3<315::AID-EAT2260130310>3.0.CO;2-3)
- Fairburn, C. G., & Cooper, Z. (1993). *The eating disorder examination* (C. G. Fairburn & G. T. Wilson, Eds.; 12th ed.). Guilford Press.
- Fairburn, C. G., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: a “transdiagnostic” theory and treatment. *Behaviour Research and Therapy*, 41(5), 509–528. [https://doi.org/10.1016/S0005-7967\(02\)00088-8](https://doi.org/10.1016/S0005-7967(02)00088-8)
- Federal Council of Switzerland. (2022). *Coronavirus: Rückkehr in die normale Lage und Planung der Übergangsphase bis Frühling 2023 [Medienmitteilung]*.
- Feingold, A. (2009). Effect sizes for growth-modeling analysis for controlled clinical trials in the same metric as for classical analysis. *Psychological Methods*, 14(1), 43–53. <https://doi.org/10.1037/a0014699>
- Félix, S., Gonçalves, S., Ramos, R., Tavares, A., Vaz, A. R., Machado, P. P. P., & Conceição, E. (2025). Emotion regulation as a transdiagnostic construct across the spectrum of disordered eating in adolescents: A systematic review. *Journal of Affective Disorders*, 369, 868–885. <https://doi.org/10.1016/j.jad.2024.10.017>
- Ferreiro, F., Seoane, G., & Senra, C. (2012). Gender-related Risk and Protective Factors for Depressive Symptoms and Disordered Eating in Adolescence: A 4-year Longitudinal Study. *Journal of Youth and Adolescence*, 41(5), 607–622. <https://doi.org/10.1007/s10964-011-9718-7>
- Ferreiro, F., Seoane, G., & Senra, C. (2014). Toward understanding the role of body dissatisfaction in the gender differences in depressive symptoms and disordered eating: A longitudinal study during adolescence. *Journal of Adolescence*, 37(1), 73–84. <https://doi.org/10.1016/j.adolescence.2013.10.013>
- Forrer, F., Rubo, M., Wyssen, A., Meyer, A. H., & Munsch, S. (2025). The predictive value of emotion regulation difficulties and negative mood on short and long-term treatment outcomes in an online guided self-help programme for adults with binge-eating disorder. *European Eating Disorders Review*, 33(1), 163–173. <https://doi.org/10.1002/erv.3135>
- Foster, L., Lundh, L., & Daukantaitė, D. (2024). Disordered eating in a 10-year perspective from adolescence to young adulthood: Stability, change, and body dissatisfaction as a predictor. *Scandinavian Journal of Psychology*, 65(1), 32–41. <https://doi.org/10.1111/sjop.12950>

- Frederick, D. A., Crerand, C. E., Brown, T. A., Perez, M., Best, C. R., Cook-Cottone, C. P., Compte, E. J., Convertino, L., Gordon, A. R., Malcarne, V. L., Nagata, J. M., Parent, M. C., Pennesi, J.-L., Pila, E., Rodgers, R. F., Schaefer, L. M., Thompson, J. K., Tylka, T. L., & Murray, S. B. (2022). Demographic predictors of body image satisfaction: The U.S. Body Project I. *Body Image*, 41, 17–31. <https://doi.org/10.1016/j.bodyim.2022.01.011>
- Frisén, A., Lunde, C., & Berg, A. I. (2015). Developmental patterns in body esteem from late childhood to young adulthood: A growth curve analysis. *European Journal of Developmental Psychology*, 12(1), 99–115. <https://doi.org/10.1080/17405629.2014.951033>
- Garcia, S. C., Mikhail, M. E., Keel, P. K., Burt, S. A., Neale, M. C., Boker, S., & Klump, K. L. (2020). Increased rates of eating disorders and their symptoms in women with major depressive disorder and anxiety disorders. *International Journal of Eating Disorders*, 53(11), 1844–1854. <https://doi.org/10.1002/eat.23366>
- Gardner, A. A., Hawes, T., Zimmer-Gembeck, M. J., Webb, H. J., Waters, A. M., & Nesdale, D. (2021). Emotion regulation and support from others: Buffering of body dysmorphic symptoms in adolescent and young adult men but not women. *Journal of Adolescence*, 86(1), 1–10. <https://doi.org/10.1016/j.adolescence.2020.11.008>
- Garipey, G., Nitka, D., & Schmitz, N. (2010). The association between obesity and anxiety disorders in the population: a systematic review and meta-analysis. *International Journal of Obesity*, 34(3), 407–419. <https://doi.org/10.1038/ijo.2009.252>
- Girard, M., Rodgers, R. F., & Chabrol, H. (2018). Prospective predictors of body dissatisfaction, drive for thinness, and muscularity concerns among young women in France: A sociocultural model. *Body Image*, 26, 103–110. <https://doi.org/10.1016/j.bodyim.2018.07.001>
- Gitimu, P. N., Jameson, M. M., Turel, T., Pohle-Krauza, R., Mincher, J., Rowlands, Z., & Elias, J. (2016). Appearance issues, depression, and disordered eating among college females. *Cogent Psychology*, 3(1), 1196512. <https://doi.org/10.1080/23311908.2016.1196512>
- Glazer, K. B., Sonnevile, K. R., Micali, N., Swanson, S. A., Crosby, R., Horton, N. J., Eddy, K. T., & Field, A. E. (2019). The Course of Eating Disorders Involving Bingeing and Purging Among Adolescent Girls: Prevalence, Stability, and Transitions. *Journal of Adolescent Health*, 64(2), 165–171. <https://doi.org/10.1016/j.jadohealth.2018.09.023>
- Goldschmidt, A. B., Lavender, J. M., Hipwell, A. E., Stepp, S. D., & Keenan, K. (2017a). Emotion Regulation and Loss of Control Eating in Community-Based Adolescents. *Journal of Abnormal Child Psychology*, 45(1), 183–191. <https://doi.org/10.1007/s10802-016-0152-x>
- Goldschmidt, A. B., Lavender, J. M., Hipwell, A. E., Stepp, S. D., & Keenan, K. (2017b). Emotion Regulation and Loss of Control Eating in Community-Based Adolescents. *Journal of Abnormal Child Psychology*, 45(1), 183–191. <https://doi.org/10.1007/s10802-016-0152-x>
- González-Martí, I., Fernández Bustos, J. G., Hernández-Martínez, A., & Contreras Jordán, O. R. (2014). Physical Perceptions and Self-Concept in Athletes with Muscle Dysmorphia Symptoms. *The Spanish Journal of Psychology*, 17, E43. <https://doi.org/10.1017/sjp.2014.45>
- Goodwin, H., Haycraft, E., & Meyer, C. (2014). Emotion regulation styles as longitudinal predictors of compulsive exercise: A twelve month prospective study. *Journal of Adolescence*, 37(8), 1399–1404. <https://doi.org/10.1016/j.adolescence.2014.10.001>
- Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54. <https://doi.org/10.1023/B:JOBA.0000007455.08539.94>

- Griffiths, S., Hay, P., Mitchison, D., Mond, J. M., McLean, S. A., Rodgers, B., Massey, R., & Paxton, S. J. (2016). Sex differences in the relationships between body dissatisfaction, quality of life and psychological distress. *Australian and New Zealand Journal of Public Health*, 40(6), 518–522. <https://doi.org/10.1111/1753-6405.12538>
- Griffiths, S., & Stefanovski, A. (2019). Thinspiration and fitspiration in everyday life: An experience sampling study. *Body Image*, 30, 135–144. <https://doi.org/10.1016/j.bodyim.2019.07.002>
- Grogan, S. (2021). *Body Image: Understanding Body Dissatisfaction in Men, Women and Children*. Routledge. <https://doi.org/10.4324/9781003100041>
- Grosick, T. L., Talbert-Johnson, C., Myers, M. J., & Angelo, R. (2013). Assessing the Landscape: Body Image Values and Attitudes Among Middle School Boys and Girls. *American Journal of Health Education*, 44(1), 41–52. <https://doi.org/10.1080/19325037.2012.749682>
- Gross, J. J. (1998). The Emerging Field of Emotion Regulation: An Integrative Review. *Review of General Psychology*, 2(3), 271–299. <https://doi.org/10.1037/1089-2680.2.3.271>
- Haedt-Matt, A. A., & Keel, P. K. (2011). Revisiting the affect regulation model of binge eating: A meta-analysis of studies using ecological momentary assessment. *Psychological Bulletin*, 137(4), 660–681. <https://doi.org/10.1037/a0023660>
- Hansson, E., Daukantaitė, D., & Johnsson, P. (2016). Typical patterns of disordered eating among Swedish adolescents: associations with emotion dysregulation, depression, and self-esteem. *Journal of Eating Disorders*, 4(1), 28. <https://doi.org/10.1186/s40337-016-0122-2>
- Hansson, E., Daukantaitė, D., & Johnsson, P. (2017). Disordered eating and emotion dysregulation among adolescents and their parents. *BMC Psychology*, 5(1), 12. <https://doi.org/10.1186/s40359-017-0180-5>
- Hansson, E., & Schmidt, M. (2025). Measuring disordered eating in adolescent boys: a systematic literature review. *Eating Disorders*, 1–21. <https://doi.org/10.1080/10640266.2024.2433325>
- Hawes, T., Zimmer-Gembeck, M. J., & Campbell, S. M. (2020). Unique associations of social media use and online appearance preoccupation with depression, anxiety, and appearance rejection sensitivity. *Body Image*, 33, 66–76. <https://doi.org/10.1016/j.bodyim.2020.02.010>
- Hay, P., Aouad, P., Le, A., Marks, P., Maloney, D., Barakat, S., Boakes, R., Brennan, L., Bryant, E., Byrne, S., Caldwell, B., Calvert, S., Carroll, B., Castle, D., Caterson, I., Chelius, B., Chiem, L., Clarke, S., Conti, J., ... Maguire, S. (2023). Epidemiology of eating disorders: population, prevalence, disease burden and quality of life informing public policy in Australia—a rapid review. *Journal of Eating Disorders*, 11(1), 23. <https://doi.org/10.1186/s40337-023-00738-7>
- Hazzard, V. M., Loth, K. A., Hooper, L., & Becker, C. B. (2020). Food Insecurity and Eating Disorders: a Review of Emerging Evidence. *Current Psychiatry Reports*, 22(12), 74. <https://doi.org/10.1007/s11920-020-01200-0>
- Heinberg, L. J., Thompson, J. K., & Stormer, S. (1995). Development and validation of the sociocultural attitudes towards appearance questionnaire. *International Journal of Eating Disorders*, 17(1), 81–89. [https://doi.org/10.1002/1098-108X\(199501\)17:1<81::AID-EAT2260170111>3.0.CO;2-Y](https://doi.org/10.1002/1098-108X(199501)17:1<81::AID-EAT2260170111>3.0.CO;2-Y)
- Henn, A. T., Taube, C. O., Vocks, S., & Hartmann, A. S. (2019). Body Image as Well as Eating Disorder and Body Dysmorphic Disorder Symptoms in Heterosexual, Homosexual, and Bisexual Women. *Frontiers in Psychiatry*, 10. <https://doi.org/10.3389/fpsy.2019.00531>

- Herpertz, S., Fichter, M., Herpertz-Dahlmann, B., Hilbert, A., Tuschen-Caffier, B., Vocks, S., & Zeeck, A. (2011). *S3-Leitlinie Diagnostik und Behandlung der Essstörungen* (2nd ed.). Springer.
- Herpertz-Dahlmann, B. (2015). Adolescent Eating Disorders. *Child and Adolescent Psychiatric Clinics of North America*, 24(1), 177–196. <https://doi.org/10.1016/j.chc.2014.08.003>
- Herpertz-Dahlmann, B., Dimpfle, A., Konrad, K., Klasen, F., & Ravens-Sieberer, U. (2015). Eating disorder symptoms do not just disappear: the implications of adolescent eating-disordered behaviour for body weight and mental health in young adulthood. *European Child & Adolescent Psychiatry*, 24(6), 675–684. <https://doi.org/10.1007/s00787-014-0610-3>
- Hilbert, A., & Tuschen-Caffier, B. (2016). *Eating Disorder Examination - Deutschsprachige Übersetzung* (2nd ed.). dgvt-Verlag.
- Hildebrandt, T., Langenbucher, J., & Schlundt, D. G. (2004). Muscularity concerns among men: development of attitudinal and perceptual measures. *Body Image*, 1(2), 169–181. <https://doi.org/10.1016/j.bodyim.2004.01.001>
- Hoffmann, S., & Warschburger, P. (2018). Patterns of body image concerns in adolescence and early adulthood: A latent profile analysis. *Eating Behaviors*, 29, 28–34. <https://doi.org/10.1016/j.eatbeh.2018.02.002>
- Holsen, I., Jones, D. C., & Birkeland, M. S. (2012). Body image satisfaction among Norwegian adolescents and young adults: A longitudinal study of the influence of interpersonal relationships and BMI. *Body Image*, 9(2), 201–208. <https://doi.org/10.1016/j.bodyim.2012.01.006>
- Homan, K. (2010). Athletic-ideal and thin-ideal internalization as prospective predictors of body dissatisfaction, dieting, and compulsive exercise. *Body Image*, 7(3), 240–245. <https://doi.org/10.1016/j.bodyim.2010.02.004>
- Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, 61(3), 348–358. <https://doi.org/10.1016/j.biopsych.2006.03.040>
- Hughes, E. K., & Gullone, E. (2011a). Emotion regulation moderates relationships between body image concerns and psychological symptomatology. *Body Image*, 8(3), 224–231. <https://doi.org/10.1016/j.bodyim.2011.04.001>
- Hughes, E. K., & Gullone, E. (2011b). Emotion regulation moderates relationships between body image concerns and psychological symptomatology. *Body Image*, 8(3), 224–231. <https://doi.org/10.1016/j.bodyim.2011.04.001>
- Hutchison, E. N., Haden, S. C., Saunders, B. A., Cain, N. M., & Grundleger, A. B. (2020). Disordered Eating in Men and Women: Internalization of Sociocultural Body Image Norms and Emotion Dysregulation. *American Journal of Health Education*, 51(3), 151–160. <https://doi.org/10.1080/19325037.2020.1740119>
- Jacobi, C., Fittig, E., Bryson, S. W., Wilfley, D., Kraemer, H. C., & Taylor, C. B. (2011). Who is really at risk? Identifying risk factors for subthreshold and full syndrome eating disorders in a high-risk sample. *Psychological Medicine*, 41(9), 1939–1949. <https://doi.org/10.1017/S0033291710002631>
- Jankowski, G. S., Diedrichs, P. C., & Halliwell, E. (2014). Can appearance conversations explain differences between gay and heterosexual men's body dissatisfaction? *Psychology of Men & Masculinity*, 15(1), 68–77. <https://doi.org/10.1037/a0031796>
- Karazsia, B. T., van Dulmen, M. H. M., Wong, K., & Crowther, J. H. (2013). Thinking meta-theoretically about the role of internalization in the development of body dissatisfaction and body change behaviors. *Body Image*, 10(4), 433–441. <https://doi.org/10.1016/j.bodyim.2013.06.005>
- Kaufman, E. A., Xia, M., Fosco, G., Yaptangco, M., Skidmore, C. R., & Crowell, S. E. (2016). The Difficulties in Emotion Regulation Scale Short Form (DERS-SF):

- Validation and Replication in Adolescent and Adult Samples. *Journal of Psychopathology and Behavioral Assessment*, 38(3), 443–455. <https://doi.org/10.1007/s10862-015-9529-3>
- Keenan, K. (2000). Emotion dysregulation as a risk factor for child psychopathology. *Clinical Psychology: Science and Practice*, 7(4), 418–434. <https://doi.org/10.1093/clipsy.7.4.418>
- Kim, J. E., & Lee, S. J. (2020). Thought-Action Fusion as Predictors of Obsessive-Compulsive Symptom Dimensions. *Psychiatry Investigation*, 17(12), 1226–1235. <https://doi.org/10.30773/pi.2020.0292>
- Kliem, S., Mößle, T., Zenger, M., & Brähler, E. (2014). Reliability and validity of the beck depression inventory-fast screen for medical patients in the general German population. *Journal of Affective Disorders*, 156, 236–239. <https://doi.org/10.1016/j.jad.2013.11.024>
- Kliem, S., Mößle, T., Zenger, M., Strauß, B., Brähler, E., & Hilbert, A. (2016). The eating disorder examination-questionnaire 8: A brief measure of eating disorder psychopathology (EDE-Q8). *International Journal of Eating Disorders*, 49(6), 613–616. <https://doi.org/10.1002/eat.22487>
- Klimek, P., Murray, S. B., Brown, T., Gonzales IV, M., & Blashill, A. J. (2018). Thinness and muscularity internalization: Associations with disordered eating and muscle dysmorphia in men. *International Journal of Eating Disorders*, 51(4), 352–357. <https://doi.org/10.1002/eat.22844>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford publications.
- Knauss, C., Paxton, S. J., & Alsaker, F. D. (2008). Body Dissatisfaction in Adolescent Boys and Girls: Objectified Body Consciousness, Internalization of the Media Body Ideal and Perceived Pressure from Media. *Sex Roles*, 59(9–10), 633–643. <https://doi.org/10.1007/s11199-008-9474-7>
- Knauss, C., Paxton, S. J., & Alsaker, F. D. (2009). Validation of the German version of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-G). *Body Image*, 6(2), 113–120. <https://doi.org/10.1016/j.bodyim.2009.01.002>
- Kroenke, K., Spitzer, R. L., Williams, J. B. W., & Lowe, B. (2009). An Ultra-Brief Screening Scale for Anxiety and Depression: The PHQ-4. *Psychosomatics*, 50(6), 613–621. <https://doi.org/10.1176/appi.psy.50.6.613>
- Lacroix, E., Atkinson, M. J., Garbett, K. M., & Diedrichs, P. C. (2022). One size does not fit all: Trajectories of body image development and their predictors in early adolescence. *Development and Psychopathology*, 34(1), 285–294. <https://doi.org/10.1017/S0954579420000917>
- Lafrance Robinson, A., Kosmerly, S., Mansfield-Green, S., & Lafrance, G. (2014). Disordered eating behaviours in an undergraduate sample: Associations among gender, body mass index, and difficulties in emotion regulation. *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement*, 46(3), 320–326. <https://doi.org/10.1037/a0031123>
- Laghi, F., Bianchi, D., Pompili, S., Lonigro, A., & Baiocco, R. (2018). Metacognition, emotional functioning and binge eating in adolescence: the moderation role of need to control thoughts. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, 23(6), 861–869. <https://doi.org/10.1007/s40519-018-0603-1>
- Lampard, A. M., Tasca, G. A., Balfour, L., & Bissada, H. (2013). An Evaluation of the Transdiagnostic Cognitive-behavioural Model of Eating Disorders. *European Eating Disorders Review*, 21(2), 99–107. <https://doi.org/10.1002/erv.2214>
- Lavell, C. H., Zimmer-Gembeck, M. J., Farrell, L. J., & Webb, H. (2014). Victimization, social anxiety, and body dysmorphic concerns: Appearance-based rejection sensitivity as a mediator. *Body Image*, 11(4), 391–395. <https://doi.org/10.1016/j.bodyim.2014.06.008>

- Lavender, J. M., & Anderson, D. A. (2010). Contribution of emotion regulation difficulties to disordered eating and body dissatisfaction in college men. *International Journal of Eating Disorders*, 43(4), 352–357. <https://doi.org/10.1002/eat.20705>
- Lavender, J. M., Wonderlich, S. A., Engel, S. G., Gordon, K. H., Kaye, W. H., & Mitchell, J. E. (2015). Dimensions of emotion dysregulation in anorexia nervosa and bulimia nervosa: A conceptual review of the empirical literature. *Clinical Psychology Review*, 40, 111–122. <https://doi.org/10.1016/j.cpr.2015.05.010>
- Lee, A. Y., Reynolds, K. D., Stacy, A., Niu, Z., & Xie, B. (2019). Family functioning, moods, and binge eating among urban adolescents. *Journal of Behavioral Medicine*, 42(3), 511–521. <https://doi.org/10.1007/s10865-018-9994-8>
- Leone, J. E., Wise, K. A., Mullin, E. M., Harmon, W., Moreno, N., & Drenth, J. (2015). The effects of pubertal timing and alexithymia on symptoms of muscle dysmorphia and the drive for muscularity in men. *Psychology of Men & Masculinity*, 16(1), 67–77. <https://doi.org/10.1037/a0035920>
- Leppanen, J., Brown, D., McLinden, H., Williams, S., & Tchanturia, K. (2022). The Role of Emotion Regulation in Eating Disorders: A Network Meta-Analysis Approach. *Frontiers in Psychiatry*, 13. <https://doi.org/10.3389/fpsyt.2022.793094>
- Liechty, J. M., & Lee, M. (2013). Longitudinal predictors of dieting and disordered eating among young adults in the U.S. *International Journal of Eating Disorders*, 46(8), 790–800. <https://doi.org/10.1002/eat.22174>
- Limbers, C. A., Cohen, L. A., & Gray, B. A. (2018). Eating disorders in adolescent and young adult males: prevalence, diagnosis, and treatment strategies. *Adolescent Health, Medicine and Therapeutics, Volume 9*, 111–116. <https://doi.org/10.2147/AHMT.S147480>
- Loose, T., Geoffroy, M. C., Orri, M., Chadi, N., Scardera, S., Booij, L., Breton, E., Tremblay, R., Boivin, M., & Côté, S. (2023). Pathways of association between disordered eating in adolescence and mental health outcomes in young adulthood during the COVID-19 pandemic. *Canadian Journal of Public Health*, 114(1), 22–32. <https://doi.org/10.17269/s41997-022-00715-8>
- López-Gil, J. F., García-Hermoso, A., Smith, L., Firth, J., Trott, M., Mesas, A. E., Jiménez-López, E., Gutiérrez-Espinoza, H., Tárraga-López, P. J., & Victoria-Montesinos, D. (2023). Global Proportion of Disordered Eating in Children and Adolescents. *JAMA Pediatrics*, 177(4), 363. <https://doi.org/10.1001/jamapediatrics.2022.5848>
- Loth, K. A., MacLehose, R., Bucchianeri, M., Crow, S., & Neumark-Sztainer, D. (2014). Predictors of Dieting and Disordered Eating Behaviors From Adolescence to Young Adulthood. *Journal of Adolescent Health*, 55(5), 705–712. <https://doi.org/10.1016/j.jadohealth.2014.04.016>
- Loth, K. A., Watts, A. W., van den Berg, P., & Neumark-Sztainer, D. (2015). Does Body Satisfaction Help or Harm Overweight Teens? A 10-Year Longitudinal Study of the Relationship Between Body Satisfaction and Body Mass Index. *Journal of Adolescent Health*, 57(5), 559–561. <https://doi.org/10.1016/j.jadohealth.2015.07.008>
- Löwe, B., Wahl, I., Rose, M., Spitzer, C., Glaesmer, H., Wingenfeld, K., Schneider, A., & Brähler, E. (2010). A 4-item measure of depression and anxiety: Validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of Affective Disorders*, 122(1–2), 86–95. <https://doi.org/10.1016/j.jad.2009.06.019>
- Lucibello, K. M., Gohari, M. R., Leatherdale, S. T., & Patte, K. A. (2024). Factors associated with prospective changes in weight control intentions among adolescents. *Journal of Adolescence*, 96(5), 953–968. <https://doi.org/10.1002/jad.12307>
- Machado, P. P. P., Grilo, C. M., Rodrigues, T. F., Vaz, A. R., & Crosby, R. D. (2020). Eating Disorder Examination – Questionnaire short forms: A comparison. *International Journal of Eating Disorders*, 53(6), 937–944. <https://doi.org/10.1002/eat.23275>

- Marashi, M., Lucibello, K. M., & Sabiston, C. M. (2024). The female athletic ideal — Friend or foe? Fit, thin, and athletic body ideals and their associations with women's body image. *Body Image*, 48, 101672. <https://doi.org/10.1016/j.bodyim.2023.101672>
- Mason, T. B., Smith, K. E., Crosby, R. D., Engel, S. G., Peterson, C. B., Wonderlich, S. A., & Jin, H. (2021). Multi-state modeling of thought-shape fusion using ecological momentary assessment. *Body Image*, 39, 139–145. <https://doi.org/10.1016/j.bodyim.2021.07.002>
- Mastro, S., Zimmer-Gembeck, M. J., Webb, H. J., Farrell, L., & Waters, A. (2016). Young adolescents' appearance anxiety and body dysmorphic symptoms: Social problems, self-perceptions and comorbidities. *Journal of Obsessive-Compulsive and Related Disorders*, 8, 50–55. <https://doi.org/10.1016/j.jocrd.2015.12.001>
- Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. Editor's note: This article was written before the development of some contemporary measures of social phobia, such as the Social Phobia and Anxiety Inventory (Turner et al., 1989). We have invited this article for publication because of the growing interest in the scales described therein. *S.T. Behaviour Research and Therapy*, 36(4), 455–470. [https://doi.org/10.1016/S0005-7967\(97\)10031-6](https://doi.org/10.1016/S0005-7967(97)10031-6)
- McFarland, M. B., & Kaminski, P. L. (2009). Men, muscles, and mood: The relationship between self-concept, dysphoria, and body image disturbances. *Eating Behaviors*, 10(1), 68–70. <https://doi.org/10.1016/j.eatbeh.2008.10.007>
- McLaughlin, K. A., Hatzenbuehler, M. L., Mennin, D. S., & Nolen-Hoeksema, S. (2011). Emotion dysregulation and adolescent psychopathology: A prospective study. *Behaviour Research and Therapy*, 49(9), 544–554. <https://doi.org/10.1016/j.brat.2011.06.003>
- McLean, C. P., Miller, N. A., & Hope, D. A. (2007). Mediating Social Anxiety and Disordered Eating: The Role of Expressive Suppression. *Eating Disorders*, 15(1), 41–54. <https://doi.org/10.1080/10640260601044485>
- McLean, C. P., Utpala, R., & Sharp, G. (2022). The impacts of COVID-19 on eating disorders and disordered eating: A mixed studies systematic review and implications. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.926709>
- McLean, S. A., Rodgers, R. F., Slater, A., Jarman, H. K., Gordon, C. S., & Paxton, S. J. (2022). Clinically significant body dissatisfaction: prevalence and association with depressive symptoms in adolescent boys and girls. *European Child & Adolescent Psychiatry*, 31(12), 1921–1932. <https://doi.org/10.1007/s00787-021-01824-4>
- Meschberger-Annweiler, F.-A., Ascione, M., Porras-Garcia, B., Mendoza-Medialdea, M. T., Ferrer-Garcia, M., & Gutierrez-Maldonado, J. (2024). The Moderating Effect of Suggestibility on the Relationship between Body Mass Index and Body Dissatisfaction in Women. *Journal of Clinical Medicine*, 13(16), 4647. <https://doi.org/10.3390/jcm13164647>
- Mikhail, M. E., Burt, S. A., Neale, M. C., Keel, P. K., Katzman, D. K., & Klump, K. L. (2024). Changes in affect longitudinally mediate associations between emotion regulation strategy use and disordered eating. *International Journal of Eating Disorders*, 57(5), 1181–1191. <https://doi.org/10.1002/eat.24162>
- Mikhail, M. E., & Kring, A. M. (2019). Emotion regulation strategy use and eating disorder symptoms in daily life. *Eating Behaviors*, 34, 101315. <https://doi.org/10.1016/j.eatbeh.2019.101315>
- Mitchison, D., Mond, J., Bussey, K., Griffiths, S., Trompeter, N., Lonergan, A., Pike, K. M., Murray, S. B., & Hay, P. (2020). DSM-5 full syndrome, other specified, and unspecified eating disorders in Australian adolescents: prevalence and clinical significance. *Psychological Medicine*, 50(6), 981–990. <https://doi.org/10.1017/S0033291719000898>
- Mitchison, D., Mond, J., Griffiths, S., Hay, P., Nagata, J. M., Bussey, K., Trompeter, N., Lonergan, A., & Murray, S. B. (2022). Prevalence of muscle dysmorphia in adolescents:

- findings from the EveryBODY study. *Psychological Medicine*, 52(14), 3142–3149. <https://doi.org/10.1017/S0033291720005206>
- Mitchison, D., Morin, A., Mond, J., Slewa-Younan, S., & Hay, P. (2015). The Bidirectional Relationship between Quality of Life and Eating Disorder Symptoms: A 9-Year Community-Based Study of Australian Women. *PLOS ONE*, 10(3), e0120591. <https://doi.org/10.1371/journal.pone.0120591>
- Mohler-Kuo, M., Schnyder, U., Dermota, P., Wei, W., & Milos, G. (2016). The prevalence, correlates, and help-seeking of eating disorders in Switzerland. *Psychological Medicine*, 46(13), 2749–2758. <https://doi.org/10.1017/S0033291716001136>
- Mohorić, T., Pokrajac-Bulian, A., Anić, P., Kukić, M., & Mohović, P. (2023). Emotion regulation, perfectionism, and eating disorder symptoms in adolescents: the mediating role of cognitive eating patterns. *Current Psychology*, 42(32), 28505–28516. <https://doi.org/10.1007/s12144-022-03824-2>
- Mond, J., Hall, A., Bentley, C., Harrison, C., Gratwick-Sarll, K., & Lewis, V. (2014). Eating-disordered behavior in adolescent boys: Eating disorder examination questionnaire norms. *International Journal of Eating Disorders*, 47(4), 335–341. <https://doi.org/10.1002/eat.22237>
- Mond, J., Mitchison, D., Latner, J., Hay, P., Owen, C., & Rodgers, B. (2013). Quality of life impairment associated with body dissatisfaction in a general population sample of women. *BMC Public Health*, 13(1), 920. <https://doi.org/10.1186/1471-2458-13-920>
- Morin, G., & Meilleur, D. (2024). Association Between Emotion Regulation and Body Image Concerns in a Group of Adolescent Boys: Interaction With the Internalization of the Sociocultural Body Ideal. *Journal of Emotional and Behavioral Disorders*, 32(4), 213–225. <https://doi.org/10.1177/10634266231179434>
- Mueller, V. M., Forrer, F., Meyer, A. H., & Munsch, S. (2024). Psychological correlates of body dissatisfaction in Swiss youth over a one-year study-period. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1269364>
- Mueller, V. M., Meyer, A. H., Forrer, F., Rauen, A. C., & Munsch, S. (2025). A path model linking emotion regulation difficulties to disturbed eating and compensatory behavior in young females. *Journal of Eating Disorders*, 13(1), 265. <https://doi.org/10.1186/s40337-025-01445-1>
- Mueller, V. M., Meyer, A. H., Forrer, F., Rauen, A., & Munsch, S. (n.d.-a). *A Path Model Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behavior in Young Females*.
- Mueller, V. M., Meyer, A. H., Forrer, F., Rauen, A., & Munsch, S. (n.d.-b). *Linking Emotion Regulation Difficulties to Disturbed Eating and Compensatory Behaviors in Adolescents and Young Adults: A Path Model Analysis*.
- Munsch, S., Forrer, F., Naas, A., Mueller, V., Rubo, M., Hannoun, F., & Mugellini, E. (2021). Correlates of interpersonal emotion regulation problems in Loss of Control eating (LOC) in youth: study protocol of the combined online and App based questionnaire, laboratory and randomized controlled online intervention i-BEAT trial. *BMC Psychology*, 9(1), 193. <https://doi.org/10.1186/s40359-021-00690-8>
- Munsch, S., Messerli-Bürgy, N., Meyer, A. H., Humbel, N., Schopf, K., Wyssen, A., Forrer, F., Biedert, E., Lennertz, J., Trier, S., Isenschmid, B., Milos, G., Claussen, M., Whinyates, K., Adolph, D., Margraf, J., Assion, H.-J., Teismann, T., Ueberberg, B., ... Schneider, S. (2021). Consequences of exposure to the thin ideal in mass media depend on moderators in young women: An experimental study. *Journal of Abnormal Psychology*, 130(5), 498–511. <https://doi.org/10.1037/abn0000676>
- Murray, S. B., Nagata, J. M., Griffiths, S., Calzo, J. P., Brown, T. A., Mitchison, D., Blashill, A. J., & Mond, J. M. (2017). The enigma of male eating disorders: A critical review and

- synthesis. *Clinical Psychology Review*, 57, 1–11.
<https://doi.org/10.1016/j.cpr.2017.08.001>
- Nagata, J. M., Ganson, K. T., Griffiths, S., Mitchison, D., Garber, A. K., Vittinghoff, E., Bibbins-Domingo, K., & Murray, S. B. (2022). Prevalence and correlates of muscle-enhancing behaviors among adolescents and young adults in the United States. *International Journal of Adolescent Medicine and Health*, 34(2), 119–129.
<https://doi.org/10.1515/ijamh-2020-0001>
- Nagata, J. M., Ganson, K. T., & Murray, S. B. (2020). Eating disorders in adolescent boys and young men: an update. *Current Opinion in Pediatrics*, 32(4), 476–481.
<https://doi.org/10.1097/MOP.0000000000000911>
- Nagl, M., Jacobi, C., Paul, M., Beesdo-Baum, K., Höfler, M., Lieb, R., & Wittchen, H.-U. (2016). Prevalence, incidence, and natural course of anorexia and bulimia nervosa among adolescents and young adults. *European Child & Adolescent Psychiatry*, 25(8), 903–918. <https://doi.org/10.1007/s00787-015-0808-z>
- Nelson, S. C., Kling, J., Wängqvist, M., Frisén, A., & Syed, M. (2018). Identity and the body: Trajectories of body esteem from adolescence to emerging adulthood. *Developmental Psychology*, 54(6), 1159–1171. <https://doi.org/10.1037/dev0000435>
- Neumark-Sztainer, D., Paxton, S. J., Hannan, P. J., Haines, J., & Story, M. (2006). Does Body Satisfaction Matter? Five-year Longitudinal Associations between Body Satisfaction and Health Behaviors in Adolescent Females and Males. *Journal of Adolescent Health*, 39(2), 244–251. <https://doi.org/10.1016/j.jadohealth.2005.12.001>
- Newsom, J. T. (2023). *Longitudinal Structural Equation Modeling*. Routledge.
<https://doi.org/10.4324/9781003263036>
- Nolan, E., Bunting, L., McCartan, C., Davidson, G., Grant, A., Schubotz, D., Mulholland, C., McBride, O., Murphy, J., & Shevlin, M. (2023). Prevalence of probable eating disorders and associated risk factors: An analysis of the Northern Ireland Youth Wellbeing Survey using the <scp>SCOFF</scp>. *British Journal of Clinical Psychology*, 62(1), 180–195.
<https://doi.org/10.1111/bjc.12401>
- Nolen-Hoeksema, S., Stice, E., Wade, E., & Bohon, C. (2007). Reciprocal relations between rumination and bulimic, substance abuse, and depressive symptoms in female adolescents. *Journal of Abnormal Psychology*, 116(1), 198–207. <https://doi.org/10.1037/0021-843X.116.1.198>
- Ouellet-Courtois, C., Coelho, J. S., Radomsky, A. S., Israël, M., & Steiger, H. (2015). A Feeling You Can't Let Go: Temporal Stability and Vulnerability to Thought–Shape Fusion in Eating Disorders. *Cognitive Therapy and Research*, 39(5), 678–687.
<https://doi.org/10.1007/s10608-015-9691-7>
- Park, L. E. (2007). Appearance-Based Rejection Sensitivity: Implications for Mental and Physical Health, Affect, and Motivation. *Personality and Social Psychology Bulletin*, 33(4), 490–504. <https://doi.org/10.1177/0146167206296301>
- Park, L. E., Calogero, R. M., Harwin, M. J., & DiRaddo, A. M. (2009). Predicting interest in cosmetic surgery: Interactive effects of appearance-based rejection sensitivity and negative appearance comments. *Body Image*, 6(3), 186–193. <https://doi.org/10.1016/j.bodyim.2009.02.003>
- Park, L. E., & Pinkus, R. T. (2009). Interpersonal effects of Appearance-based Rejection Sensitivity. *Journal of Research in Personality*, 43(4), 602–612.
<https://doi.org/10.1016/j.jrp.2009.02.003>
- Parker, L. L., & Harriger, J. A. (2020a). Eating disorders and disordered eating behaviors in the LGBT population: a review of the literature. *Journal of Eating Disorders*, 8(1), 51.
<https://doi.org/10.1186/s40337-020-00327-y>

- Parker, L. L., & Harriger, J. A. (2020b). Eating disorders and disordered eating behaviors in the LGBT population: a review of the literature. *Journal of Eating Disorders*, 8(1), 51. <https://doi.org/10.1186/s40337-020-00327-y>
- Paterna, A., Alcaraz-Ibáñez, M., Fuller-Tyszkiewicz, M., & Sicilia, Á. (2021). Internalization of body shape ideals and body dissatisfaction: A systematic review and meta-analysis. *International Journal of Eating Disorders*, 54(9), 1575–1600. <https://doi.org/10.1002/eat.23568>
- Pedalino, F., & Camerini, A.-L. (2022). Instagram Use and Body Dissatisfaction: The Mediating Role of Upward Social Comparison with Peers and Influencers among Young Females. *International Journal of Environmental Research and Public Health*, 19(3), 1543. <https://doi.org/10.3390/ijerph19031543>
- Peebles, R., & Sieke, E. H. (2019). Medical Complications of Eating Disorders in Youth. *Child and Adolescent Psychiatric Clinics of North America*, 28(4), 593–615. <https://doi.org/10.1016/j.chc.2019.05.009>
- Perthes, K., Kirschbaum-Lesch, I., Legenbauer, T., Holtmann, M., Hammerle, F., & Kolar, D. R. (2021). Emotion regulation in adolescents with anorexia and bulimia nervosa: Differential use of adaptive and maladaptive strategies compared to healthy adolescents. *International Journal of Eating Disorders*, 54(12), 2206–2212. <https://doi.org/10.1002/eat.23608>
- Peschel, S. K. V., Fürtjes, S., Sigrist, C., Voss, C., Berwanger, J., Ollmann, T. M., Kische, H., Rückert, F., Koenig, J., Pieper, L., & Beesdo-Baum, K. (2024). Tension and disordered eating behaviors in the daily lives of adolescents and young adults from the general population: Associations and moderating role of trait emotion regulation. *Scandinavian Journal of Psychology*, 65(2), 252–263. <https://doi.org/10.1111/sjop.12971>
- Peschel, S. K. V., Sigrist, C., Voss, C., Fürtjes, S., Berwanger, J., Ollmann, T. M., Kische, H., Rückert, F., Koenig, J., & Beesdo-Baum, K. (2024). Subclinical patterns of disordered eating behaviors in the daily life of adolescents and young adults from the general population. *Child and Adolescent Psychiatry and Mental Health*, 18(1), 69. <https://doi.org/10.1186/s13034-024-00752-w>
- Peter, C., Tuch, A., & Schuler, D. (2023). Psychische Gesundheit–Erhebung Herbst 2022. Wie geht es der Bevölkerung in der Schweiz. *Schweizerisches Gesundheitsobservatorium (Obsan)*.
- Peters, L., Sunderland, M., Andrews, G., Rapee, R. M., & Mattick, R. P. (2012). Development of a short form Social Interaction Anxiety (SIAS) and Social Phobia Scale (SPS) using nonparametric item response theory: The SIAS-6 and the SPS-6. *Psychological Assessment*, 24(1), 66–76. <https://doi.org/10.1037/a0024544>
- Peterson, C. B., Engel, S. G., Crosby, R. D., Strauman, T., Smith, T. L., Klein, M., Crow, S. J., Mitchell, J. E., Erickson, A., Cao, L., Bjorlie, K., & Wonderlich, S. A. (2020). Comparing integrative cognitive-affective therapy and guided self-help cognitive-behavioral therapy to treat binge-eating disorder using standard and naturalistic momentary outcome measures: A randomized controlled trial. *International Journal of Eating Disorders*, 53(9), 1418–1427. <https://doi.org/10.1002/eat.23324>
- Pila, E., Murray, S. B., Le Grange, D., Sawyer, S. M., & Hughes, E. K. (2019). Reciprocal relations between dietary restraint and negative affect in adolescents receiving treatment for anorexia nervosa. *Journal of Abnormal Psychology*, 128(2), 129–139. <https://doi.org/10.1037/abn0000402>
- Pisetsky, E. M., Haynos, A. F., Lavender, J. M., Crow, S. J., & Peterson, C. B. (2017). Associations between emotion regulation difficulties, eating disorder symptoms, non-suicidal self-injury, and suicide attempts in a heterogeneous eating disorder sample. *Comprehensive Psychiatry*, 73, 143–150. <https://doi.org/10.1016/j.comppsy.2016.11.012>

- Pook, M., Tuschen-Caffier, B., & Brähler, E. (2008). Evaluation and comparison of different versions of the Body Shape Questionnaire. *Psychiatry Research*, 158(1), 67–73. <https://doi.org/10.1016/j.psychres.2006.08.002>
- Pook, M., Tuschen-Caffier, B., & Stich, N. (2002). Evaluation des Fragebogens zum Figurbewusstsein (FFB, deutsche Version des Body Shape Questionnaire). *Verhaltenstherapie*, 12(2), 116–124. <https://doi.org/10.1159/000064375>
- Pope, H. G., Gruber, A. J., Choi, P., Olivardia, R., & Phillips, K. A. (1997). Muscle Dysmorphia: An Underrecognized Form of Body Dysmorphic Disorder. *Psychosomatics*, 38(6), 548–557. [https://doi.org/10.1016/S0033-3182\(97\)71400-2](https://doi.org/10.1016/S0033-3182(97)71400-2)
- Pöttsch, A., Rudolph, A., Schmidt, R., & Hilbert, A. (2018). Two sides of weight bias in adolescent binge-eating disorder: Adolescents' perceptions and maternal attitudes. *International Journal of Eating Disorders*, 51(12), 1339–1345. <https://doi.org/10.1002/eat.22982>
- Prefit, A. B., & Szentagotai-Tătar, A. (2018). Depression and disordered eating behaviors: The role of emotion regulation difficulties. *Journal of Evidence-Based Psychotherapies*, 18(1), 95–106. <https://doi.org/10.24193/jebp.2018.1.8>
- Prefit, A.-B., Căndea, D. M., & Szentagotai-Tătar, A. (2019). Emotion regulation across eating pathology: A meta-analysis. *Appetite*, 143, 104438. <https://doi.org/10.1016/j.appet.2019.104438>
- Purton, T., Mond, J., Cicero, D., Wagner, A., Stefano, E., Rand-Giovannetti, D., & Latner, J. (2019). Body dissatisfaction, internalized weight bias and quality of life in young men and women. *Quality of Life Research*, 28(7), 1825–1833. <https://doi.org/10.1007/s11136-019-02140-w>
- Racine, S. E., & Wildes, J. E. (2015). Dynamic longitudinal relations between emotion regulation difficulties and anorexia nervosa symptoms over the year following intensive treatment. *Journal of Consulting and Clinical Psychology*, 83(4), 785–795. <https://doi.org/10.1037/ccp0000011>
- Ramos, P., Moreno-Maldonado, C., Moreno, C., & Rivera, F. (2019). The Role of Body Image in Internalizing Mental Health Problems in Spanish Adolescents: An Analysis According to Sex, Age, and Socioeconomic Status. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.01952>
- Rapee, R. M., Oar, E. L., Johnco, C. J., Forbes, M. K., Fardouly, J., Magson, N. R., & Richardson, C. E. (2019). Adolescent development and risk for the onset of social-emotional disorders: A review and conceptual model. *Behaviour Research and Therapy*, 123, 103501. <https://doi.org/10.1016/j.brat.2019.103501>
- Rauen, A. C., Meyer, A. H., Forrer, F., Müller, V. M., & Munsch, S. (2025). The role of appearance-based and interpersonal rejection sensitivity in youth loss of control eating: A one-year longitudinal study. *Appetite*, 219, 108427. <https://doi.org/10.1016/j.appet.2025.108427>
- Ravens-Sieberer, U., Kaman, A., Erhart, M., Devine, J., Schlack, R., & Otto, C. (2022). Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *European Child & Adolescent Psychiatry*, 31(6), 879–889. <https://doi.org/10.1007/s00787-021-01726-5>
- Raykos, B. C., McEvoy, P. M., Erceg-Hurn, D., Byrne, S. M., Fursland, A., & Nathan, P. (2014). Therapeutic alliance in Enhanced Cognitive Behavioural Therapy for bulimia nervosa: Probably necessary but definitely insufficient. *Behaviour Research and Therapy*, 57, 65–71. <https://doi.org/10.1016/j.brat.2014.04.004>
- Reel, J., Voelker, D., & Greenleaf, C. (2015). Weight status and body image perceptions in adolescents: current perspectives. *Adolescent Health, Medicine and Therapeutics*, 149. <https://doi.org/10.2147/AHMT.S68344>

- Ricciardelli, L. A., & Yager, Z. (2015). *Adolescence and Body Image*. Routledge.
<https://doi.org/10.4324/9781315849379>
- Riediger, M., & Luong, G. (2015). From Adolescence to Old Age: Developmental Perspectives on the Extended Process Model of Emotion Regulation. *Psychological Inquiry*, 26(1), 99–107. <https://doi.org/10.1080/1047840X.2015.962443>
- Roberts, C., Zimmer-Gembeck, M. J., Lavell, C., Miyamoto, T., Gregertsen, E., & Farrell, L. J. (2018). The appearance anxiety inventory: Factor structure and associations with appearance-based rejection sensitivity and social anxiety. *Journal of Obsessive-Compulsive and Related Disorders*, 19, 124–130. <https://doi.org/10.1016/j.jocrd.2018.10.004>
- Roberts, S. R., Maheux, A. J., Hunt, R. A., Ladd, B. A., & Choukas-Bradley, S. (2022). Incorporating social media and muscular ideal internalization into the tripartite influence model of body image: Towards a modern understanding of adolescent girls' body dissatisfaction. *Body Image*, 41, 239–247. <https://doi.org/10.1016/j.bodyim.2022.03.002>
- Rodgers, R. F., Franko, D. L., Lovering, M. E., Luk, S., Pernal, W., & Matsumoto, A. (2018). Development and Validation of the Female Muscularity Scale. *Sex Roles*, 78(1–2), 18–26. <https://doi.org/10.1007/s11199-017-0775-6>
- Rodgers, R. F., Paxton, S. J., & McLean, S. A. (2014). A Biopsychosocial Model of Body Image Concerns and Disordered Eating in Early Adolescent Girls. *Journal of Youth and Adolescence*, 43(5), 814–823. <https://doi.org/10.1007/s10964-013-0013-7>
- Rodgers, R. F., Slater, A., Gordon, C. S., McLean, S. A., Jarman, H. K., & Paxton, S. J. (2020). A Biopsychosocial Model of Social Media Use and Body Image Concerns, Disordered Eating, and Muscle-Building Behaviors among Adolescent Girls and Boys. *Journal of Youth and Adolescence*, 49(2), 399–409. <https://doi.org/10.1007/s10964-019-01190-0>
- Rohde, P., Stice, E., & Marti, C. N. (2015). Development and predictive effects of eating disorder risk factors during adolescence: Implications for prevention efforts. *International Journal of Eating Disorders*, 48(2), 187–198. <https://doi.org/10.1002/eat.22270>
- Rosenbach, C., & Renneberg, B. (2011). Abgelehnt, ausgeschlossen, ignoriert: Die Wahrnehmung sozialer Zurückweisung und psychische Störungen – eine Übersicht. *Verhaltenstherapie*, 21(2), 87–98. <https://doi.org/10.1159/000328839>
- Rosenqvist, E., Konttinen, H., Berg, N., & Kiviruusu, O. (2024). Development of Body Dissatisfaction in Women and Men at Different Educational Levels During the Life Course. *International Journal of Behavioral Medicine*, 31(5), 718–729. <https://doi.org/10.1007/s12529-023-10213-x>
- Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, 48(2). <https://doi.org/10.18637/jss.v048.i02>
- Rowell, M., MacDonald, D. E., & Carter, J. C. (2016). Emotion regulation difficulties in anorexia nervosa: associations with improvements in eating psychopathology. *Journal of Eating Disorders*, 4(1), 17. <https://doi.org/10.1186/s40337-016-0108-0>
- Rubo, M., Forrer, F., & Munsch, S. (2020). Essstörungen bei Männern. *PiD - Psychotherapie Im Dialog*, 21(04), 57–61. <https://doi.org/10.1055/a-0987-6077>
- Rufino, K. A., Viswanath, H., Wagner, R., & Patriquin, M. A. (2018). Body dissatisfaction and suicidal ideation among psychiatric inpatients with eating disorders. *Comprehensive Psychiatry*, 84, 22–25. <https://doi.org/10.1016/j.comppsy.2018.03.013>
- Ruisoto, P., Cacho, R., López-Goñi, J. J., Real Deus, E., Vaca, S., & Mayoral, P. (2015). Gender Differences in Risk Factors for Stice's Bulimia in a Non-Clinical Sample. *The Spanish Journal of Psychology*, 18, E72. <https://doi.org/10.1017/sjp.2015.58>
- Ryan, J., Lopian, L., Le, B., Edney, S., Van Kessel, G., Plotnikoff, R., Vandelanotte, C., Olds, T., & Maher, C. (2019). It's not raining men: a mixed-methods study investigating methods of improving male recruitment to health behaviour research. *BMC Public Health*, 19(1), 814. <https://doi.org/10.1186/s12889-019-7087-4>

- Sander, J., Moessner, M., & Bauer, S. (2021). Depression, Anxiety and Eating Disorder-Related Impairment: Moderators in Female Adolescents and Young Adults. *International Journal of Environmental Research and Public Health*, 18(5), 2779. <https://doi.org/10.3390/ijerph18052779>
- Santomauro, D. F., Melen, S., Mitchison, D., Vos, T., Whiteford, H., & Ferrari, A. J. (2021). The hidden burden of eating disorders: an extension of estimates from the Global Burden of Disease Study 2019. *The Lancet Psychiatry*, 8(4), 320–328. [https://doi.org/10.1016/S2215-0366\(21\)00040-7](https://doi.org/10.1016/S2215-0366(21)00040-7)
- Sarrar, L., Vilalta, M., Schneider, N., & Correll, C. U. (2020). Body mass index and self-reported body image in German adolescents. *Journal of Eating Disorders*, 8(1), 61. <https://doi.org/10.1186/s40337-020-00330-3>
- Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health*, 2(3), 223–228. [https://doi.org/10.1016/S2352-4642\(18\)30022-1](https://doi.org/10.1016/S2352-4642(18)30022-1)
- Schmidt, J., & Martin, A. (2017). Du magst mich nicht, weil ich hässlich bin! *Zeitschrift Für Klinische Psychologie Und Psychotherapie*, 46(3), 157–168. <https://doi.org/10.1026/1616-3443/a000433>
- Schmidt, J., & Martin, A. (2019). Appearance Teasing and Mental Health: Gender Differences and Mediation Effects of Appearance-Based Rejection Sensitivity and Dysmorphic Concerns. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.00579>
- Schmidt, M., Taube, C. O., Heinrich, T., Vocks, S., & Hartmann, A. S. (2022). Body image disturbance and associated eating disorder and body dysmorphic disorder pathology in gay and heterosexual men: A systematic analyses of cognitive, affective, behavioral und perceptual aspects. *PLOS ONE*, 17(12), e0278558. <https://doi.org/10.1371/journal.pone.0278558>
- Schneider, J., Pegram, G., Gibson, B., Talamonti, D., Tinoco, A., Craddock, N., Matheson, E., & Forshaw, M. (2023). A mixed-studies systematic review of the experiences of body image, disordered eating, and eating disorders during the COVID-19 pandemic. *International Journal of Eating Disorders*, 56(1), 26–67. <https://doi.org/10.1002/eat.23706>
- Schuck, K., Munsch, S., & Schneider, S. (2018). Body image perceptions and symptoms of disturbed eating behavior among children and adolescents in Germany. *Child and Adolescent Psychiatry and Mental Health*, 12(1), 10. <https://doi.org/10.1186/s13034-018-0216-5>
- Shafran, R., Teachman, B. A., Kerry, S., & Rachman, S. (1999). A cognitive distortion associated with eating disorders: Thought-shape fusion. *British Journal of Clinical Psychology*, 38(2), 167–179. <https://doi.org/10.1348/014466599162728>
- Shagar, P. S., Harris, N., Boddy, J., & Donovan, C. L. (2017). The Relationship Between Body Image Concerns and Weight-Related Behaviours of Adolescents and Emerging Adults: A Systematic Review. *Behaviour Change*, 34(4), 208–252. <https://doi.org/10.1017/bec.2018.3>
- Sharpe, H., Griffiths, S., Choo, T., Eisenberg, M. E., Mitchison, D., Wall, M., & Neumark-Sztainer, D. (2018). The relative importance of dissatisfaction, overvaluation and preoccupation with weight and shape for predicting onset of disordered eating behaviors and depressive symptoms over 15 years. *International Journal of Eating Disorders*, 51(10), 1168–1175. <https://doi.org/10.1002/eat.22936>
- Shriver, L. H., Dollar, J. M., Lawless, M., Calkins, S. D., Keane, S. P., Shanahan, L., & Wideman, L. (2019). Longitudinal Associations between Emotion Regulation and Adiposity in Late Adolescence: Indirect Effects through Eating Behaviors. *Nutrients*, 11(3), 517. <https://doi.org/10.3390/nu11030517>

- Sifneos, P. E. (1973). The Prevalence of 'Alexithymic' Characteristics in Psychosomatic Patients. *Psychotherapy and Psychosomatics*, 22(2–6), 255–262. <https://doi.org/10.1159/000286529>
- Sifre, N., Deringer, R., Prapkree, L., & Palacios, C. (2024). Disordered Eating Attitudes and Their Association with Age, BMI, Stress, and Diet in College Students. *International Journal of Environmental Research and Public Health*, 21(6), 766. <https://doi.org/10.3390/ijerph21060766>
- Silén, Y., & Keski-Rahkonen, A. (2022). Worldwide prevalence of DSM-5 eating disorders among young people. *Current Opinion in Psychiatry*, 35(6), 362–371. <https://doi.org/10.1097/YCO.0000000000000818>
- Sim, L., & Zeman, J. (2005). Emotion Regulation Factors as Mediators Between Body Dissatisfaction and Bulimic Symptoms in Early Adolescent Girls. *The Journal of Early Adolescence*, 25(4), 478–496. <https://doi.org/10.1177/0272431605279838>
- Simone, M., Emery, R. L., Hazzard, V. M., Eisenberg, M. E., Larson, N., & Neumark-Sztainer, D. (2021). Disordered eating in a population-based sample of young adults during the COVID-19 outbreak. *International Journal of Eating Disorders*, 54(7), 1189–1201. <https://doi.org/10.1002/eat.23505>
- Solmi, M., Monaco, F., Højlund, M., Monteleone, A. M., Trott, M., Firth, J., Carfagno, M., Eaton, M., De Toffol, M., Vergine, M., Meneguzzo, P., Collantoni, E., Gallicchio, D., Stubbs, B., Girardi, A., Busetto, P., Favaro, A., Carvalho, A. F., Steinhausen, H., & Correll, C. U. (2024). Outcomes in people with eating disorders: a transdiagnostic and disorder-specific systematic review, meta-analysis and multivariable meta-regression analysis. *World Psychiatry*, 23(1), 124–138. <https://doi.org/10.1002/wps.21182>
- Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Il Shin, J., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2022). Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*, 27(1), 281–295. <https://doi.org/10.1038/s41380-021-01161-7>
- Somerville, L. H., Jones, R. M., & Casey, B. J. (2010). A time of change: Behavioral and neural correlates of adolescent sensitivity to appetitive and aversive environmental cues. *Brain and Cognition*, 72(1), 124–133. <https://doi.org/10.1016/j.bandc.2009.07.003>
- Spettigue, W., Obeid, N., Santos, A., Norris, M., Hamati, R., Hadjiyannakis, S., & Buchholz, A. (2020). Binge eating and social anxiety in treatment-seeking adolescents with eating disorders or severe obesity. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, 25(3), 787–793. <https://doi.org/10.1007/s40519-019-00689-6>
- Stangier, U., Heidenreich, T., Berardi, A., Golbs, U., & Hoyer, J. (1999). Die Erfassung sozialer Phobie durch Social Interaction Anxiety Scale (SIAS) und die Social Phobia Scale (SPS). *Zeitschrift Für Klinische Psychologie*.
- Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, 9(2), 69–74. <https://doi.org/10.1016/j.tics.2004.12.005>
- Stice, E. (1994). Review of the evidence for a sociocultural model of bulimia nervosa and an exploration of the mechanisms of action. *Clinical Psychology Review*, 14(7), 633–661. [https://doi.org/10.1016/0272-7358\(94\)90002-7](https://doi.org/10.1016/0272-7358(94)90002-7)
- Stice, E. (2001). A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology*, 110(1), 124–135. <https://doi.org/10.1037/0021-843X.110.1.124>
- Stice, E. (2016). Interactive and Mediational Etiologic Models of Eating Disorder Onset: Evidence from Prospective Studies. *Annual Review of Clinical Psychology*, 12(1), 359–381. <https://doi.org/10.1146/annurev-clinpsy-021815-093317>

- Stice, E., Gau, J. M., Rohde, P., & Shaw, H. (2017). Risk factors that predict future onset of each DSM-5 eating disorder: Predictive specificity in high-risk adolescent females. *Journal of Abnormal Psychology, 126*(1), 38–51. <https://doi.org/10.1037/abn0000219>
- Stice, E., Marti, C. N., & Durant, S. (2011). Risk factors for onset of eating disorders: Evidence of multiple risk pathways from an 8-year prospective study. *Behaviour Research and Therapy, 49*(10), 622–627. <https://doi.org/10.1016/j.brat.2011.06.009>
- Stice, E., Marti, C. N., & Rohde, P. (2013). Prevalence, incidence, impairment, and course of the proposed DSM-5 eating disorder diagnoses in an 8-year prospective community study of young women. *Journal of Abnormal Psychology, 122*(2), 445–457. <https://doi.org/10.1037/a0030679>
- Stice, E., & Van Ryzin, M. J. (2019). A prospective test of the temporal sequencing of risk factor emergence in the dual pathway model of eating disorders. *Journal of Abnormal Psychology, 128*(2), 119–128. <https://doi.org/10.1037/abn0000400>
- Swanson, S. A., Crow, S. J., Le Grange, D., Swendsen, J., & Merikangas, K. R. (2011). Prevalence and Correlates of Eating Disorders in Adolescents: Results from the national comorbidity survey replication adolescent supplement. *Archives of General Psychiatry, 68*(7), 714. <https://doi.org/10.1001/archgenpsychiatry.2011.22>
- Tantleff-Dunn, S., Barnes, R. D., & Larose, J. G. (2011). It's Not Just a "Woman Thing:" The Current State of Normative Discontent. *Eating Disorders, 19*(5), 392–402. <https://doi.org/10.1080/10640266.2011.609088>
- Thompson, J. K., Schaefer, L. M., & Menzel, J. E. (2012). Internalization of Thin-Ideal and Muscular-Ideal. In *Encyclopedia of Body Image and Human Appearance* (pp. 499–504). Elsevier. <https://doi.org/10.1016/B978-0-12-384925-0.00079-1>
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development, 59*(2–3), 25–52. <https://doi.org/10.1111/j.1540-5834.1994.tb01276.x>
- Thompson, R. A., & Calkins, S. D. (1996). The double-edged sword: Emotional regulation for children at risk. *Development and Psychopathology, 8*(1), 163–182.
- Treasure, J., & Russell, G. (2011). The case for early intervention in anorexia nervosa: theoretical exploration of maintaining factors. *British Journal of Psychiatry, 199*(1), 5–7. <https://doi.org/10.1192/bjp.bp.110.087585>
- Trompeter, N., Bussey, K., Forbes, M. K., Hay, P., Goldstein, M., Thornton, C., Basten, C., Heruc, G., Roberts, M., Byrne, S., Griffiths, S., Lonergan, A., & Mitchison, D. (2022). Emotion Dysregulation and Eating Disorder Symptoms: Examining Distinct Associations and Interactions in Adolescents. *Research on Child and Adolescent Psychopathology, 50*(5), 683–694. <https://doi.org/10.1007/s10802-022-00898-1>
- Trompeter, N., Bussey, K., Forbes, M. K., & Mitchison, D. (2021). Emotion Dysregulation within the CBT-E Model of Eating Disorders: A Narrative Review. *Cognitive Therapy and Research, 45*(6), 1021–1036. <https://doi.org/10.1007/s10608-021-10225-5>
- Trompeter, N., Bussey, K., K Forbes, M., Griffiths, S., Mond, J., Lonergan, A., & Mitchison, D. (2022). Peer victimization and weight/shape concerns in adolescents: Examining the moderating role of appearance-based rejection sensitivity. *Body Image, 40*, 207–212. <https://doi.org/10.1016/j.bodyim.2021.12.004>
- Turel, T., Jameson, M., Gitimu, P., Rowlands, Z., Mincher, J., & Pohle-Krauza, R. (2018). Disordered eating: Influence of body image, sociocultural attitudes, appearance anxiety and depression - a focus on college males and a gender comparison. *Cogent Psychology, 5*(1), 1483062. <https://doi.org/10.1080/23311908.2018.1483062>
- Turner, H., Bryant-Waugh, R., & Marshall, E. (2015). The impact of early symptom change and therapeutic alliance on treatment outcome in cognitive-behavioural therapy for eating disorders. *Behaviour Research and Therapy, 73*, 165–169. <https://doi.org/10.1016/j.brat.2015.08.006>

- Vaillancourt, T., Brittain, H., Krygsman, A., Farrell, A. H., Landon, S., & Pepler, D. (2021). School bullying before and during COVID-19: Results from a population-based randomized design. *Aggressive Behavior*, 47(5), 557–569. <https://doi.org/10.1002/ab.21986>
- Van Durme, K., Goossens, L., Bosmans, G., & Braet, C. (2018). The Role of Attachment and Maladaptive Emotion Regulation Strategies in the Development of Bulimic Symptoms in Adolescents. *Journal of Abnormal Child Psychology*, 46(4), 881–893. <https://doi.org/10.1007/s10802-017-0334-1>
- Van Malderen, E., Goossens, L., Verbeken, S., Boelens, E., & Kemps, E. (2019). The interplay between self-regulation and affectivity in binge eating among adolescents. *European Child & Adolescent Psychiatry*, 28(11), 1447–1460. <https://doi.org/10.1007/s00787-019-01306-8>
- Vandewalle, J., Moens, E., Bosmans, G., & Braet, C. (2017). The effect of parental rejection on the emotional eating behaviour of youngsters: A laboratory-based study. *Appetite*, 108, 219–225. <https://doi.org/10.1016/j.appet.2016.10.007>
- Verschuere, M., Claes, L., Bogaerts, A., Palmeroni, N., Gandhi, A., Moons, P., & Luyckx, K. (2018). Eating Disorder Symptomatology and Identity Formation in Adolescence: A Cross-Lagged Longitudinal Approach. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.00816>
- Viborg, N., Wångby-Lundh, M., Lundh, L.-G., Wallin, U., & Johnsson, P. (2018). Disordered eating in a Swedish community sample of adolescent girls: subgroups, stability, and associations with body esteem, deliberate self-harm and other difficulties. *Journal of Eating Disorders*, 6(1), 5. <https://doi.org/10.1186/s40337-018-0189-z>
- Von Holle, A., Poyastro Pinheiro, A., Thornton, L. M., Klump, K. L., Berrettini, W. H., Brandt, H., Crawford, S., Crow, S., Fichter, M. M., Halmi, K. A., Johnson, C., Kaplan, A. S., Keel, P., La Via, M., Mitchell, J., Strober, M., Blake Woodside, D., Kaye, W. H., & Bulik, C. M. (2008). Temporal Patterns of Recovery Across Eating Disorder Subtypes. *Australian & New Zealand Journal of Psychiatry*, 42(2), 108–117. <https://doi.org/10.1080/00048670701787610>
- Vuong, A. T., Jarman, H. K., Doley, J. R., & McLean, S. A. (2021). Social Media Use and Body Dissatisfaction in Adolescents: The Moderating Role of Thin- and Muscular-Ideal Internalisation. *International Journal of Environmental Research and Public Health*, 18(24), 13222. <https://doi.org/10.3390/ijerph182413222>
- Wagner, A. F., Bennett, B. L., Stefano, E. C., & Latner, J. D. (2022). Thin, muscular, and fit-ideals: Prevalence and correlates in undergraduate women. *Journal of American College Health*, 70(8), 2476–2482. <https://doi.org/10.1080/07448481.2020.1865981>
- Wang, S. B., Haynos, A. F., Wall, M. M., Chen, C., Eisenberg, M. E., & Neumark-Sztainer, D. (2019). Fifteen-Year Prevalence, Trajectories, and Predictors of Body Dissatisfaction From Adolescence to Middle Adulthood. *Clinical Psychological Science*, 7(6), 1403–1415. <https://doi.org/10.1177/2167702619859331>
- Warne, N., Heron, J., Mars, B., Solmi, F., Biddle, L., Gunnell, D., Hammerton, G., Moran, P., Munafò, M., Penton-Voak, I., Skinner, A., Stewart, A., & Bould, H. (2023). Emotional dysregulation in childhood and disordered eating and self-harm in adolescence: prospective associations and mediating pathways. *Journal of Child Psychology and Psychiatry*, 64(5), 797–806. <https://doi.org/10.1111/jcpp.13738>
- Webb, H. J., Kerin, J. L., & Zimmer-Gembeck, M. J. (2021). Increases in Emotional Eating During Early Adolescence and Associations With Appearance Teasing by Parents and Peers, Rejection, Victimization, Depression, and Social Anxiety. *The Journal of Early Adolescence*, 41(5), 754–777. <https://doi.org/10.1177/0272431620950469>
- Webb, H. J., & Zimmer-Gembeck, M. J. (2015). Body Image and Body Change Strategies Within Friendship Dyads and Groups: Implications for Adolescent Appearance-based

- Rejection Sensitivity. *Social Development*, 24(1), 1–19.
<https://doi.org/10.1111/sode.12081>
- Webb, H. J., & Zimmer-Gembeck, M. J. (2016). A Longitudinal Study of Appearance-based Rejection Sensitivity and the Peer Appearance Culture. *Journal of Applied Developmental Psychology*, 43, 91–100. <https://doi.org/10.1016/j.appdev.2016.01.004>
- Webb, H. J., Zimmer-Gembeck, M. J., & Donovan, C. L. (2014). The appearance culture between friends and adolescent appearance-based rejection sensitivity. *Journal of Adolescence*, 37(4), 347–358. <https://doi.org/10.1016/j.adolescence.2014.02.008>
- Webb, H. J., Zimmer-Gembeck, M. J., & Mastro, S. (2016). Stress exposure and generation: A conjoint longitudinal model of body dysmorphic symptoms, peer acceptance, popularity, and victimization. *Body Image*, 18, 14–18. <https://doi.org/10.1016/j.bodyim.2016.04.010>
- Webb, H. J., Zimmer-Gembeck, M. J., Waters, A. M., Farrell, L. J., Nesdale, D., & Downey, G. (2017). “Pretty Pressure” From Peers, Parents, and the Media: A Longitudinal Study of Appearance-Based Rejection Sensitivity. *Journal of Research on Adolescence*, 27(4), 718–735. <https://doi.org/10.1111/jora.12310>
- Weinbach, N., Lock, J., & Bohon, C. (2020). Superior response inhibition to high-calorie foods in adolescents with anorexia nervosa. *Behaviour Research and Therapy*, 124, 103441. <https://doi.org/10.1016/j.brat.2019.103441>
- Weinbach, N., Sher, H., & Bohon, C. (2018). Differences in Emotion Regulation Difficulties Across Types of Eating Disorders During Adolescence. *Journal of Abnormal Child Psychology*, 46(6), 1351–1358. <https://doi.org/10.1007/s10802-017-0365-7>
- Weinberger, N.-A., Kersting, A., Riedel-Heller, S. G., & Luck-Sikorski, C. (2016). Body Dissatisfaction in Individuals with Obesity Compared to Normal-Weight Individuals: A Systematic Review and Meta-Analysis. *Obesity Facts*, 9(6), 424–441. <https://doi.org/10.1159/000454837>
- Weir, C. B., & Jan, A. (2025). *BMI Classification Percentile And Cut Off Points*.
- Welch, E., Lagerström, M., & Ghaderi, A. (2012). Body Shape Questionnaire: Psychometric properties of the short version (BSQ-8C) and norms from the general Swedish population. *Body Image*, 9(4), 547–550. <https://doi.org/10.1016/j.bodyim.2012.04.009>
- White, C., Bickner, E., & Racine, S. E. (2023). Gender differences in compulsive exercise facets and their associations with eating disorder symptoms. *Eating Behaviors*, 49, 101737. <https://doi.org/10.1016/j.eatbeh.2023.101737>
- Wicke, F. S., Krakau, L., Löwe, B., Beutel, M. E., & Brähler, E. (2022). Update of the standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *Journal of Affective Disorders*, 312, 310–314. <https://doi.org/10.1016/j.jad.2022.06.054>
- Widmer Howald, F., Schär Gmelch, M., & Peterseil, M. (2018). Das Körperbild von Jugendlichen in der Schweiz – Studienergebnisse. *Praxis*, 107(14), 765–771. <https://doi.org/10.1024/1661-8157/a003016>
- Wojtowicz, A. E., & von Ranson, K. M. (2012). Weighing in on risk factors for body dissatisfaction: A one-year prospective study of middle-adolescent girls. *Body Image*, 9(1), 20–30. <https://doi.org/10.1016/j.bodyim.2011.07.004>
- Wonderlich, J. A., Crosby, R. D., Engel, S. G., Crow, S. J., Peterson, C. B., Le Grange, D., Wonderlich, S. A., & Fischer, S. (2022). Negative affect and binge eating: Assessing the unique trajectories of negative affect before and after <scp>binge</scp> - <scp>eating</scp> episodes across eating disorder diagnostic classifications. *International Journal of Eating Disorders*, 55(2), 223–230. <https://doi.org/10.1002/eat.23648>
- Wonderlich, S. A., Peterson, C. B., Crosby, R. D., Smith, T. L., Klein, M. H., Mitchell, J. E., & Crow, S. J. (2014). A randomized controlled comparison of integrative cognitive-affective therapy (ICAT) and enhanced cognitive-behavioral therapy (CBT-E) for

- bulimia nervosa. *Psychological Medicine*, 44(3), 543–553.
<https://doi.org/10.1017/S0033291713001098>
- Wyssen, A., Bryjova, J., Meyer, A. H., & Munsch, S. (2016). A model of disturbed eating behavior in men: The role of body dissatisfaction, emotion dysregulation and cognitive distortions. *Psychiatry Research*, 246, 9–15. <https://doi.org/10.1016/j.psychres.2016.09.010>
- Wyssen, A., Coelho, J. S., Wilhelm, P., Zimmermann, G., & Munsch, S. (2016). Thought-shape fusion in young healthy females appears after vivid imagination of thin ideals. *Journal of Behavior Therapy and Experimental Psychiatry*, 52, 75–82.
<https://doi.org/10.1016/j.jbtep.2016.03.010>
- Wyssen, A., Debbeler, L. J., Meyer, A. H., Coelho, J. S., Humbel, N., Schuck, K., Lennertz, J., Messerli-Bürge, N., Biedert, E., Trier, S. N., Isenschmid, B., Milos, G., Whinyates, K., Schneider, S., & Munsch, S. (2017). Cognitive Distortions Associated with Imagination of the Thin Ideal: Validation of the Thought-Shape Fusion Body Questionnaire (TSF-B). *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.02194>
- Wyssen, A., Debbeler, L. J., Meyer, A. H., Coelho, J. S., Humbel, N., Schuck, K., Lennertz, J., Messerli-Bürge, N., Trier, S. N., Isenschmid, B., Milos, G., Flury, H., Schneider, S., & Munsch, S. (2018). Relevance of the Thought-Shape Fusion Trait Questionnaire for healthy women and women presenting symptoms of eating disorders and mixed mental disorders. *Clinical Psychology & Psychotherapy*, 25(4), 601–607.
<https://doi.org/10.1002/cpp.2186>
- Wyssen, A., Leins, J., Reichenberger, J., Blechert, J., Munsch, S., & Steins-Loeber, S. (2020). Body-related cognitive distortions (thought–shape fusion body) associated with thin-ideal exposure in female students—An ecological momentary assessment study. *Clinical Psychology & Psychotherapy*, 27(2), 220–227. <https://doi.org/10.1002/cpp.2421>
- Yamamiya, Y., Desjardins, C. D., & Stice, E. (2023). Sequencing of symptom emergence in anorexia nervosa, bulimia nervosa, binge eating disorder, and purging disorder in adolescent girls and relations of prodromal symptoms to future onset of these eating disorders. *Psychological Medicine*, 53(10), 4657–4665.
<https://doi.org/10.1017/S0033291722001568>
- Yamamiya, Y., & Stice, E. (2024). Risk Factors That Predict Future Onset of Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder, and Purging Disorder in Adolescent Girls. *Behavior Therapy*, 55(4), 712–723. <https://doi.org/10.1016/j.beth.2023.10.002>
- Zeeck, A., Welter, V., Alatas, H., Hildebrandt, T., Lahmann, C., & Hartmann, A. (2018a). Muscle Dysmorphic Disorder Inventory (MDDI): Validation of a German version with a focus on gender. *PLOS ONE*, 13(11), e0207535. <https://doi.org/10.1371/journal.pone.0207535>
- Zeeck, A., Welter, V., Alatas, H., Hildebrandt, T., Lahmann, C., & Hartmann, A. (2018b). Muscle Dysmorphic Disorder Inventory (MDDI): Validation of a German version with a focus on gender. *PLOS ONE*, 13(11), e0207535. <https://doi.org/10.1371/journal.pone.0207535>
- Zimmer-Gembeck, M. J., Rudolph, J., & Pariz, J. (2022). A cascade of rejection and appearance preoccupation: Adolescents’ body dysmorphic symptoms and appearance rejection sensitivity over 4 years. *British Journal of Developmental Psychology*, 40(1), 17–34. <https://doi.org/10.1111/bjdp.12377>