UTS UNIVERSITY OF TECHNOLOGY SYDNEY

The Development of Disordered Eating: Factors of Influence and Treatment Experience in Male Adolescents

by Shauna Byrne

Thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

under the supervision of Dr. John McAloon and Dr. Christopher Basten

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Certificate of Original Authorship

I, Shauna Byrne, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy (Psychology) in the Graduate School of Health at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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Statement of Thesis Format

The present work is in the format of thesis by compilation, including a mix of published and unpublished works, as well as linking text between the chapters. The content of manuscripts of published papers is identical to the published versions. This thesis has been formatted in accordance with the guidelines outlined by the University of Technology Sydney at the time of this submission (May 2024).

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Paper 3 (Chapter 6): Testing a Cross-Sectional Model of the Development of Disordered Eating in a Normative Sample of Male Adolescents

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All chapters were written by SB and reviewed by JM.

The Impact Of COVID-19 on this Program of Research

The majority of data collection for this project was undertaken during the COVID-19 pandemic. Consequently, some significant obstacles arose that hindered the development of the program of research as planned. Firstly, data collection was planned to occur within public and private high schools across Australia in 2020. UTS MREC (high risk) ethical approval, together with NSW Department of Education SERAP approval was gained for the collection of longitudinal data from n = 2000 Australian school children. However, the processes of recruitment and data collection were significantly interrupted following lockdowns to Australian schools and restrictions placed on research planned to be undertaken within high schools by State and Federal governments. Research approvals were postponed from proceeding in any NSW school to reduce the impact of COVID-19 disruptions on students and teachers. Learning was transferred online and our attempts to transfer our data collection online in response were interrupted. The collection data from sufficient time-one participants to facilitate n = 2000 time two participants was prohibited. Thus, our initial plans to undertake a single cross-sectional study followed by a longitudinal study did not proceed. In an effort to address these limitations, two experimental research studies were developed using a time one normative sample of 338 male adolescents and a small clinical sample was successfully recruited for the final qualitative study. The quantitative studies complement each other by assessing characteristics of membership of cross-sectional latent classes, and, subsequently, the development of a structural model and the assessment of its invariance across classes. Our original plan was to test this latter model with the longitudinal data. This dissertation has been developed and completed consistent with the opportunities and significant limitations presented above.

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List of Abbreviations

BMI	Body Mass Index
CBT-E	Cognitive Behavior Therapy for Eating Disorders
CHEAT	Children's Eating Attitudes Test
ChEDE-Q	Child Eating Disorder Examination Questionnaire
COEDS	The College Eating Disorders Screen
DEBQ	Dutch Eating Behavior Questionnaire
DMS	Drive for Muscularity Scale
EAT-26	Eating Attitudes Test
EDDS	Eating Disorder Diagnosis Scale
EDE-Q	Eating Disorder Examination-Questionnaire
EDI-3	Eating Disorder Inventory- Third Edition
EDI-II	The Eating Disorder Inventory-Second Edition
FBT	Family Behavior Therapy
GP	General Practioner
OSFED	Other Specified Feeding and Eating Disorder
PBI-BC	Parental Bonding Instrument-Brief Current form
SDQ	Strengths and Difficulties Questionnaire-Youth self-report version
SEDS	Stirling Eating Disorder Scales
SIAQ-A	Sociocultural Internalization of Appearance Questionnaire for Adolescents
UFED	Unspecific Feeding and Eating Disorder
WRB	Weight Reduction Behavior

Thesis overview

Chapter 1 provides a general overview of disordered eating (DE) and its occurrence in male adolescents. This includes a review of prevalence, difficulties with males presenting for eating disorder (ED) treatment, the paucity of research on male adolescent DE, conceptual models of risk factors for EDs and how they may or may not apply to male adolescents, distinct characteristics of male DE, issues with applying current assessment measures used to diagnose EDs to male adolescents as well as ED treatment outcomes for male adolescents. Aims of the current program of research are also outlined.

Chapter 2 describes a systematic review of longitudinal studies on the risk factors for DE in male adolescents and psychometric measures currently used to assess EDs. The implications and limitations of the results of the systematic review and directions of the second study of program of research are also discussed.

Chapter 3 offers a concise summary of the main findings from the systematic review and provides an overview of the context for the forthcoming study.

Chapter 4 describes a cross-sectional study in which a latent class segmentation analysis was conducted to examine the most appropriate number of latent classes that could be derived from a normative sample of male adolescents. The study also assessed the extent of the relationship between each of those latent classes and a range of associated psychosocial factors. The implications and limitations of the findings of the cross-sectional study and future research directions also discussed.

Chapter 5 offers a summary of the findings from the latent class analysis and uses these findings to establish the context for the forthcoming study.

Chapter 6 describes a cross-sectional study in which a structural model is developed to assess the influence of parent-child relational quality on attitudes and behaviors indicative of disordered eating in male adolescents. The model was tested across latent classes established in Chapter 4 and found to be invariant across classes. The implications and limitations of the findings of the cross-sectional study and future research directions also discussed.

Chapter 7 summarizes the main findings from the previous chapter and develops a context for the forthcoming study.

Chapter 8 describes a qualitative analysis of the experiences of male adolescents undergoing treatment for an ED. The implications and limitations of the findings of the qualitative study and future research directions also discussed.

Chapter 9 provides a broader examination of the findings of each of the studies in this program of research in the context of current literature. This chapter also addresses general limitations and strengths, as well as the theoretical and clinical implications of the findings of the research in this dissertation. Lastly, this chapter outlines directions for future research and provides a general conclusion for the thesis.

Abstract

Evidence suggests that distinct psychosocial factors are associated with disordered eating (DE) in male and female adolescents, and trajectories toward diagnosable eating disorders (ED) have been differentiated between the sexes in the literature. This thesis explored the association between psychosocial variables and disordered eating in male adolescents in four distinct ways.

Initially, a PRISMA based systematic review of factors that influence the development of DE in male adolescents was undertaken. Thirty-five factors including psychological concerns, body appearance factors, sociocultural and familial influences were identified as prospectively associated with the development of DE attitudes and behaviors in male adolescents. Potential limitations were also identified in the psychometric assessment measures used to identify those factors, namely that they reflected assumptions derived from research and treatment literature developed in the area of female EDs, and that they were validated predominantly or entirely on female populations.

A latent class segmentation analysis was then conducted to examine the association between DE attitudes and behaviors in male adolescents and family relational quality; child social, emotional, and behavioral functioning; and child social media use. A three-class solution provided the best fit to the data and subscale score means on the EDI-3 (Garner, 2004) increased across classes. However, there were no significant differences in parenting quality; child social, emotional, and behavioral functioning; and internalization of appearance ideals across the classes.

In the third study, a structural model was developed and tested, which assessed the association between parent-child relational quality and features of DE in male adolescents. While no direct association was identified between parent-

child relational quality and DE in male adolescents, two distinct relationships were identified: one involved child social, emotional, and behavioral functioning and a second involved an association with social media.

Finally, a qualitative analysis was conducted to explore male adolescent patient's experience of ED treatment and the extent to which patients understood their treatment to be responsive to their symptoms.

The thesis concludes that there is significant potential to continue to redefine both the development of DE and the presence of EDs in male adolescents. This potential may better reflect DE attitudes and behaviors unique to male adolescents and may, therefore, provide better assistance in early intervention and treatment response. Findings are discussed in terms of their clinical implications, the limitations associated with this program of research, and potential directions for future research.

CHAPTER 1: Introduction and Literature Synthesis

Despite findings that disordered eating (DE) or other eating disorder (ED) symptoms in adolescence are highly predictive of later, diagnosable EDs, male adolescents have been overlooked in the research, assessment, diagnosis and clinical treatment of eating difficulties (Mitchison et al., 2013; Murray et al., 2017b). Adolescents between the ages of 11-18 years evidence the greatest of risk for developing DE or an ED, and males are becoming increasingly represented in those figures (Dzielska et al., 2020; Mitchison & Mond, 2015). Importantly, however, less than 1% of ED research has focused on male adolescent presentations (Murray et al., 2016). This is concerning as EDs, including Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder (BED) are highly complex, serious physical and mental health problems (Arcelus et al., 2011; Marzola et al., 2022). Without targeted intervention males may be at risk of experiencing prolonged illness, impaired social functioning and increased risk of comorbid mental health concerns (Forrest et al., 2017; Limbers et al., 2018).

Prevalence

Rates of prevalence of DE and EDs in male adolescents continue to be difficult to accurately determine and are likely underestimated (Murray et al., 2018). In a comparative analysis spanning 26 European countries, it was found that around 10% of adolescent males and 20% of adolescent females engaged in weight reduction behaviors, with increases in prevalence observed among male adolescents contrasting with stable trends among female adolescents (Dzielska et al., 2020). Approximately 5.5% of male adolescents in the United States evidence DE (Lipson & Sonneville, 2017). Additionally, nationwide surveys conducted in the USA revealed that 30% of male adolescents admit to attempting weight gain or muscle building, including 40% who were objectively considered to be of

normal weight according to their Body Mass Index (BMI) (Nagata et al., 2019a). In Australia and Canada, the incidence of Diagnostic and Statistical Manual of Mental Disorders (5th ed., text rev.) (DSM-V TR; American Psychiatric Association [APA], 2022) EDs in male adolescents has been reported as 1.2% and 2.2%, respectively (Allen et al., 2013a; Flament et al., 2015). A study of ED prevalence rates within the UK revealed male adolescents between the ages of 11-24 years account for 0.1% cases of Anorexia Nervosa, 0.33% cases of Bulimia Nervosa and 0.79% cases of Other Specified Feeding and Eating Disorder (OSFED) (Sweeting et al., 2015). Internationally, the prevalence of EDs varies with lowest rates reported in African and Latin populations followed by Japan and China (Hoek, 2016). Reviews suggest that non-Caucasian, non-western participants living western countries are included in DE research at levels lower than their proportion of population (Egbert et al., 2022a).

Prevalence studies amongst adults indicate that DSM-V TR residual ED diagnoses, such as OSFED, are up to six times more prevalent than full-criteria EDs (Hay et al., 2017). A recent Australian study by Mitchison et al. (2020) outlined prevalence figures for various subthreshold ED and OSFED classifications amongst 2495 male adolescents. They reported 1.2% of male adolescents met criteria for atypical Anorexia Nervosa, 1.2% for subthreshold Bulimia Nervosa, and 0.0% for subthreshold BED, compared to 0.0% for Anorexia Nervosa, 1.8% for Bulimia Nervosa, and 0.2% for BED (Mitchison et al., 2020). Additionally, 1.6% of male adolescents met criteria for purging disorder, 4.9% had night eating syndrome, and 4.9% exhibited clinically significant EDs not classifiable under DSM-V TR criteria (Mitchison et al., 2020). These findings indicate that 11.4% of boys had EDs that fell beyond the clinical presentations associated with full or subthreshold EDs recognized by the DSM-V

TR, outnumbering by nearly three to one those that fell within defined diagnostic categories.

Further evidence suggests that of adolescents and young adults presenting at emergency departments, males comprised 26.6% of those who were determined to have an ED and that DE is increasing faster in males compared to females (Dooley-Hash et al., 2012; Gorrell & Murray, 2019). Early research has indicated that approximately 28% of males and 35% of females aged 11-24 are dissatisfied with their appearance, whilst from 12-17 years, 90% of females and 68% of males have attempted various kinds of diets (National Eating Disorders Collaboration [NEDC], 2010; Tucci et al., 2007). Additionally, early data from Project Eating Amongst Teens (EAT) also revealed that compared to 9.4% of girls, 13.5% of boys engaged in higher levels of recurrent and severe purging behaviors including laxative abuse, over-exercising to influence shape or weight and self-induced vomiting (Ackard et al., 2007).

However, these aforementioned statistics only partially capture the prevalence of male adolescent EDs, without addressing subclinical levels of EDs (Murray et al., 2018). Besides prevalence, the demographics of male adolescents with EDs, as well as the specific risk factors they experience, may not be accurately estimated from studies which have been conducted in clinical settings, as only a portion of males experiencing an ED receive treatment and even less so present for treatment of subclinical symptoms (Murray et al., 2017b). In this way, such clinical samples may be less than representative of male adolescents who are suffering with eating difficulties of varying severity (Murray et al., 2017b).

Male Adolescent Representation in Eating Disorder Research

Many of our current assumptions regarding EDs in males originate from a relatively small empirical basis, likely due to a paucity of research into the

characteristics of presentation, screening and treatment for male adolescents with eating difficulties (Darcy, 2011; Murray et al., 2018). For instance, a recent review of short and long-term outcomes for males treated for Anorexia Nervosa highlighted the scarcity of knowledge in this area (Strobel et al., 2018). The findings indicated that limited studies and insufficient numbers of males are included in such research, thus preventing strong conclusions on the course and outcome of anorexia nervosa in males from current literature (Strobel et al., 2018). Similarly, a recent review of socciodemographic reporting and representation in ED psychotherapy treatment trials in the United States revealed that males are underrepresented in relevant research spanning from 1985 to 2020 (Burnette et al., 2022). Accordingly, less than 1% of ED research has focused on male adolescent presentations (Murray et al., 2016). It is assumed that this gap in literature may be due to the characterization of EDs throughout the twentieth century as disorders which did not affect males. In particular, the defining diagnostic criteria of amenorrhea, as included in the DSM-IV (APA, 1994), did not apply to males (Lavender et al., 2017).

Due to the historical lack of attention to male EDs and a lack of males presenting to treatment clinics, researchers have inadvertently maintained the homogeneity of samples by excluding males from their studies (Brown & Keel, 2023). Whilst there are of course exceptions to this statement (e.g., Verschueren et al., 2020; Zaitsoff et al., 2020) in general terms, research and the development of diagnostic criteria and treatment approaches have been largely female-centered (Lavender et al., 2017). The study of EDs can be methodologically difficult given the prevalence of comorbid mental health concerns (Hambleton et al., 2022), difficulties matching cases with diagnostic criteria (Murray et al., 2018), high drop-out rates, low generalizability and female-centric assessment measures

(Fernández-Aranda et al., 2021; Mitchison & Mond, 2015).These difficulties may be amplified among males, however, because of increased difficulty determining base rates of EDs in males compared to females (Gorrell & Murray, 2019), and the lack of a well-defined characterization of EDs in males, which makes their detection more challenging (Brytek-Matera & Czepczor, 2017; Darcy, 2011).

Similarly, research has not been impervious to the characterization of EDs as female-bound disorders (Murray et al., 2017b), thus limiting the development of appropriate means of assessment, clinical formulation, and treatment (Murray et al., 2018), as well as making it difficult to effectively uncover and investigate male-specific features (Griffiths et al., 2015). As such, is it difficult to determine the extent to which clinical work with male adolescents with eating difficulties has been informed by male specific research (Murray et al., 2016). Maintaining the tendency to examine EDs through a female lens risks limiting access to vital information relevant to male experience, and risks maintaining limited ability to address concerns in treatment (Darcy, 2011; Mitchison & Mond, 2015).

Conceptual Models of Male Adolescent Risk Factors

Gaps in research may result from a range of factors including limitations in the presentation of male adolescents to treatment settings and therefore a reduced imperative to engage in clinically based research (Griffiths et al., 2015; Grillot & Keel, 2018). This may have fed into limitations in the development of theoretical models of EDs based on the identification of factors of risk for males and trajectories toward eating difficulties that result. Of course, factors that contribute to the development of EDs vary for each individual (Byrne et al., 2023), and a number of theoretical models have been proposed to explain the mechanisms involved in the development and maintenance of EDs (Brytek-Matera & Czepczor, 2017). For example, according to Fairburn, Cooper and Shafran's

(2003) transdiagnostic model of EDs, individuals with Anorexia Nervosa, Bulimia Nervosa and BED display common clinical features, which are primarily maintained by a dysfunctional self-evaluation system. As such, individuals with these EDs over-evaluate their bodily appearance and derive their self-worth and esteem from their eating behaviors, body shape and weight and their ability to control these factors (Fairburn et al., 2003).

According to Fairburn et al.'s (2003) model, it is the overvaluation of a "thin" body weight and shape in particular that underpins many of our current treatment models and assessment measures of EDs, as well as diagnostic criteria which outline a fear of weight gain and compensatory behaviors to prevent such (Lavender et al., 2017). Although early studies (i.e., Dakanalis et al., 2014; Murray et al., 2013) have indicated the potential relevance of Fairburn et al.'s (2003) model to undergraduate-aged males, recent investigations of male body dissatisfaction have revealed that males overvalue a larger body and report a desire to gain instead of lose weight (Nagata et al., 2019b; Rodgers et al., 2020b). According to sociocultural theory (Thompson et al., 1999; Tylka, 2011), this dissatisfaction results from unrealistic standards that are set in Western society, which majority of adolescents fail to meet. In contemporary Western social media, appearance standards frequently concentrate on thinness, however they also increasingly focus on a combination of leanness, muscularity and fitness (Nagata et al., 2019b; Rodgers et al., 2020b). For males, the two characteristics of muscularity and low body fat serve as dual standards to achieve ideal male appearance (Murray et al., 2017b; Nagata et al., 2019b). Internalization of the muscular ideal by male adolescents may result in a variety of DE behaviors and attitudes to achieve the standard (Rodgers et al., 2020b). These may be fundamentally distinct to ideal appearance characteristics for female adolescents

(Lavender et al., 2017). For example, whilst females may more commonly engage in restriction and self-induced vomiting to achieve the thin ideal, males may more commonly engage in behaviors directed toward achieving leanness and building muscle, including over-exercising and following a rigid diet plan to enhance muscle gain (Chu et al., 2021; Lavender et al., 2017).

Early research identified that the development of self-evaluative processes based on a muscular shape and weight ideals in male adolescents, may develop as a result of specific predisposing factors (Garner, 1993). Evidence confirms that psychosocial factors including the use of social media, peer and parent influences as well as individual psychological attributes may function to predispose adolescents to the development of EDs (Brown & Keel, 2023; Byrne et al., 2023).

In this way, sociocultural theory, as outlined in the tripartite influence model (Thompson et al., 1999; Tylka, 2011), may extend upon the factors identified by Fairburn et al. (2003). The refinement of the tripartite influence model by Tylka (2011) introduced dual pathways of muscularity-oriented and body fat-oriented dissatisfaction for male adults. These pathways predicted engagement in muscular enhancement and DE behaviors, respectively. The re-evaluation of the dual pathway model (Tylka, 2011) revealed that internalization of the muscular ideal mediated the relationship between pressure to be muscular from family and the media, and both forms of body dissatisfaction. Thus, exposure to idealized body images on social media during adolescence may lead male adolescents to compare their own bodies, potentially triggering DE and muscle-building practices (Murray et al., 2018). These behaviors could include a desire to gain muscle mass, consuming excessive protein or supplements, and developing an unhealthy fear of losing weight or muscle (Murray et al., 2018).

Consistent with the sociocultural theory (Thompson et al., 1999; Tylka,

2011), subsequent research demonstrated a minor but significant association between peer and parent influences, social media use, body image problems, and DE in male adolescents (de Vries et al., 2016; Holland & Tiggemann, 2016). Existing research has demonstrated a link between low mood and muscle dysmorphic symptoms, body dissatisfaction, and DE among male adolescents (Hoffmann & Warschburger, 2017; Murray et al., 2017b). More recent findings have indicated an indirect association between negative affect, body image concerns, and DE through media-ideal internalization and appearance comparison, in both male and female adolescents (Rodgers et al., 2020b). Although these mechanisms are not exclusive to ED and may not manifest in every individual with eating challenges, they do account for casual influence on the development and perpetuation of self-assessment systems centered around dieting, weight, and body shape (Dudek et al., 2014). Hence, elements from both models, including predisposing sociocultural factors such as the portrayal of muscular ideals across various social media platforms (Thompson et al., 1999; Tylka, 2011), alongside maintenance mechanisms like deriving self-esteem from regulating body shape, weight, and eating habits, (Fairburn et al., 2003; Panton & Garzon Maaks 2021), could be amplified by specific developmental transitions in male adolescence.

The Impact of Adolescence

Importantly, the aforementioned models do not explicitly account for factors that contribute to developmental trajectories toward EDs in male adolescents, and there is a paucity of data identifying ED phenomena as they apply to male adolescents (Breton et al., 2022; Darcy, 2011). Because of this, researchers often extrapolate data from literature on females or adult males (Gorrell & Murray, 2019; Murray et al., 2016), which may be inappropriate as the prevalence, characterization and trajectories of eating difficulties may differ as they appear

during the course of puberty compared with adulthood (Darcy, 2011; Keski-Rahkonen & Mustelin, 2016).

Due to significant developmental changes impacting body image satisfaction and self-perception, adolescents are among the most susceptible groups for developing EDs (Panton & Garzon Maaks 2021). Distinct from the experiences of male adults, male adolescents undergo substantial physical, social, emotional, and behavioral transformations during puberty (Crone & Fuligni, 2020; Dahl et al., 2018). During this period, factors such as peer relationships, academic stress and identity exploration play pivotal roles in shaping adolescents' attitudes towards their bodies and eating behavior (Hellström & Beckman, 2021; Verschueren et al., 2020). Significant bodily and behavioral changes, identity formation, emotional adjustment, and heightened self-awareness experienced by adolescents also heighten their susceptibility to self-doubt and negative comparisons with peers (Feinberg-Walker et al., 2009; Paganini et al., 2021). Perceived inadequacies or discomfort stemming from personal changes during puberty may also contribute to challenges in self-acceptance, a difficulty further compounded by sociocultural pressures related to appearance and success (Mustapic et al., 2017). Such circumstances can foster feelings of self-doubt and heightened sensitivity to peer comparisons, which may increase vulnerability to the onset of DE during adolescence (Long et al., 2020; Volpe et al., 2016).

Relational dynamics with parents and caregivers likely play a more significant role in shaping DE attitudes and behaviors among males adolescents compared to adult males (Pace et al., 2018). Early research has revealed noteworthy and statistically significant associations between parenting style, feeding practices, and various adolescent mental health outcomes, including eating-related behaviors (Brown et al., 2016; Pace et al., 2018). Additionally,

recent research has revealed that parental patterns of DE may not only influence eating behaviors but also impact parent-child interactions, potentially affecting overall child development beyond the transmission of eating behaviors (Chapman et al., 2021).

Further research has reflected that unhelpful family relationships, poor self-esteem and depressive symptoms among adolescents, increase their risk of engaging in DE (Pelletier Brochu et al., 2018; Rodgers et al., 2014). For example, for adolescents with heightened emotional reactivity and a background of invalidating feedback from their parents, such adverse life events likely result in increased emotional arousal, low self-esteem and negative affect, which they may subsequently attempt to alleviate through DE (Haynos & Fruzzetti, 2011; Juarascio et al., 2016). Consequently, low self-esteem might heighten risk by impacting self-evaluation, especially in terms of physical attractiveness (Dakanalis et al., 2015). Due to a link between depressive symptoms and low self-esteem, a negative processing bias may therefore cause male adolescents to view their appearance as different from the societal ideal, leading to a persistent sense low self-worth (Hoffmann & Warschburger, 2019). Thus, negative family dynamics, low self-esteem, and depressive symptoms may amplify the risk of DE more significantly among male adolescents than adults, given the heightened influence of family during adolescence (Van Durme et al., 2018).

Therefore, extrapolating data from studies involving adult males may not comprehensively capture the intricate interplay of risk factors and vulnerabilities which shape male adolescents' experiences and behaviors in nuanced ways (Byrne et al., 2023; Darcy, 2011). Such extrapolation may also overlook the developmental specificity and complexity of factors contributing to ED risk for male adolescents (Darcy, 2011; Keski-Rahkonen & Mustelin, 2016).

Additionally, the sociocultural landscape surrounding body image ideals, masculinity norms, family influence and peer influences undergoes significant evolution during adolescence (Panton & Garzon Maaks 2021). This further underscores the need for research capable of elucidating mechanisms underlying the development of DE behaviors in male adolescents.

Consistent with this, and in following the guidelines set forth by the American Psychological Association ([APA], 2020, p. 135), this thesis adopts the term "male adolescent" to signify a focus on the specific experiences of young individuals who identify as male and are in the developmental stage of adolescence within the context of ED development and treatment. The APA guidelines (2020, p. 135) define adolescence as the period from 13 to 17 years old. For the purposes of this thesis, we define adolescents as individuals in the high school age group within the Australian secondary schooling system. This definition aligns with the participant samples of all studies included in this thesis, encompassing individuals aged 11 to 19 years.

Furthermore, the decision to distinguish between "male" and "female" in this study stems from an acknowledgment of nuanced gender distinctions. We recognize "male" and "female" as descriptors pertaining to biological sex, while "man" and "woman" encompass broader considerations of gender identity. When referring to groups that encompass individuals across a wide age range, we employ the terms "males" and "females," as recommended by the APA guidelines (APA, 2020, p. 135). This methodology, which acknowledges the potential differences in experiences of male adolescents in ED treatment compared to females, adheres to APA guidelines to ensure transparency and precision, thus facilitating an accurate portrayal of the unique aspects of male adolescent experience.

Sex Differences between Female and Male Adolescent Disordered Eating

Understanding the differences in DE attitudes and behaviors between male and female adolescents is crucial in exploring the distinct factors that contribute to these patterns (Mitchison & Mond, 2015; Verschueren et al., 2020). For instance, epidemiological evidence suggests a later onset of DE in males compared to females, highlighting the significance of pubertal timing for female onset (Gorrell & Murray, 2019; Zehr et al., 2007). Female-specific factors, such as increases in ovarian hormones, have been linked to higher rates of DE among females, but these do not apply to males (Chapman et al., 2021; Paganini et al., 2021). However, certain psychosocial factors, like anxiety, have previously shown associations with increased DE in both post-pubertal females and males, suggesting potential commonalities across genders (Schaumberg et al., 2019). Much of the research in this area has predominantly involved female participants, adhering to models of DE that focus on attitudes and behaviors relevant to females (Neale et al., 2020; Paganini et al., 2021). Differences in genetic, temperamental, and maturational influences on DE between males and females appear to be more varied and less defined for males than females (Culbert et al., 2017). Hence, future studies aiming to identify processes specific to male adolescent DE and its relationship with temperamental and maturational characteristics are essential (Paganini et al., 2021).

A crucial point in understanding DE between male adolescents and females is recognizing the substantial differences in their attitudes and behaviors (Murray et al., 2017b). Early reviews have outlined several phenotypic traits that are now recognized as distinctly associated with male DE behaviors (Mitchison & Mond, 2015). While body dissatisfaction is a common feature in both sexes, traditional ideas about DE in females mainly focus on a desire for thinness achieved through

restriction or purging (APA, 2022). In contrast, a review by Murray et al. (2010) was pivotal in reshaping the concept of male DE by highlighting muscularity as central. Phenotypic processes unique to males may involve a dual drive to increase both body muscularity and leanness simultaneously (Lavender et al., 2017; Tylka, 2011).

Additional reviews have further elucidated the processes central to the development of male DE (Mitchison & Mond, 2015; Murray et al., 2017b). The first process involves striving for a male body 'ideal' characterized by increased muscularity and a corresponding leanness achieved consistent with socio-cultural norms. The second process is associated with eating habits focused on muscularity to support muscle growth and enhance body leanness (Murray et al., 2017b). These processes often involve a cycle of “bulking” and “cutting” (Lavender et al., 2017, p. 3), which includes consuming enough food to support muscle development while restricting intake to achieve leanness and enhance muscular appearance.

Behaviors such as increased exercise to facilitate muscle development have been associated with DE patterns related to muscularity (Lavender et al., 2017; Murray et al., 2017b). This might include heightened gym attendance or engagement in various forms of bodybuilding exercise, often accompanied by obsessive, compulsive, or anxiety-related features, especially when eating-related goals are not met (Ganson et al., 2022; Murray et al., 2010). Thus, understanding the factors associated with the development and persistence of male-specific ED phenotypes amongst male adolescents, alongside a well-informed developmental understanding of these associations, is essential (Jaworski et al., 2019; Lavender et al., 2017).

The Influence of Masculine Gender-Role Socialization

The influence of gender role socialization (Addis & Mahalik, 2003) may also play a significant role in shaping DE in male adolescents and in their willingness to engage in treatment (Griffiths et al., 2015; Grillot & Keel, 2018). Research has shown that compared to females, males are less likely to present for treatment for an ED and may, therefore, be left under-diagnosed and under-treated within clinical settings (Forrest et al., 2017; Limbers et al., 2018). This may be due to a perception of stigma related to seeking mental health treatment amongst males, particularly for help related to eating (Griffiths et al., 2015; Grillot & Keel, 2018). For instance, gender roles for males may include self-reliance, independence and resilience, and thus a refrain from help-seeking (Griffiths et al., 2015). As part of this narrative, it appears that males suffering from DE or an ED may be expected to easily overcome eating difficulties stereotypically attributed as female-bound problems (Griffiths et al., 2014; Manzato, 2019). This is concerning as demonstrated in a study by Griffiths et al. (2015), whereby males who prescribed to the stigma of seeking help for an ED had an increased probability of having an undiagnosed ED compared to females.

Research has long demonstrated that if males do seek treatment, it often occurs late in the disorder and, as a result, they may already be experiencing more severe medical complications (Forrest et al., 2017; Limbers et al., 2018). For instance, in an early investigation of a random sample of 500 males presenting to medical practices, six were identified as meeting criteria for an ED (Hay et al., 2005). Of those, only one male sought treatment for an ED, suggesting that males may not recognize symptoms of DE or underestimate their severity, thereby overlooking the necessity for treatment (Burton et al., 2022; Fatt et al., 2020). Further, recent findings have shown when males do seek treatment, their

presentation to clinical settings may be characterized by psychiatric comorbidity and escalating symptoms of such, rather than for treatment of an ED as the primary concern (Burton et al., 2022).

Therefore, in an effort to address the under-diagnosis and under-treatment of male adolescents with EDs, it is imperative that healthcare systems create environments that encourage and support male adolescents to recognize symptoms of concern and seek assistance in response (Ganson et al., 2021). There is an onus on health-care professionals to lead the challenge to 'masculine' ideals of strength, power, and control associated with eating difficulties and, as a result, to lead to the refinement of ED treatments (Thapliyal et al., 2020; Thapliyal et al., 2017). This response may contribute to creating more secure environments for male adolescents to openly discuss concerns such as DE and body image (Ganson et al., 2021).

Defining Diagnostic Characteristics of Disordered Eating for Males

Due to the lack of specific research into male adolescent DE and the influence of established models of EDs, there is limited definitive understanding of what constitutes DE behaviors and/or changes in attitudes towards for male adolescents (Brytek-Matera & Czepczor, 2017). However, EDs are often conceptualized as running on a continuum commencing with concerns about body shape/weight and progressing to implementing extreme control over body shape/weight (Alexander & Treasure, 2013; Vainik et al., 2015). As such, DE is often defined by researchers as the behaviors or attitudes along this continuum which do not fulfil ED criteria but also do not encompass appropriate eating habits (Hansson et al., 2016). In previous research, DE has also been referred to as “subthreshold eating disorders”, “subclinical eating disorders”, “symptomatic eating” and Unspecified Feeding and Eating Disorders (UFED) (Dennard &

Richards, 2013; Klump et al., 2012). These behaviors may mirror clinical-level EDs and manifest in diverse ways including fasting, fixation on specific food groups like carbohydrates or protein, use of diet pills, vomiting, laxative use, or smoking to avoid weight gain (Ortega-Luyando et al., 2015; Zhang et al., 2021).

When applying the criteria from the DSM-V TR (APA, 2022) for Anorexia Nervosa, Bulimia Nervosa, and BED to male adolescents, the results are mixed, but tend to reveal lower prevalence rates than female adolescents (Qian et al., 2022). However, early research has shown that applying partial ED criteria revealed significant levels of subclinical concerns for male adolescents (Johnson et al., 2001; RodrÍguez et al., 2001), while in adults, less strict Anorexia Nervosa and Bulimia Nervosa criteria resulted in higher incidence rates for men (Woodside et al., 2001). As such, males may receive more frequent diagnoses of residual ED categories such as UFED, given their potential failure to meet criteria for full syndrome EDs. Indeed, this trend was observed in a study by Le Grange et al. (2012) where 83% of male adolescents were diagnosed with UFED compared to 79% of females. Similarly, further studies on adult prevalence indicate that DSM-V TR residual ED diagnoses are up to 6 times more prevalent than full criterial EDs (Hay et al., 2017), and, among male adolescents, OSFED diagnoses (8.5%) were more prevalent than full criterial ED diagnoses (2.1%) (Mitchison et al., 2020). Hence, ongoing research discussions have focused on broadening the ED DSM-V TR criteria to encompass a wider range of DE behaviors unique to male adolescents, including those currently labelled as muscle dysmorphia (Gorrell & Murray, 2019; Murray et al., 2010).

Dating back three decades to a seminal study conducted by Pope Jr et al. (1993), researchers have suggested that muscle dysmorphia, which occurs almost exclusively in males, may be the male equivalent of Anorexia Nervosa, “termed

reverse anorexia" (Gorrell & Murray, 2019). Muscle dysmorphia is defined in the DSM-V TR by a desire to increase lean muscle mass; perceptions that the body is too thin and use of unhealthy methods to achieve a muscular ideal (APA, 2022). Males who pursue muscularity to a disordered degree, have been reported to exhibit ED symptoms including changes in eating habits, disturbances in body image, and the adoption of extreme methods to manage weight and shape (Gorrasi et al., 2020; Mitchison et al., 2022). Additionally, early research has posited that males with muscle dysmorphia demonstrate comparable scores to males with an ED concerning measures of ED pathology, as evidenced by assessments such as the Eating Disorder Inventory (EDI-3; Garner, 2004; Murray et al., 2010). However muscle dysmorphia is included in the DSM-V TR as a subtype of body dysmorphia, and as such, early assertions that "there is no eating disorder diagnosis which is specifically geared towards the male experience of eating pathology" (Greenberg & Schoen, 2008, p. 469) are maintained in current diagnostic criteria (Brown & Keel, 2023). In this way, such criteria may not only marginalize males experiencing behaviors related to muscularity-oriented EDs, but also perpetuate the misconception that EDs are rare among males (Murray et al., 2016).

Consequently, the classification of muscle dysmorphia is subject to debate in the scientific community and there may be a need to revise the criteria used in clinical practice for EDs to include muscle dysmorphia (Cooper et al., 2020a; Murray et al., 2010). Some researchers propose that due to shared clinical features and the prevalence of concerns about muscularity among male adolescents with EDs, it could be better situated within the ED spectrum (Cooper et al., 2020a; Murray et al., 2016). Alternatively, muscle dysmorphia and EDs may be classified together as "body image disorders," a categorization proposed by Cooper et al.

(2020a, p. 1600) and supported by empirical evidence from Hartmann et al. (2020). In this way, incorporating criteria linked to muscular dysmorphia behaviors, predominantly observed in males with EDs, could address the female-centric classification of EDs (Cooper et al., 2020a; Murray et al., 2016). This adaptation could also uncover additional male adolescents who were previously missed regarding subclinical eating difficulties, potentially leading to a full criterial diagnosis for these individuals (Cooper et al., 2020a; Murray et al., 2016).

Assessment Measures

Another central challenge within the field of EDs relates to the assessment and detection of factors which contribute to ED symptoms, particularly amongst male adolescents (Murray et al., 2018). As such, it has been suggested that established psychometric ED assessment measures including the Eating Disorder Examination (EDE-Q; Fairburn & Beglin, 2008) and the EDI-3 (Garner, 2004) may fail to accurately capture the specific eating difficulties of male adolescents (Murray et al., 2018). Although widely used and validated, the EDI-3 (Garner, 2004) and EDE-Q (Fairburn & Beglin, 2008) may overlook nuanced aspects of male adolescent DE, such as muscularity and body image concerns, due to their primary focus on female-centric ED symptoms (Murray et al., 2017b). For example, whilst early studies have found that males desire a body size that is 13kg more muscular than their current appearance (Pope et al., 2000), these measures have mostly excluded items that capture the desire to gain weight or increase muscle mass (Murray et al., 2017b).

Thus, in a statistical investigation of the EDI-3 (Garner, 2004), a between-subjects MANOVA revealed that males with EDs scored considerably lower (M = 37.73) than females (M = 47.33) on the body dissatisfaction subscale (Stanford & Lemberg, 2012). Such results suggest that males with EDs experience lower

levels of body dissatisfaction than females. However, it's inaccurate to presume males are less affected by body dissatisfaction than females, as heightened dissatisfaction amongst males is linked to increased use of anabolic steroids, excessive exercise, and DE (Kinnaird et al., 2018; Sangha et al., 2019). Furthermore, early research by Olivardia et al. (2004) found that American males had high levels of body dissatisfaction, with the majority preferring to develop muscle and eliminate fat. Consequently, it is likely that the body dissatisfaction subscale items on measures like the EDI-3 (Garner, 2004), fail to encapsulate the male body dissatisfaction construct in the same way as they do for females (Murray et al., 2017b). Specifically, EDI-3 subscale items such as "I think my buttocks are too enormous" and "I think my hips are too large", are not typical concerns for males regarding body dissatisfaction (Murray et al., 2017b; Stanford & Lemberg, 2012). Thus, such items may not accurately measure male body image dissatisfaction and overall ED symptoms, resulting in lower EDI-3 scores (Murray et al., 2018).

Similarly, Darcy et al. (2012) compared responses on the EDE-Q (Fairburn & Beglin, 2008) in matched sample of male and female adolescents with Anorexia Nervosa, revealing significantly lower scores for males on the EDE-Q Global Score, Shape Concern and Weight Concern subdomains. These results suggested that male adolescents were less likely than females to affirm wanting a flat or empty stomach, being uncomfortable while eating in front of others, secret eating and having a desire to lose weight (Darcy et al., 2012). Thus, low endorsement of a desire to reduce weight among males raises questions about the suitability of EDE-Q as a measure of ED symptoms in males, given that this item corresponds to diagnostic criterion for Anorexia Nervosa (Murray et al., 2017b; Murray et al., 2010). Additionally, early studies have reported less variance in

male responses compared to females, with over 90% of males responding "no days/none/not at all" to approximately one-third of the subscale items, implying that the EDE-Q functions effectively but with less reliability in male adolescents (Reas et al., 2012).

Hence, the requirement for completing the EDE-Q (Fairburn & Beglin, 2008) to obtain an Eating Disorder Plan (EDP) in Australia, and qualify for rebates on psychology sessions, poses a significant challenge. This challenge arises from the potential oversight of distinctions between male adolescent and female presentations of DE and EDs by commonly used assessment measures, raising concerns about the implications for the diagnosis and treatment experiences of male adolescents (Murray et al., 2018; Thapliyal et al., 2018). Consequently, accurate diagnosis of male adolescents may occur after a delayed presentation to treatment compared to females, and they may exhibit more severe ED symptomatology than females (Thapliyal et al., 2018).

However, although male adolescents often score lower on psychometric assessment measures designed in line with female DE criteria, they still endorse items on these measures (Carey et al., 2019; Jennings & Phillips, 2017). This suggests that males might internalize a broader range of socio-cultural body ideals than adolescent females, indicating a degree of relevance to males in both the drive for thinness and “bulk and cut” models of DE (Carey et al., 2019; Smith et al., 2017). Additionally, early research indicates that both male and female participants endorse psychometric assessment items reflecting a desire for thinness (Thurfjell et al., 2003), with some minority male populations showing similar levels of endorsement to female participants (Cella et al., 2010; Klimek et al., 2021).

Yet one implication of using psychometric assessment measures developed

based on models of female DE, is an underestimation of the prevalence rates and presentation patterns of DE in males (Limbers et al., 2018). Thus, recent studies have proposed the need to evaluate whether and how measures such as the EDI-3 (Garner, 2004) or EDE-Q (Fairburn & Beglin, 2008) could be adapted to more accurately capture the ED attitudes and behaviors observed in male adolescents (Lavender, 2021). For example, Lavender (2021, p. 96) suggests that existing questionnaire items targeting thinness could be adjusted to address low body fat or leanness. Similarly, items addressing dissatisfaction with gendered body parts, such as thighs, could be rephrased to encompass more general (e.g., legs) or muscularity-oriented (e.g., quads) concerns (Lavender, 2021, p. 96).

As such, researchers have more recently pursued and developed measures specifically tailored to EDs in males (Cooper et al., 2020b; Stanford & Lemberg, 2012). For instance, the Eating Disorder Assessment for Men (EDAM) is a 50-item questionnaire that examines behavioral and cognitive symptoms unique to males with EDs encompassing food worries, weight concerns, exercise concerns, body image/appearance concerns, and DE behaviors (Stanford & Lemberg, 2012). The initial validation of this measure was conducted on 78 male and 30 female ED patients, as well as 45 males without an ED, and revealed that the EDAM accurately predicted an ED in 82.1% of adult males, with a Cronbach's alpha for the total score within acceptable ranges (alpha = 0.91) (Stanford & Lemberg, 2012). However, this measure has yet to be verified in populations of male adolescents (Limbers et al., 2018). Additionally, an early study by Morgan et al. (2000) revealed that on the SCOFF (Sick, Control, One Stone, Fat, Food) Questionnaire, a 5-item ED screening measure, males with EDs indicated lower cut-off scores compared to females. As such, lower cut-off scores on ED assessment measures may be appropriate for males in order to establish a level

of clinical severity in their presentations (Liu et al., 2015; Smith et al., 2017).

Further research has also focused on delving deeper into the aspects of EDs, DE, and body image that are more prevalent among male adolescents as well as adult males. For instance, the Eating Pathology Symptoms Inventory (Forbush et al., 2013) was created and normed within male and female populations (Forbush et al., 2014). This inventory includes subscales dedicated to excessive exercise, muscle building, and more traditional ED indicators and has been found to differentiate between individuals with and without an ED (Forbush et al., 2013). Additionally, the Muscularity-Oriented Eating Test (MOET; Murray et al., 2019) and the Eating for Muscularity Scale (EMS; Cooper et al., 2020b) were recently developed specifically to evaluate behaviors related to DE focused on muscularity. The MOET is a 15-item questionnaire designed to assess eating attitudes and behaviors linked to the pursuit of muscularity (Murray et al., 2019). The measure contains eight subscales which assess adherence to strict dietary rules, such as monitoring macronutrient intake, regulating protein consumption, and adjusting food intake to affect muscularity (Murray et al., 2019). The MOET was originally validated in a sample of 511 undergraduate males and demonstrated a unidimensional structure, high internal consistency (omega = 0.92~0.93), and high test-retest correlation (r = 0.75) (Murray et al., 2019). Recently, validation of the MOET has been conducted in a sample of undergraduate females (Cunningham et al., 2021). Additionally, Spanish (Compte et al., 2021) and Turkish (Caliskan & Alim, 2021) adaptations of the MOET have undergone validation among undergraduate males, while Brazilian (de Carvalho et al., 2023) and Chinese (He et al., 2023; He et al., 2021) versions have been validated in both adult male and female samples.

Similarly, the EMS was designed to measure muscularity-oriented DE

attitudes and behaviors (Cooper et al., 2020b). The measure contains nine subscales with 27 items which assess preoccupation, diet gain, diet loss, dietary restraint, excessive attention, functional impairment, health risk, compensatory exercise and negative affect (Cooper et al., 2020b). The EMS has been validated amongst male and female adults, showing high internal consistency (Cronbach's alpha = .95), moderate to strong concurrent validity with related measures (r = .43–.78), good construct validity using known-group assessment, and strong test–retest reliability (r = .90) (Cooper et al., 2020b).

Thus, both the MOET (Murray et al., 2019) and EMS (Cooper et al., 2020b) provide reliable and valid measures of muscularity-oriented DE pathology in undergraduate and adult populations, however both measures are yet to be validated in male adolescent and clinical populations (Cooper et al., 2020b; Murray et al., 2019). Nonetheless, these advancements represent a step towards a more comprehensive understanding of EDs across gender lines. In this way, it is essential for healthcare professionals to acknowledge the gender-specific complexities of EDs in assessment and diagnosis (Limbers et al., 2018). This is particularly crucial when utilizing established ED assessment measures such as the EDI-3 (Garner, 2004) or the EDE-Q (Fairburn & Beglin, 2008) with male adolescents, as they may not adequately address their male-specific ED concerns (Murray et al., 2017b).

Treatment Outcomes for Males

Recent research has underscored the importance of caution among clinicians when utilizing existing ED measures to establish definitive diagnoses or gauge symptom severity in male adolescents (Limbers et al., 2018).

Yet, there is insufficient research available to inform the training of medical and health professionals in screening and treating EDs in male adolescents

(Ganson et al., 2021; Heruc et al., 2020). This gap contributes to diverse treatment outcomes for male adolescents (Ganson et al., 2021). Concerningly, recent research has indicated that professionals lacking experience and a comprehensive understanding of ED management may endanger patients or impede their recovery process (Heruc et al., 2020). Indeed, these findings reflect early research by Vo et al. (2016) where over half of male adolescent ED patients were found to necessitate urgent hospitalization during initial outpatient visits, due to inadequate assessment and identification of ED symptoms. Such outcomes are problematic as medical practitioners are often the first line of contact for individuals seeking treatment for EDs (Ivancic et al., 2021; Rowe, 2017). Furthermore, optimal ED prognosis needs early detection and treatment by a multidisciplinary team (Austin et al., 2022; Pasi & Pauli, 2019). While the average recovery period for an ED spans from 1 to 6 years, with up to 25% experiencing a long-term illness, early detection and intervention increase the likelihood of recovery (Deloitte Access Economics, 2015; Pasi & Pauli, 2019).

However, the current RANZCGP medical guidelines for treating adolescent EDs do not specifically address male adolescents and disproportionally center on female-centric concerns (Ganson et al., 2021; Hay et al., 2014). Additionally, recent research has indicated that many medical practitioners may be unprepared to identify and treat EDs due to limited training provided in tertiary education programs (Ganson et al., 2021; Heruc et al., 2020). Indeed, according to early research by Girz et al. (2014), 70% of medical practitioners received fewer than 5 hours of training in child and adolescent EDS. In another early study by Linville et al. (2012), more than 92% of doctors indicated that they believed they missed an ED diagnosis in presenting patients, and 68% reported they did not do additional screening for an ED because it was not the presenting issue. More

recent investigation by the National Agenda for Eating Disorders in Australia, highlighted that 97% of clinicians lacked adequate training in Eds, leaving them ill-prepared to provide ED treatment with confidence (Butterfly Foundation, 2018).

Nonetheless, medical professionals play an important role in identifying EDs, assessing medical stability, guiding refeeding plans and treatment goals, and collaborating with a multidisciplinary team (Ganson et al., 2021; Heruc et al., 2020). Additionally, when treated by trained and knowledgeable health experts, most individuals with EDs achieve full recovery and good quality of life (Butterfly Foundation, 2022; Pasi & Pauli, 2019). As such, Ganson et al. (2021) suggested the need for health professionals to undergo additional training in the assessment and treatment of male adolescents with EDs. Such training may provide medical professionals with increased awareness of differing ED presentations between males and females and confidence to identify male adolescents with ED early (Ganson et al., 2021; Heruc et al., 2020). For instance, if health professionals were to enquire about a desire to be stronger or more muscular when examining male adolescents, they may achieve a more accurate clinical picture of male-specific weight and shape concerns and potential DE risk (Shu et al., 2015).

Affirming positive ideas about obtaining mental health treatment among male adolescents with EDs may also be particularly essential in early intervention attempts (Griffiths et al., 2015). Thus, health practitioners supporting and treating male adolescents with EDs may need to consider addressing and challenging ‘masculine’ ideals of strength, power, and control that coincide with eating difficulties for male adolescents (Thapliyal et al., 2018). This approach seeks to establish safe spaces for male adolescents to openly address sensitive topics such

DE or body image concerns (Ganson et al., 2021). Consequently, such efforts may increase identification of male adolescents with EDs, reduce their stigmatization and isolation within treatment services and the community, and improve overall treatment outcomes (Ganson et al., 2021).

Research Aims

Current research has been relatively limited in identifying and describing specific risks for DE amongst male adolescents (Byrne et al., 2023; Cooper et al., 2020a) surveying general populations of Australian male adolescents to examine current risks for DE (Larsen et al., 2015), and investigating the experiences of male adolescents seeking treatment for DE in clinical settings (Burnette et al., 2022; Richardson & Paslakis, 2021).

It is important to reiterate that considerable limitations were experienced in the development and completion of this program of research. Data collection, that commenced prior to the COVID-19 pandemic, was interrupted by it. Data collection was planned to occur within public and private high schools across Australia commencing in 2020. UTS MREC ethical approval and NSW Department of Education SERAP approval was gained for the collection of longitudinal data from n = 2000 NSW school children. However, recruitment and data collection were prohibited following lockdowns to Australian schools and restrictions placed on research planned to be undertaken within schools by State and Federal governments. Learning was transferred online, and data collection did not follow. In short, the planned research was interrupted. Our initial plans to undertake a single cross-sectional study of n = 2000 adolescents, followed by a longitudinal study of n = 2000 adolescents, did not eventuate. Two experimental research studies were developed using the time one sample of 338 male adolescents that was collected in 2020 prior to lockdown, and a small clinical

sample was subsequently recruited for the final qualitative study. The quantitative studies that we developed for inclusion in this thesis were developed because they best reflected our ability to undertake the planned program of research using the available data.

The first study in the program of research involved a PRISMA based systematic review of prospective longitudinal studies that explored risk factors predicting the development of DE in male adolescents was not identified in current literature. Several advantages of prospective designs indicate that a review of prospective research would be valuable in identifying factors associated with trajectories toward male adolescent DE. Prospective studies enable the tracking of individual trajectories over time, an important factor in accounting for development. Prospective research is not prone to vulnerabilities associated with retrospective data such as recall bias, and as data may be collected at multiple points in time, points of continuity and discontinuity in trajectories of development, potentially important in prevention and early intervention terms, may be identified. Thus, such research may provide valuable insights into the progression of susceptibility to DE among male adolescents and identify points at which such vulnerabilities emerge (Caruana et al., 2015; Verschueren et al., 2020).

Furthermore, much remains unknown about specific psychosocial factors, and the mechanisms by which such factors operate, in influencing the development of self-evaluation systems based on dieting, weight and shape for male adolescents (Argyrides et al., 2020; Bakalar et al., 2015). Parents, for instance, play a pivotal role in fostering healthy social, emotional, and cognitive growth in male adolescents (Larsen et al., 2015; Pace et al., 2018) and there are links between individual psychological characteristics in male adolescents and

their interaction with social media (Pace et al., 2018; Rodgers et al., 2020b). These factors may serve as potential influences on the development of DE behaviors in male adolescents (Ganson et al., 2021; Verschueren et al., 2020). Therefore, examining the associations between such factors may yield insight into the specific demographic, psychological, and social factors that contribute to the increased vulnerability of certain individuals relative to others (Caruana et al., 2015; Verschueren et al., 2020). In this way, increased understanding of the characteristics and contexts that heighten the likelihood of DE in male adolescents, may influence the development of targeted approaches to prevention, early intervention, and support for this population (Argyrides et al., 2020; Bakalar et al., 2015).

Despite an identified need to better understand the development of DE attitudes and behaviors in male adolescents (Ganson et al., 2021), limited research has been undertaken into the developmental relation between psychosocial characteristics and the development of DE attitudes and behaviors in male adolescents. The two cross-sectional studies included herein (Study 2 and Study 3) complement each other by assessing characteristics that predict the membership of cross-sectional latent classes, and, subsequently, examining the development of a structural model and the assessment of its 28evelop28tce across latent classes.

In an effort to identify distinct classes of trajectory, Study 2 employed latent class analysis of a normative cross-sectional sample of male adolescents. Participants reported their eating attitudes and behaviors using the Eating Disorders Inventory-3 (Garner, 2004). Latent class segmentation informs research, prevention and intervention by articulating the profiles of distinct latent classes within datasets and advancing knowledge about factors that predict member ship of those classes. Analysis of data will reveal the best number of

latent classes given the data. Cross sectional associations between each latent class and psychosocial characteristics will then be assessed in light of participants' parent-child relational quality, adolescent social emotional and behavioral functioning, and the influence of social media on class membership. This study has important potential in assessing the association between distinct classes of eating related characteristics and psychosocial characteristics associated with them.

In contrast to the analysis undertaken in Study 2, Study 3 sought to develop a cross-sectional structural model of DE in male adolescents. Once again, this normative sample of n = 338 males aged 11 and 19 years completed psychometric assessment measures and regression models will be used to test initial relationships between variables related to eating attitudes and behavior: parent-child relational quality, social, emotional, and behavioral functioning, eating attitudes/behavior, parent-child relational quality, internalization of body ideals, and eating attitudes/behavior. On the basis of the results of these data, a cross-sectional structural model of DE will be developed and tested for invariance across latent groups. It is anticipated that the results will be important in informing the development of a longitudinal model that will be of assistance in longitudinal research that has potential to assist in examining trajectories of development over time, thereby informing efforts directed toward prevention and early intervention.

Finally, the experiences of male adolescents undergoing treatment for an ED have largely been overlooked in research and by treating health professionals largely to gaps in ED diagnostic criteria, assessment measures and qualitative research on male adolescents with EDs (Murray et al., 2017b). Misconceptions of male-specific concerns and presentation of EDs, which are increasing in

adolescent populations, may therefore permeate the clinical understanding of the health professionals by whom they are treated, leading to inconsistent and insufficient treatment experiences for male adolescents (Murray et al., 2018; Thapliyal et al., 2018).

CHAPTER 2: The Development of Disordered Eating in Male Adolescents: A Systematic Review of Prospective Longitudinal Studies

The Development of Disordered Eating in Male Adolescents: A Systematic Review of Prospective Longitudinal Studies

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The Development of Disordered Eating in Male Adolescents: A Systematic Review of Prospective Longitudinal Studies

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Abstract
A lack of research exists about the development of disordered eating in adolescent males. A systematic review was undertaken with the primary aim of identifying psychosocial risk factors that are prospectively associated with the development of disordered eating attitudes and behavior in adolescent males. The review's secondary aim was to appraise the appropriateness of the psychometric assessment measures used to identify those risk factors. Electronic databases Scopus (Elsevier), PsycINFO (EBSCO), PsycARTICLES, Medline (Ovid), Web of Science Core Collection and Pubmed (Thomson Reuters) were searched for prospective longitudinal research involving 11–19 year-old adolescents that was published between 2010 and 2022. Twenty-one publications met inclusion criteria and thirty-five factors including fourteen psychological factors, ten body appearance factors, four sociocultural factors, three familial and four peer factors were identified as prospectively associated with the development of disordered eating attitudes and behavior in male adolescents. The psychometric assessment measures used to identify those factors, together with the proportion of female respondents upon whose data the measures were based, were critically appraised. Accurate assessment is imperative in generating reliable and valid research and informing clinical practice. Existing female-centric psychometric assessments normed predominantly on female participants may not be appropriate for use with adolescent males.

Keywords Male · Adolescent · Eating · Prospective · Longitudinal · Muscle

Introduction

Eating disorders are complex and serious mental health problems that commonly appear during adolescence. Compared with female adolescents, however, male adolescents have been relatively overlooked in research terms (Mitchison et al., 2013; Murray et al., 2017). In 2010, Murray and colleagues published a review of research on the topic of muscle dysmorphia in males in an effort to examine the appropriateness of its re-conceptualization as a feature of male disordered eating (Murray et al., 2010). Research about factors that are prospectively associated with the development of disordered eating in adolescent males has increased and there is now an understanding that phenotypic differences exist between disordered eating attitudes and behavior in adolescent males and females (Lavender et al., 2017; Mitchison & Mond, 2015). Psychometric assessment measures available to researchers and clinicians to assess disordered eating in adolescent males may be less than appropriate for this use, however, because the evidentiary basis and psychometric data they were established upon reflect female-centric disordered eating attitudes and behaviour (Murray et al., 2010). This review aims to extend current knowledge by synthesizing evidence about factors that are associated with the development of disordered eating in male adolescents and clarifying the extent to which the assessment measures used to identify those factors are appropriate for use with adolescent males..

Reviews of existing research have assisted greatly in understanding the epidemiological and demographic characteristics of disordered eating in male adolescents. Across 26 European countries, approximately 10% of adolescent males and 20% of adolescent females reported some weight reduction behavior, however, recent increases in the prevalence of weight reduction behaviors in adolescent males were

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compared with stable patterns for adolescent females (Dzielska et al., 2020). Approximately 5.5% of young males in the United States evidence disordered eating (Lipson & Sonneville, 2017). In Australia and Canada, the incidence of DSM-5 (American Psychiatric Association, 2013) eating disorders in male adolescents has been reported as 1.2% and 2.2%, respectively (Allen et al., 2013; Flament et al., 2015). Reviews of the contributions of both family environmental and genetic factors in the development of disordered eating indicate that substantial environmental influence is associated with genetic contributions to Anorexia Nervosa and Bulimia Nervosa (Bulik et al., 2016; Trace et al., 2013). Internationally, the prevalence of eating disorders varies with lowest rates reported in African and Latin populations followed by Japan and China (Hoek, 2016). Reviews suggest that non-Caucasian, non-western participants living in western countries are included in disordered eating research at levels lower than their proportion of population (Egbert et al., 2022).

Relational experiences with parents and carers likely contribute to disordered eating attitudes and behavior in adolescent males (Pace et al., 2018). Despite its importance, however, relatively little is known about the developmental significance of parenting factors to disordered eating in adolescent male populations. Positive and statistically significant relationships that have been demonstrated between parenting style, and parenting feeding practices have important implications for the relation between parenting and developing adolescent mental health outcomes including eating related behavior (Brown et al., 2016; Hubbs-Tait et al., 2008). In addition, parental disordered eating behavior may detrimentally influence parent–child interactions and, therefore, child development, beyond the transmission of eating behavior (Chapman et al., 2021). Variability in findings in this area may reflect a lack of consistency in operationalization and measurement of characteristics currently understood as central to disordered eating in adolescent males (Murray et al., 2017). For instance, research has suggested that adolescent males maternal but not paternal parenting style was statistically significantly associated with less extreme, but not extreme, weight control behaviors in male adolescents (Zubatsky et al., 2015). By contrast, paternal but not maternal parenting characteristics during early adolescence positively predicted negative eating attitudes and behavior in adolescent males (Pace et al., 2018). Further research that identifies parenting factors associated with the development and maintenance of disordered eating in adolescent males is, therefore, needed.

The degree of biological and social change that is evident in adolescence is unrivalled developmentally (Mendle, 2014; Paganini et al., 2021). The developmental timing of disordered eating, and its association with puberty in adolescent males, is an area of emerging importance in eating disorders research (Chapman et al., 2021; Paganini et al., 2021). Epidemiological data points to later onset of disordered eating in males compared with females, reflecting the importance of pubertal timing for onset in females (Zehr et al., 2007). Female specific factors, such as increases in ovarian hormones, have been implicated in increases in disordered eating in females but do not generalize to males (Klump et al., 2012). However, some psychosocial factors, such as anxiety, have previously been associated with increases in disordered eating in both female and male post-pubertal populations and may, therefore, generalize across the sexes (Zehr et al., 2007). Consistent with traditional conceptualizations of disordered eating, much research that has been undertaken in this area has used female participants and maintained adherence to models of disordered eating driven by attitudes and behaviors applicable to females (Neale et al., 2020; Paganini et al., 2021). Genetic, temperamental, and maturational influences on disordered eating in males appear more variable and poorly articulated than those in females (Klump, 2013), and future research directed at identifying processes unique to the relation between male disordered eating and temperamental and maturational characteristics is essential (Paganini et al., 2021).

Key in differentiating between adolescent males and females is a recognition that substantive differences exist between them in disordered eating attitudes and behavior (Murray et al., 2017). Recent reviews have articulated a range of phenotypic characteristics that are now broadly understood to be uniquely associated with male disordered eating behaviors (Mitchison & Mond, 2015). While evidence accounts for body dissatisfaction as a predominant feature of disordered eating in both sexes, traditional female-centric conceptualizations of disordered eating are primarily concerned with a drive for thinness that is typically attained through processes of restriction or purging (American Psychiatric Association, 2013). By contrast, the 2010 review was instrumental in re-conceptualizing male disordered eating by placing muscularity at its heart (Murray et al., 2010). Phenotypically distinct process in males may instead reflect dual drives to increase body muscularity and, simultaneously, to increase leanness (Tylka, 2011).

Subsequent reviews have further articulated processes central to the development of male disordered eating (Mitchison & Mond, 2015; Murray et al., 2017). The first represents the pursuit of a male body ‘ideal’ characterized by increased muscularity and a concomitant increase in leanness acquired as a result of the internalization of socio-cultural processes. Second, this ideal has been articulated in association with muscularity orientated eating that serves to facilitate muscle growth and enhance body leanness (Murray et al., 2017). Mutually dependent process of *bulk and cut* account for the need to support muscle development through food intake while restricting food intake to attain leanness

and enhance muscle appearance (Lavender et al., 2017). Muscularity orientated disordered eating has been associated with behavioral excesses in the form of increased exercise to develop muscle (Lavender et al., 2017; Murray et al., 2017). This may involve an increase in gym attendance or engagement in various forms of body building exercise, and may be associated with obsessive, compulsive or anxiety-related features where eating related targets are, or are not, met (Murray et al., 2010). Knowledge about factors associated with the development and maintenance of male-specific eating disorder phenotypes, and an informed developmental understanding of those associations, are currently needed (Jaworski et al., 2019; Lavender et al., 2017).

The internalization of a male body ideal is central to current conceptualizations of adolescent male disordered eating and male exposure to media that depicts idealized male body imagery is potentially important in influencing the development of disordered eating attitudes and behavior (Sweeting et al., 2015). Images displayed in media may influence males and females through similar processes of internalization of socio-culturally driven body ideals (Lavender et al., 2017), even if the ideals that are pursued between the sexes are dissimilar. Western media depictions of female ideals focus on themes similar to those that underscore current conceptualizations of female disordered eating presentations, namely striving to attain thinness (Mitchison & Mond, 2015). By contrast, media representations of male bodies that fit current sociocultural ideals, focus on the dual themes of a drive toward increased muscularity and increased leanness (Tylka, 2011). It is not by coincidence that efforts to attain these outcomes engender concern about current versus idealized muscularity and body fat (Lavender et al., 2017), the very themes that have recently emerged as central to muscularity orientated adolescent male disordered eating (Murray et al., 2017).

Media may advance adolescent male muscularity and leanness ideals in similar ways to those that have long pervaded media presenting idealized female body images (Bardone-Cone & Cass, 2006). Themes of diet, exercise, muscularity, substance use, and health related risk implicitly or explicitly extol the virtues of pursuing disordered eating related behavior and depiction of non-ideal bodies and marginalization further endorse socio-cultural ideals (Murray et al., 2016; Sweeting et al., 2015). The implications of the influence of media for disordered eating attitudes and behavior in adolescent males is continuously changing (Sweeting et al., 2015). The range of media currently available to adolescents is extensive, and assessment of factors of influence in driving muscularity orientated idealized body images may well be extended to include all forms of media where the presentation or marketing of idealized images occurs (Murray et al., 2016). Despite recent advances, much remains to be understood about the role of media in the development of disordered eating attitudes and behavior in adolescent males. In addition to describing associations between variables, mediational, moderational and modelling analyses hold promise to further elucidate the role of media in the establishment and maintenance of disordered eating attitudes and behaviors in adolescent males (Lavender et al., 2017).

Valid assessment is essential to developing an accurate understanding of adolescent male disordered eating attitudes and behavior. Many psychometric assessment measures that have been utilized to assess female populations have been utilized with males with reliability; however concern remains about their validity for use with males (Smith et al., 2017). Psychometric assessment measures developed consistent with criteria which typically underlie characteristics of female disordered eating commonly exclude items that capture the desire to increase muscle mass (Reas et al., 2012; Smith et al., 2017). For instance, the Eating Disorders Inventory-3 (EDI-3; Garner, 2004) assesses people's perceptions of specific body parts such as "I think my hips are too big" or "I think my buttocks are too large". These concerns may not generalize well across the sexes, potentially rendering them inappropriate for assessing male body image (Smith et al., 2017). Furthermore, a comparison of the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) across a matched sample of male and female adolescents diagnosed with Anorexia Nervosa found that males scored significantly lower on the EDE-Q global score and the shape concern and weight concern subscales than females (Darcy et al., 2012). Disparities such as these may be addressed by developing normative male data on existing psychometric assessment measures that have been developed consistent with female-centric assumptions (Mitchison & Mond, 2015). This solution may, however, not demonstrate sufficient reach in addressing male specific attitudes and behavior.

Though adolescent males typically return lower scores on psychometric assessment measures developed consistent with female disordered eating criteria, they nevertheless do endorse items on those measures (Carey et al., 2019; Smith et al., 2017). Importantly, therefore, males may be susceptible to internalizing a broader range of socio-cultural body ideals than adolescent females, suggesting a degree of applicability to males in both *drive for thinness* and *bulk and cut* models of disordered eating (Carey et al., 2019; Smith et al., 2017). Research has reported that male as well as female participants endorse psychometric assessment items that reflect a drive for thinness (Thurfjell et al., 2003), and for some minority male populations, similar levels of endorsement between male and female participants have been noted (Cella et al., 2010; Klimek et al., 2021). One of the implications of using psychometric assessment measures developed consistent with models of disordered eating in females is an underestimation of rates of prevalence and patterns

of presentation of disordered eating in males (Mitchison & Mond, 2015). Some measures have been developed in consideration of male features of disordered eating (for instance the Eating Disorder Assessment fo Men; Stanford & Lemberg, 2012), however, they require further evaluation in clinical settings (Murray et al., 2017; Smith et al., 2017).

Current Study

Much research has been undertaken in adolescent male disordered eating since 2010; however, reviews of prospective longitudinal literature, and systematic reviews, are limited. A systematic review of prospective longitudinal research that examines factors associated with the development of disordered eating attitudes and behavior in male adolescents is, therefore, timely. Specifically, a review of research that extends current understanding of the influence of familial, developmental, social, emotional, behavioral and socio-cultural processes, as well as the psychometric assessment of those processes, on trajectories towards disordered eating, is warranted. This review aimes to address this gap by examining recent prospective research that identifies psychosocial risk factors relevant to the development of disordered eating in adolescent males. The primary aim of the review is to identify psychometrically assessed psychosocial risk factors that are prospectively associated with the development of disordered eating attitudes and behavior in adolescent males. Its secondary aim is to assess the appropriateness of the psychometric assessment measures used to identify those factors in the included research.

Methods

Protocol and Registration

The systematic review was conducted in accordance with the PRISMA guideline for reporting systematic reviews (Page et al., 2021). The protocol was originally registered with PROSPERO (CRD 42018085385) and refined to focus solely on male adolescents. It was developed in line with the procedures outlined in the Cochrane Handbook for systematic reviews (Higgins & Green, 2011).

Inclusion/Eligibility Criteria

Participants

Studies that included participants aged 11–19 years (i.e.,: adolescents) were eligible for inclusion in this review. Studies that included participants who met current DSM or ICD diagnostic criteria for an Eating Disorder at baseline, and those that included participants with neurodevelopmental disorders, diabetes, or who had undergone bariatric surgery, were excluded. Studies that included participants who were involved with child protective services or who were incarcerated were also excluded.

Outcomes

Studies were included in this review if they examined psychosocial risk factors identified to influence the development of disordered eating behavior in male adolescents.

Study Design

Prospective longitudinal studies that captured psychometrically assessed data from at least two points in time and had previously published psychometric properties were included in our review. Psychometric assessment measures targeted in the review assessed a variety of factors including generic disordered eating attitudes and behavior (n = 5), diagnosable categories (Anorexia Nervosa, Bulimia Nervosa and Binge-Eating Disorder, n = 2), characteristics included in well-established assessment measures (EDI, EDE-Q, n = 3), as well as weight reduction behaviors (n = 1) and aspirational items (n = 1).

Search Strategy

An electronic search of the databases Scopus (Elsevier), PsycINFO (EBSCO), PsycARTICLES (APA), Medline (Ovid), Web of Science Core collection and PubMed was completed on May 13, 2022. The search was limited to studies published in the English language in peer-reviewed journals between 2010 and 2022, to coincide with the year the Murray et al. (2010) review was published. The databases were searched through a multi-field format using the terms listed in Table 1. A manual search of reference lists from relevant articles and chapters failed to identify any additional research that met the inclusion criteria.

Assessment of Methodological Quality

A modified version of the Downs and Black (1998) checklist was used to assess the methodological quality and risk of bias of each included study. Of the original 27 checklist items, 11 items in the areas of reporting (questions 1–3, 6, 7, 10) external validity (questions 11 and 12) and internal validity (questions 17–20) were considered appropriate to assessment in systematic reviews of longitudinal studies. Previous authors have utilized the same items in assessing methodological quality and risk of bias in systematic reviews of longitudinal studies (Duch et al., 2013; Vanderloo, 2014).

Table 1 Search terms for electronic database search

Key word	Search terms
Disordered Eating	"Subclinical eating" or "subthreshold eating" or "symptomatic eating" or "maladaptive eating" or "disordered eating" or "unspecified feeding and eating disorder"
Adolescent	Adolescent or adoles* or young or young* or "young people" or child* or youth or youth* or teen* or "teenager" or "teenager"
Male	Male or boys
Longitudinal	Longitudinal or trajector* or prospect* or course or "time point"

Data Extraction

Relevant data from the included studies were recorded in a data extraction table designed for this review. Extraction was undertaken by authors SB and JM independently of each other and checked for consistency. The following information was extracted: key study details (author, year, and country), study characteristics (design and duration), setting (population), sample characteristics (baseline sample size, final sample size, sex, mean age, attrition rate), disordered eating outcomes (restriction, purging, binge eating), Eating Disorder outcome measure and predictors/factors associated with disordered eating development.

Data Synthesis

The review process extracted data and synthesized it in narrative and tabular form. The potential to use meta-analytic approaches was explored, however, as effect, data was not extracted or assessed, meta-analytic approaches were judged as being of limited use.

Results

Study Selection

A total of 347 records were identified through the database searches. Of these, 72 studies were removed as duplicates and a further 103 studies were removed upon title and abstract screening. The remaining 77 full text studies were reviewed by two authors SB and JM and inter-rater reliability was estimated at (K = 0.91) using Cohen's kappa (Landis & Koch, 1977). Any disagreements in final study selection were resolved through discussion and a total of 21 studies were identified as meeting inclusion criteria. Figure 1 presents a PRISMA flow chart of the study selection process.

Study Characteristics

Of the $k = 21$ studies that were eligible for inclusion in the review, $k = 4$ studies (Juarascio et al., 2016; Perkins & Brausch, 2019; Petersen & Hyde, 2013; Stojek et al., 2017) were based in USA, $k = 3$ studies (Van Durme et al., 2018; Verschueren et al., 2020; Verstuyf et al., 2014) were based in Belgium, $k = 3$ studies (Espinoza et al., 2019; Ferreiro et al., 2011, 2014) were based in Spain, $k = 3$ studies (Hoffmann & Warschburger, 2017, 2019; Sehm & Warschburger, 2018) were based in Germany, $k = 2$ studies (Jackson & Chen, 2011, 2014) were based in China, $k = 2$ studies (Mougharbel et al., 2020; Zaitsoff et al., 2020) were based in Canada, $k = 1$ study (Rosenrauch et al., 2017) was based in Australia, $k = 1$ study (Dakanalis et al., 2015) was based in Italy, $k = 1$ study (Rotenberg & Sangha, 2015) was based in the UK and $k = 1$ study (Dzielska et al., 2020) was based in Europe and in North America. Table 2 presents the characteristics of included studies.

Research Design

All eligible studies utilized a prospective longitudinal design, however the duration of the studies varied from 1 to 16 years. A median study length of two years was reported in $k = 7$ studies.

Sample Characteristics

The sample sizes of studies included in this review ranged from $n = 116$ to $n = 639{,}194$ participants. Across eligible studies, data was drawn from a total of $n = 658{,}917$ participants. Females were over-represented in $k = 17$ studies. Female participation in the remaining studies ranged from 46–49.6%. The age of participants at the commencement of each study ranged from 11.52 years ($SD = 0.31$)

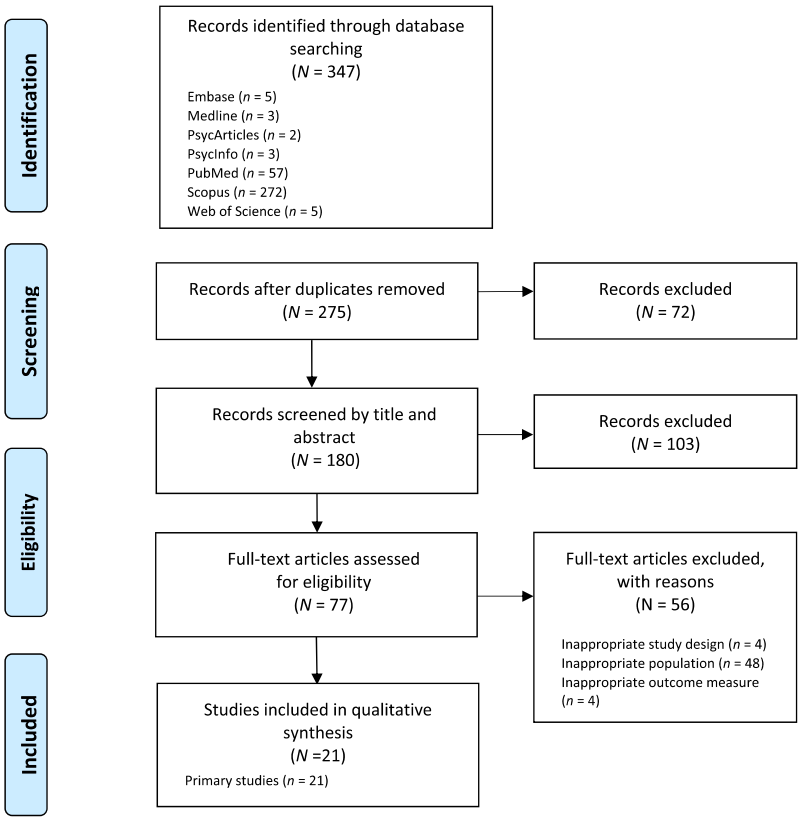

Fig. 1 PRISMA flow chart depicting study selection process

to 16.54 years ($SD = 1.19$). The studies demonstrated considerable sample homogeneity with all participants drawn from secondary school based community samples.

Quality Assessment

The Downs and Black checklist recommends that all studies that receive a score above 5 out of a possible 11 indicate low risk of bias (Downs & Black, 1998). The risk of bias was assessed by two of the review authors (SB and JM). No studies were rated below 5 and thus no studies indicated a high level of bias. This may, in part, be due to the prospective nature of all the included studies. Rate of agreement for overall quality of each study using the Downs and Black (1998) tool was considered excellent (Cicchetti, 1994) as reflected by an intra-class correlation coefficient of 0.91. The results of the quality assessment are summarized in Table 3.

Outcomes

All studies included in this review reported finding at least one male-specific predictor of disordered eating development in adolescents. Results are summarized in Table 4 and narratively synthesized below. Factors were classified under five factor groupings as follows: psychological factors (driven primarily by an individual's cognitive, affective, somatic or behavioral processes); body appearance factors (driven primarily by an individual's perception of, or attributions about, their physical self); sociocultural factors (driven primarily by implicit or explicit social or cultural expectations, assumptions or values); family factors (driven primarily as a result of parental and sibling influences within family systems) and peer factors (driven primarily as a result of peer based influences including assumptions about, and reports from, peers). In total, 35 male-specific predictors of disordered eating and behavior in males including psychological factors ($n = 14$), body appearance factors $n = 10$), sociocultural factors ($n = 4$), family factors ($n = 3$) and peer factors ($n = 4$).

Table 2 Characteristics of included studies

Author (year)	Country	Study design and duration	Setting, population	Baseline and final sample size, Mean age, Gender %, Attrition	DE measure	DE outcomes	Factors
Dakanalis et al. (2015)	Italy	Longitudinal, 3 years, 4 intervals 1 year apart	Community sample, high school Culture/ethnicity: 94% Caucasian 2% Latino/a 4% Mixed ethnic	$n = 718$, $n(f) = 685$ $M_{age} = 14.54$, $SD = 0.38$ Females: 52.7% Males: 47.3% Attrition: 95.4% Puberty status: NR	EDE-Q	BE, DR	Appearance Anxiety, Body Shame, Self-objectification, Media-ideal Internalization, Depression, BMI
Dzielska et al. (2020)	Europe and North America	Longitudinal, 16 years, 5 intervals 4 years apart	Community sample, high school Culture/ethnicity: NR	$n = 639{,}194$ $M_{age} = 11.52$ years = 33%, 13 years = 34%, 15 years = 33% Females: 51.1% Males: 48.9% Attrition: NR Puberty status: NR	WRB	WRB	BMI, Body Image, Body Weight Congruence
Espinoza et al. (2019)	Spain	Longitudinal, 1.5 years, 12 intervals, 16 months apart	Community sample, high school Culture/ethnicity: 81% Europe, 10% Moroccan, 8% Central/South America, 1% Asia/Africa	$n = 303$, $n(f) = 256$ $M_{age} = 13.4$, $SD = 0.49$ Females: 46% Males: 54% Attrition:84.5% Puberty status: 80% reported, puberty, data not reported by sex	EAT-26	DEAB	BMI, Internalization of appearance ideals, Self-esteem
Ferreiro et al. (2011)	Spain	Longitudinal, 2 years, 2 intervals 2 years apart	Community sample, high school Culture/ethnicity: NR	$n = 959$, $n(f) = 828$ M_{age} Females = (T1) 12.8, $SD = 0.7$, M_{age} Males = (T1) 12.0, $SD = 0.8$ Females: 48.8% Males: 49.8% Attrition:86.3.% Puberty status: NR	CHEAT EDI-II	DEAB	BMI, Depressive symptoms, Perfectionism, Self-esteem
Ferreiro et al. (2014)	Spain	Longitudinal, 6 years, 3 intervals, 2 years apart	Community sample, high school Culture/ethnicity: 98.5% Caucasian, 1% Moroccan .5% "other"	$n = 882$, n$(f) = 476$ $M_{age} = 12.85$, $SD = 0.77$ Females: 49.6% Males: 50.5% Attrition: 53.9% Puberty status: NR	CHEAT	DEAB	Depressive Symptoms, BD

Table 2 (continued)

Author (year)	Country	Study design and duration	Setting, population	Baseline and final sample size, Mean age, Gender %, Attrition	DE measure	DE outcomes	Factors
Hoffmann and Warschburger (2017)	Germany	Longitudinal 3 years, 2 intervals, 20 months apart	Community sample, high school Culture/ethnicity: NR	$n = 675$ M_{age} Females = (T1) 14.04, $SD = 1.29$ M_{age} Males = (T1) 13.90, $SD = 1.32$, Females: 57.7% Males: 48.3% Attrition: NR Puberty status: NR	ChEDE-Q	DEAB	Muscularity concern, Weight status, Weight and Shape Concern, Age
Hoffmann and Warschburger (2019)	Germany	Longitudinal, 5 years, 3 intervals 20–30 months apart	Community sample Culture/ethnicity: NR	$n = 973$, n(f) = 422 M_{age} Females = (T1) 14.20, $SD = 1.33$ M_{age} Males = (T1) 14.09, $SD = 1.37$, Females: 50.6% Males: 49.4% Attrition: 43.4% Puberty status: NR	EDE-Q ChEDE-Q DMS	DEAB, DR, Muscularity Oriented behavior	Internalization of appearance ideals, Muscularity Concern, Weight and Shape Concern
Jackson and Chen (2011)	China	Longitudinal, 2 years, 2 intervals, 1 year apart	Community sample, high schools Culture/ethnicity: China ethnic minorities including 96.4% Han 1.5% Tu 1.3% Maio	$n = 2{,}909$, $n(f) = 2{,}095$ M_{age} = (T1) 12.66 years, $SD = 0.49$ Females: 39.78% Males: 32.22% Attrition: 72% Puberty status: NR	EDDS	DEAB	Perceived Sociocultural Pressure, BD, Physical Appearance Comparison, Fear of Negative Appearance Evaluation, Positive and Negative Affect, Internalization of appearance ideals, Appearance conversations, Age
Jackson and Chen (2014)	China	Longitudinal 4 years, 2 intervals, 2 years apart	Community sample, high schools Culture/ethnicity: China ethnic minorities including 96.3% Han 1.6% Tu 1.3% Maio 0.3% Man	$n = 2{,}686$, n(f) = 1,799 M_{age} Early Adolescent sample = 12.66 years, $SD = 0.49$, M_{age} Older Adolescent sample = 15.57 years, $SD = 0.73$ Females: 52.6% Males: 47.3% Attrition: 61.8% Puberty status: NR	EDDS	DEAB	BD, BMI, Negative Affect, Perceived Sociocultural Pressure, Age BMI

Table 2 (continued)

Author (year)	Country	Study design and duration	Setting, population	Baseline and final sample size, Mean age, Gender %, Attrition	DE measure	DE outcomes	Factors
Juarascio et al. (2016)	USA	Longitudinal 6 years, 6 intervals, 12 months apart	Community sample, high schools Culture/ethnicity: 49% Caucasian, 37% African-American, 4% Latino/a, 10% "Other"	$n = 206$, $n(f) = 123$ $M_{age} = 13.03$, $SD = 0.89$ Females: 46% Males: 54% Attrition: 59.7% Puberty status: NR	COEDS	DEAB	Distress intolerance, Affect reactivity, Internalizing symptoms
Mougharbel et al. (2020)	Canada	Longitudinal, 2 years, 3 intervals 1 year apart	Community sample, high schools Culture/ethnicity: NR	$n = 1{,}197$, $n(f) = 306$ $M_{age} = 13.51$, $SD = 1.10$ Females: 60.3% Males: 39.7% Attrition: 25.6% Puberty status: NR	DEBQ	DEAB	BMI, Screen time
Perkins and Brausch (2019)	USA	Longitudinal, 1 year, 2 intervals 6 months apart	Community sample, high school Culture/ethnicity: 85.3% White; 2.3% Black, 4.7% Multiethnic, 2.8% Hispanic, 1.9% Asian, 0.9% American Indian, 2.1% "other"	$n = 436$, $n(f) = 367$ $M_{age} =$ (T1) 13.19, $SD = 1.19$ Females: 52.7% Males: 46.4% Attrition: 84.2% Puberty status: NR	EDI-3	DEAB	Suicidal Ideation
Petersen and Hyde (2013)	USA	Longitudinal, 4 years, 3 intervals, 2 years apart	Community sample, high school Culture/ethnicity: 89.3% White, 1.9% African American, 0.9% American Indian 0.4% Latino/a 2.7% multiracial	$n = 406$ $M_{age} =$ Fifth grade ($M = 11.52$, $SD = 0.31$), Seventh grade ($M = 13.54$, $SD = 0.32$), Ninth grade ($M = 15.50$, $SD = 0.33$) Females: 50.9% Males: 49.1% Attrition: NR Puberty status: NR	EAT-26	DEAB	Peer Sexual Harassment, Self-Surveillance
Rosenrauch et al. (2017)	Australia	Longitudinal 3 years, 2 intervals, 2 years apart	Community sample, high school Culture/ethnicity: NR	$n = 3{,}264$, $n(f) = 1{,}938$ $M_{age} = 13.4$ Females: 56% Males: 44% Attrition: 59.4% Puberty status: NR	MS	Meal Skipping	Peer eating healthy food, Peer encouragement not to eat "junk" food, Peer encouragement to eat healthy foods, Sensitivity to peer support, Maternal and best friend influence on meal skipping, Age

Table 2 (continued)

Author (year)	Country	Study design and duration	Setting, population	Baseline and final sample size, Mean age, Gender %, Attrition	DE measure	DE outcomes	Factors
Rotenberg and Sangha (2015)	UK	Longitudinal, 1 year, 2 intervals, 5 months apart	Community sample, high school Culture/ethnicity: NR	$n = 116$, $n(f) = 96$ $M_{age} = 13.10$, $SD = 0.42$ Females: 53.5% Males: 46.5% Attrition: 82.8% Puberty status: NR	SEDS	BS	Loneliness, Trust beliefs in others
Sehm and Warschburger (2018)	Germany	Longitudinal, 3 years, 2 intervals 1 year apart	Community sample Culture/ethnicity: NR	$n = 1{,}039$, $n(f) = 299$ M_{age} = (T1) 14.37, $SD = 1.56$ Females: 62.7% Males: 37.3% Attrition: 28.8% Puberty status: NR	ChEDE-Q EDI-C	BE, DR	Internalization of appearance ideals, Weight and shape concerns, Perfectionism, Interceptive Deficits, Depressive Symptoms, Self-esteem, BMI
Stojek et al. (2017)	USA	Longitudinal 2 years, 2 intervals, 12 months apart	Community sample Culture/ethnicity: NR	$n = 189$, $n(f) = 182$ $M_{age} = 15.4$, $SD = 1.4$ Females: 66% Males: 34% Attrition: 14.3% Puberty status: NR	EDE-Q	DEAB, BE, LOC	Emotional Eating
Van Durme et al. (2018)	Belgium	Longitudinal, 2 years, 2 intervals, 1 year apart	Community sample, high school Culture/ethnicity: NR	$n = 508$, $n(f) = 397$ M_{age} = (T1) 13.10, $SD = 0.36$ Females: 62.7% Males: 37.3% Attrition: 78.1% Puberty status: NR	EDI-II	BS	BMI, Attachment towards primary caregiver, Emotion Regulation
Verschueren et al. (2020)	Belgium	Longitudinal 2 years, 3 intervals, 1 year apart	Community sample, high school Culture/ethnicity: NR	$n = 1{,}528$, $n(f) = 312$ M_{age} (T1) = 14.97, $SD = 1.81$ Females: 55.1% Males: 44.9% Attrition: 20.4% Puberty status: NR	EDI-3	DEAB	BMI, Identity confusion, Internalizing symptoms, Effortful control
Verstuyf et al. (2014)	Belgium	Longitudinal 2 years, 3 intervals, 1 year apart	Community sample, high school Culture/ethnicity: NR	$n = 418$, $n(f) = 259$ M_{age} (T1) = 13.58 Females: 54.3% Males: 45.7% *Attrition:* 61.9% Puberty status: NR	AI	Eating Regulation	Identity styles, Internalization of appearance ideals

Table 2 (continued)

Author (year)	Country	Study design and duration	Setting, population	Baseline and final sample size, Mean age, Gender %, Attrition	DE measure	DE outcomes	Factors
Zaitsoff et al. (2020)	Canada	Longitudinal 1 year, 2 intervals, 4 months apart	Community sample, high school Culture/ethnicity: NR	$n = 311$, $n(f) = 238$ M_{age} Males = 16.54, $SD = 1.19$, M_{age} Females = 16.45, $SD = 1.29$ Females: 56.3% Males: 43.7% *Attrition:* 76.5% Puberty status: NR	EDE-Q	DEAB	BMI, Body Checking

Abbreviations of ED Measures: *AI* Aspiration Index (Kasser & Ryan, 1996), *CHEAT* Children's Eating Attitudes Test (Maloney et al., 1988), *ChEDE-Q* Child Eating Disorder Examination Questionnaire (Kliem et al., 2017), *COEDS* The College Eating Disorders Screen (Nowak et al., 2003), *DMS* Drive for Muscularity Scale (McCreary & Sasse, 2000), *DEBQ* Dutch Eating Behaviour Questionnaire (Van Strien et al., 1986), *EAT-26* Eating Attitudes Test (Garner et al., 1982), *EDDS* Eating Disorder Diagnosis Scale (Stice et al., 2000), *EDE-Q* Eating Disorder Examination-Questionnaire (Fairburn & Cooper, 1993), *EDI-II* The Eating Disorder Inventory-II (Garner, 1991), *EDI-3* The Eating Disorder Inventory-3 (Garner, 2004), *SEDS* Stirling Eating Disorder Scales (Williams et al., 1994), *WRB* Weight Reduction Behaviour (Dzielska et al., 2020). *BE* Binge Eating, *BS* Bulimic Symptoms, *BD* Body Dissatisfaction, *BMI* Body Mass Index, *DEAB* Disordered eating attitudes and behaviours, *DR* Dietary Restraint, *LOC* Loss of Control, *MS* Meal Skipping, *WRB* Weight Reduction Behaviours. Key: M_{age} = Mean Age, n = sample size, $N(f)$ = sample size at final follow up, *NR* Not Reported, *SD* Standard Deviation

Psychological Factors

Fourteen psychological factors that predicted the development of disordered eating in male adolescents were identified in $k = 12$ of the included studies. Disordered eating attitudes were significantly and positively predicted by high affect reactivity and high internalizing symptoms in combination with high distress intolerance at baseline but not over time (Juarascio et al., 2016). In addition, depressive symptoms mediated (Ferreiro et al., 2011, 2014), and self-esteem and suicidal ideation prospectively predicted (Ferreiro et al., 2011; Perkins & Brausch, 2019) disordered eating behavior. In addition, internalizing symptoms, poor effortful control and identity confusion all decreased over time and were therefore identified as significant negative predictors of social emotional wellbeing (Verschueren et al., 2020), and increased emotional eating, in conjunction with eating characterized by loss of control, were significant predictors of subsequent disordered eating attitudes (Stojek et al., 2017). Affective (depressive) symptoms and low self-esteem predicted subsequent dietary restraint and binge eating and, in turn, binge eating predicted subsequent affective symptoms (Dakanalis et al., 2015; Sehm & Warschburger, 2018). By contrast, increased lack of trust in close others and loneliness were both identified as predictors of increased bulimic symptoms (Rotenberg & Sangha, 2015). One theme evident in the relation between psychological factors and disordered eating behavior was role of affect. Specifically, increased negative affect, reduced positive affect, and increased affect reactivity were all positively associated with the development of disordered eating attitudes and/or behavior over time. In addition, perception of self, either with respect to identity or esteem, emerged as central among psychological factors.

Appearance Factors

Ten appearance-related predictors of disordered eating amongst male adolescents were identified in $k = 10$ studies. In particular, BMI and overestimation of one's body weight were significant positive predictors of weight reduction behaviors (Dzielska et al., 2020; Jackson & Chen, 2014). Increased muscularity concerns, increased weight and shape concerns (Hoffmann & Warschburger, 2017, 2019), and overweight or underweight status (Hoffmann & Warschburger, 2017) were identified as significant positive predictors of eating attitudes and behaviors, dietary restraint and muscularity-oriented behavior over time (Hoffmann & Warschburger, 2017, 2019). Zaitsoff et al. (2020) identified increased body checking as a significant positive predictor of eating disordered attitudes and behaviors amongst male adolescents, whilst studies by Ferreiro et al. (2011), Jackson and Chen (2011, 2014), identified body dissatisfaction as

Table 3 Risk of bias within studies

	Hypothesis/Aim/Objectives	Outcome measures description	Participant characteristics description	Main findings	Random variability	Probability values	Participant representative of population	Proportion Representative of Population	Follow-Up	Statistical Tests	Variability and Reliability	Overall Rating	Quality
Dakanalis et al. (2015)	1	1	1	1	1	1	1	1	1	1	1	11	Quality Article
Dzielska et al. (2020)	1	1	0	1	0	1	1	1	1	1	1	9	Quality Article
Espinoza et al. (2019)	1	1	1	1	U (0)	1	U (0)	1	1	1	1	9	Quality Article
Ferreiro et al. (2011)	1	1	1	1	1	1	1	U (0)	1	1	1	10	Quality Article
Ferreiro et al. (2014)	1	1	1	1	1	1	1	1	1	1	1	11	Quality Article
Hoffmann and Warschburger (2017)	1	1	1	1	U (0)	1	1	U (0)	1	1	1	9	Quality Article
Hoffmann and Warschburger (2019)	1	1	1	1	1	1	U (0)	U (0)	0	1	1	8	Quality Article
Jackson and Chen (2011)	1	1	1	1	1	1	1	1	1	1	1	11	Quality Article
Jackson and Chen (2014)	1	1	1	1	1	0	1	U (0)	1	1	1	9	Quality Article
Juarascio et al. (2016)	1	1	1	1	1	1	1	1	1	1	1	11	Quality Article
Perkins and Brausch (2019)	1	1	1	1	1	1	U (0)	U (0)	1	1	1	9	Quality Article
Petersen and Hyde (2013)	1	1	1	1	1	1	1	1	1	1	1	11	Quality Article
Rosenrauch et al. (2017)	1	1	1	1	1	1	1	1	1	1	1	11	Quality Article

Table 3 (continued)

	Hypothesis/ Aim/Objectives	Outcome measures description	Participant characteristics description	Main findings	Random variability	Probability values	Participant representative of population	Proportion Representative of Population	Follow-Up	Statistical Tests	Variability and Reliability	Overall Rating	Quality
Rotenberg and Sangha (2015)	1	1	1	1	1	U (0)	1	1	1	1	1	11	Quality Article
Sehm and Warschburger (2018)	1	1	1	1	1	1	U (0)	U (0)	1	1	1	9	Quality Article
Stojek et al. (2017)	1	1	1	1	1	1	U (0)	0	1	1	1	9	Quality Article
Van Durme et al. (2018)	1	1	1	1	1	1	1	U (0)	1	1	1	10	Quality Article
Verschueren et al. (2020)	1	1	1	1	1	1	1	1	1	1	1	11	Quality Article
Verstuyf et al. (2014)	1	1	1	1	1	1	U (0)	U (0)	U (0)	1	1	8	Quality Article
Zaitsoff et al. (2020)	1	1	1	1	1	0	1	1	1	1	1	10	Quality Article

U unable to determine, (Value = 0)

Table 4 Summary of factors found to predict adolescent male disordered eating

Author (year)	DE outcomes	Male-specific predictors
Psychological factors		
Dzielska et al. (2020)	BE, DR	Depressive symptoms
Espinoza et al. (2019)	DEAB	Self-esteem
Ferreiro et al. (2011)	DEAB	Depressive symptoms, Perfectionism, Self-esteem
Ferreiro et al. (2014)	DEAB	Depressive symptoms
Jackson and Chen (2011)	DEAB	Negative Affect
Jackson and Chen (2014)	DEAB	Negative Affect
Juarascio et al. (2016)	DEAB	Affect reactivity
Perkins and Brausch (2019)	DEAB	Suicidal Ideation
Rotenberg and Sangha (2015)	BS	Low trust beliefs, Loneliness
Sehm and Warschburger (2018)	BE, DR	Perfectionism, Interoceptive Deficits, Depressive Symptoms, Self-esteem
Stojek et al. (2017)	DEAB, BE, LOC	Emotional Eating
Verschueren et al. (2020)	DEAB	Internalizing symptoms, Poor effortful control, Identity confusion
Verstuyf et al. (2014)	ER	Identity styles
Appearance factors		
Dakanalis et al. (2015)	BE, DR	Appearance Anxiety, Body Shame, Self-objectification, BMI
Dzielska et al. (2020)	WRB	Higher BMI, Overestimation of body weight
Ferreiro et al. (2011)	DEAB	Body Dissatisfaction
Ferreiro et al. (2014)	DEAB	Body Dissatisfaction
Hoffmann and Warschburger (2017)	DEAB	Muscularity Concern, Weight and Shape Concern, Overweight and Underweight status
Hoffmann and Warschburger (2019)	DEAB, DR, MOB	Muscularity Concern, Weight and Shape Concern
Jackson and Chen (2011)	DEAB	Body Dissatisfaction
Jackson and Chen (2014)	DEAB	BMI, Body Dissatisfaction
Sehm and Warschburger (2018)	BE, DR	Weight and Shape Concern
Zaitsoff et al. (2020)	DEAB	Body checking
Sociocultural factors		
Dakanalis et al. (2015)	BE, DR	Internalisation of appearance ideals
Espinoza et al. (2019)	DEAB	Internalisation of appearance ideals at age 14
Hoffmann and Warschburger (2019)	DEAB, DR, MOB	Internalisation of appearance ideals
Jackson and Chen (2011)	DEAB	Media pressure to be thin
Jackson and Chen (2014)	DEAB	Perceived appearance pressure from mass media to lose weight
Mougharbel et al. (2020)	DEAB	Screen Time
Sehm and Warschburger (2018)	BE, DR	Internalisation of appearance ideals
Verstuyf et al. (2014)	ER	Internalisation of appearance ideals
Family factors		
Jackson and Chen (2014)	DEAB	Perceived appearance pressure from Parents
Van Durme et al. (2018)	BS	Rumination in attachment anxiety, Emotional control in attachment avoidance
Peer factors		
Jackson and Chen (2014)	DEAB	Perceived appearance pressure from desired/current dating partners
Petersen and Hyde (2013)	DEAB	Sexual harassment
Rosenrauch et al. (2017)	MS	Friends eating healthy food with them, Friend discouragement of eating "junk" foods

BE Binge Eating, *BS* Bulimic Symptoms, *BD* Body Dissatisfaction, *BMI* Body Mass Index, *DEAB* Disordered Eating Attitudes and Behaviours, *DR* Dietary Restraint, *ER* Eating Regulation, *LOC* Loss of Control, *MOB* Muscularity Oriented Behaviour, *MS* Meal Skipping, *WRB* Weight Reduction Behaviours

predictive of eating attitudes and behaviors in mid-adolescence. Self-objectification via appearance anxiety, and body shame were identified as significant prospective predictors of dietary restraint and binge eating amongst male adolescents (Dakanalis et al., 2015) Appearance related themes were predominantly related to the over- or under-estimation of

weight and/or shape in self or others, regardless of whether it was related to estimating muscularity or leanness.

Family Factors

Three family related factors were identified in $k = 2$ of the retained studies. The activating strategy of rumination in attachment anxiety, and the deactivating strategy of emotional control in attachment avoidance with their caregivers statistically significantly predicted bulimic symptoms in male adolescents (Van Durme et al., 2018). Additionally, perceived appearance pressure from parents and dating partners predicted adolescent male eating attitudes and behavior (Jackson & Chen, 2014). Importantly, no studies that met criteria for inclusion in this review assessed sibling influences in disordered eating.

Sociocultural Factors

Four individual socio-cultural factors related to adolescent male disordered eating were identified in $k = 8$ studies. Eating attitudes and behavior in early adolescence were predicted by perceived appearance pressure from mass media to lose weight or to be thin (Jackson & Chen, 2011, 2014). Significant predictors reported to apply to middle adolescence included perceived pressure from peers, friends, media and fear of negative evaluation (Jackson & Chen, 2011; Mougharbel et al., 2020). The internalization of appearance ideals significantly and positively predicted a range of disordered eating outcomes including binge eating and dietary restraint in two studies (Dakanalis et al., 2015; Sehm & Warschburger, 2018), disordered eating attitudes and behavior (Espinoza et al., 2019), eating regulation (Verstuyf et al., 2014) and disordered eating attitudes and behavior, dietary restraint and muscularity-oriented behavior (Hoffmann & Warschburger, 2019). Sociocultural factors all related on some level to the delivery and internalization of sociocultural ideals through media.

Peer Factors

Four individual peer factors related to adolescent male disordered eating were identified in $k = 3$ studies. Eating behavior was positively and significantly predicted by sexual harassment via self-surveillance (Petersen & Hyde, 2013) and perceived appearance pressure from desired/current dating partners significantly increased disordered eating at particular points in adolescence (Jackson & Chen, 2014). For male adolescents, the inverse relationship between friends healthy eating habits and meal skipping reduced across adolescence when skipping lunch but not breakfast meals (Rosenrauch et al., 2017). Peer factors, therefore, appeared to have potential to mitigate risk that resulted from peer interactions.

Psychometric Assessment of Predictors

Across the $k = 21$ eligible studies, $n = 14$ different psychometric assessment measures were used to gather information about adolescent male disordered eating. Three studies utilized novel surveys that were designed for their study, with some form of psychometric assessment reported within or subsequent to the retained study (Dakanalis et al., 2015; Rosenrauch et al., 2017; Verstuyf et al., 2014). The most commonly used outcome measures were the EDE-Q (Fairburn & Beglin, 1994) and the Child Eating Disorder Examination Questionnaire (Kliem et al., 2017), each of which was used to generate data in $k = 6$ (28.6%) of studies. The psychometric assessment measures used in each study are included Table 2. Measure characteristics including the sex and age of the normative population used for measure validation are included in Table 5.

Discussion

Research regarding disordered eating in adolescence has historically focused on females, however, research into the development of disordered eating attitudes and behaviours in adolescent males is emerging (Mitchison et al., 2013; Murray et al., 2017). A systematic review of prospective longitudinal research was undertaken to synthesize current knowledge about factors that are prospectively associated with the development of disordered eating in adolescent males. The primary aim of the review was to identify psychometrically assessed, psychosocial risk factors that are prospectively associated with the development of disordered eating attitudes and behaviors in adolescent males. Its secondary aim was to assess the appropriateness of the psychometric assessment measures used to identify those risk factors in the reviewed research. Across the $k = 21$ studies that were eligible for inclusion in the review, we identified 35 risk factors and 12 psychometric assessment measures. The risk factors ranged across psychological, body appearance, sociocultural, family, and peer concerns and influenced a range of disordered eating outcomes identified in the reviewed studies and synthesized in this review. The review indicated that risk for disordered eating in male adolescents is established developmentally however, given limitations in the validity of the psychometric assessment measures utilized in the reviewed studies, caution may be warranted with respect to findings.

Across studies, adolescent male disordered eating attitudes and behaviors were predicted by all five factor groupings. In general terms, psychological factors predicted characteristics including those related to cognitive and affective processes, regulation and suicidal ideation. They also predicted perfectionism and self-esteem. Appearance

Table 5 Summary of psychometric assessment measures used in studies retained for inclusion in the review

Measure name	Authors	Measure acronym	Country	Measure intention	Subscales	Published psychometric properties	Sex of normative population	Age of normative population	Explicit reference to male assessment in psychometric study?
The Aspiration Index	Kasser and Ryan (1996)	AI	US	To assess the relative importance of intrinsic and extrinsic aspirations	The index assesses three extrinsic (wealth, fame, image) and four intrinsic (personal growth, community, affiliation, health) aspirations, each represented by five items	Kasser and Ryan (1996)	76% female	18–79 years Mean age of the sample was 38 years (SD = 13)	Significant differences evident between males and females on intrinsic aspirations
Children's Version of the Eating Attitude Test	Maloney et al. (1988)	ChEAT	US	The Eating Attitude Test (EAT) is a 40·item, 6-point, forced choice, self-report inventory	1. Dieting, 2. Restricting and purging, 3. Food preoccupation	Maloney et al. (1988)	47% female	The mean age of the sample was 9.7 years (SD = 1.24)	Girls scored higher than Boys in each age category after grade 3
Eating Disorder Inventory-Child version		ChEDE-Q	Germany	ChEDE-Q provides a short form assessment of eating disorder psychopathology	1. Anorexia Nervosa 2. Bulimia Nervosa and 3. Binge-Eating Disorder		49% female	The mean age of the sample was 11.58 years (SD = 2.10)	Statistically significant gender differences on some items. Internal consistency for the total sample was a.89 (boys: a.87; girls: a.90)
College Oriented Eating Disorders Screen	Nowak et al. (2003)	COEDS	USA	COEDS was created for the purpose of identifying college students vulnerable to the development of an eating disorder	Disordered eating attitudes and beliefs	Nowak et al. (2003)	72% femaale	The mean age of the sample was 19.7 years, (SD = 2.34)	Statistically significant gender differences F(1, 148) = 36.00, p < .001 with females (M = 20.38, SD = 8.00) compared with males (M = 12.40, SD = 5.08)

Table 5 (continued)

Measure name	Authors	Measure acronym	Country	Measure intention	Subscales	Published psychometric properties	Sex of normative population	Age of normative population	Explicit reference to male assessment in psychometric study?
Dutch Eating Behaviour Questionnaire	Van Strien et al. (1986)	DEBQ	Netherlands	DEBQ was designed to improve understanding of obese eating patterns	1. Restrained eating, 2. Emotional (diffuse and clearly labelled) eating, and 3. External eating	Van Strien et al. (1986)	59% female	The mean age of the sample was 29.1 years (2 studies)	Statistics, Cronbach's alpha's for Restrained eating, Emotional eating, and External eating reported for males and females
The Drive for Muscularity Scale	McCreary (2007)	DMS	Canada	DMS measures attitudes and behaviours that reflect the degree of people's preoccupation with increasing their muscularity	Unitary Scale	McCreary (2007)	49% female	The mean age of the sample was 18 years, age range was 16–24 years	Cronbach's alpha's (15 item) of .84 for males and .78 for females
Eating Attitudes Test – 26 Item	Garner et al. (1982)	EAT-26	Canada	To determine if items are associated with clinical and personality features	1. Dieting, 2. Food Preoccupation and 3. Oral Control	Garner et al. (1982)	100% female	The mean age of the sample was 21.5 years (SD = 5.4)	No
The Eating Disorder Diagnostic Scale	Stice et al. (2000)	EDDS	USA	The development and validation of a brief self-report scale for diagnosing anorexia nervosa, bulimia nervosa, and binge-eating disorder	1. Anorexia Nervosa 2. Bulimia Nervosa and 3. Binge-Eating Disorder	Stice et al. (2000)	100% female	The age range was 13–61 years with a mean age of 29.7 years (SD = 13.2)	No

Table 5 (continued)

Measure name	Authors	Measure acronym	Country	Measure intention	Subscales	Published psychometric properties	Sex of normative population	Age of normative population	Explicit reference to male assessment in psychometric study?
Eating Disorder Examination-Questionnaire	Fairburn and Beglin (1994)	EDE-Q)	UK	The aim of this study was to compare the clinician report EDE with a self-report questionnaire based on it	1. Restraint, 2. Shape Concern and 3. Weight Concern. Behavioural features of EDs also assessed	Fairburn and Beglin (1994)	100% female	Community sample: n = 243 women mean age 26.6 years (SD = 5.5). Patient sample: n = 36 women mean age 24.3 years (SD = 4.8)	No
Eating Disorder Inventory-3	Garner (2004)	EDI-3)	USA	To evaluate eating disorder risk as a result of dieting concerns, body weight, weight history, height and behavioural symptoms indicative of eating disorders	1. Eating Disorder Specific Scales (DT, B and BD) 2. Psychological Trait Scales (LSE, PA, II, IA, ID, ED, P, A and MF) 3. Composite Scales (ECC, IC IPC, APC, OC and GPM)	Garner (2004)	100% female	Adolescent sample (n = 335) age range 11-17 years. Mean age across 4diagnostic groups 15.02 (SD = 1.59) – 15.89 (SD = 1.12)	No

Table 5 (continued)

Measure name	Authors	Measure acronym	Country	Measure intention	Subscales	Published psychometric properties	Sex of normative population	Age of normative population	Explicit reference to male assessment in psychometric study?
Eating Disorder Inventory for Children	Thurfjell et al. (2004)	EDI-C	Sweeden	To evaluate subgroups (age, gender) of children against the EDI-C to determine the need for separate age/and gender-based norms	11 sub-scales Drive for Thinness (DT) Bulimia (B) Body Dissatisfaction (BD) Ineffectiveness (I) Perfectionism (P) Interpersonal Distrust (ID) Interoceptive Awareness (IA) Maturity Fears (MF) Asceticism (A) Impulse Regulation (IR) Social Insecurity (SI)	Thurfjell et al. (2004)	78% female	Pre-adolescent boys (N = 372, mean age 11.2; SD = 0.7), pre-adolescent girls (N = 582; mean age 11.5; SD = 0.7), adolescent boys (N = 1698; mean age15.5; SD = 1.6) and adolescent girls (N = 2073; mean age 15.7; SD = 1.6)	Alphas across 11 subscales for females 0.70–0.91, for males 0.52–0.80 A need for separate norms for boys and girls and for preadolescents and adolescents reported
Stirling Eating Disorder Scales	Williams et al. (1994)	SEDS	UK	To assess anorexic dietary behaviour anorexic dietary cognitions, bulimic dietary behaviour, bulimic dietary cognitions, perceived external control, low assertiveness, low self-esteem and self-directed hostility	1. Perceived External Control 2. Low Assertiveness 3. Low Self-Esteem -267- 4. Self-Directed Hostility 5. Anorexic Dietary Behaviour 6. Anorexic Dietary Cognitions 7. Bulimic Dietary Behaviour 8. Bulimic Dietary Cognitions	Williams et al. (1994)	90% females	The age range was 15—45 years with a means age of 24.4 years (SD = 4.9)	No males were included in either the anorexic or bulimic groups

Table 5 (continued)

Measure name	Authors	Measure acronym	Country	Measure intention	Subscales	Published psychometric properties	Sex of normative population	Age of normative population	Explicit reference to male assessment in psychometric study?
Weight Reduction Behaviours	Dzielska et al. (2020)	WRB (male)	26 European countries	To examine trends in weight reduction behaviours of 11, 13, and 15 year old adolescents in 26 European countries between 2002 and 2018	WRB assessed on the basis of responses to the question "'At present, are you on a diet or doing something else to lose weight?"	Dzielska et al. (2020)	Varied by country	11, 13, and 15 year old adolescents in 26 European countries. Means and (SD) not provided	Increases in WRB over time was found for boys in a portion of countries (42% of 11-year-olds, 65% of 13-year-olds, and 61% of 15-year-olds) Few significant changes were observed for girls

concerns such as muscularity, weight and shape concerns, and weight status influenced eating attitudes and behavior, dietary restraint and muscularity orientated behavior and appearance. Sociocultural factors such as engagement of mass media and engagement of peers via screen use appeared to play a role, possibly in influencing the extent to which individual male adolescents internalize socially or culturally determined appearance standards and the perception of self that result. Sociocultural factors were, therefore, instrumental in determining, and/or depicting, the appearance standards to which male adolescents held themselves and the eating attitudes and behavior that resulted. These last factors included eating regulation, binge eating, and muscularity orientated eating behavior outcomes.

One pattern that emerged in our review indicated that developmentally important relationships may be predictive of subsequent eating attitudes and behavior, however this association appeared to be relatively complex. For instance, affect regulation is established in the context of early developmental relationships (Feldman, 2012). Within adolescence, well developed affect regulation is protective against future risk of mental ill-health. For instance, processes of attachment were predictive of adolescent affect regulation (Van Durme et al., 2018). The importance of family to the development of disordered eating was further demonstrated in findings that attachment anxiety was related to Bulimia Nervosa and that attachment avoidance was related to emotional control (Van Durme et al., 2018). A second factor, fundamental to early relationships, is trust (Rotenberg & Sangha, 2015). Trust is built within the context of reciprocal or synchronous attachment relationships (Stolle & Nishikawa, 2011), and trust beliefs were found to negatively predict loneliness and Bulimia Nervosa (Rotenberg & Sangha, 2015). The development of strong, regulated, early attachment relationships is, perhaps, one of the most significant predictors of affect regulation and, therefore, reduced disordered eating attitudes and behaviors in adolescent males.

Two additional factors of risk identified as occurring early in trajectories toward disordered eating were an internalizing disposition in general (Verschueren et al., 2020) and appearance related anxiety in particular (Dakanalis et al., 2015; Juarascio et al., 2016). Both, arguably, also develop in the context of early developmentally important relationships (Gar et al., 2005). Appearance-related anxiety was found to positively influence disordered eating behavior via its influence on negative affect (Dakanalis et al., 2015). This influence was exerted via limitations in food intake and increased food regulation (Dakanalis et al., 2015; Jackson & Chen, 2014), In addition, an internalizing disposition and high distress intolerance were found to be strong and positively associated with disordered eating attitudes (Espinoza et al., 2019; Stojek et al., 2017).

Across studies, a clear association was evident between affect and disordered eating attitudes and behavior in adolescent males. A considerable range of affective processes including affective reactivity, positive and negative affect, emotional eating and distress intolerance were evaluated in the reviewed studies. High negative affect, in particular, was found to positively predict dietary restraint (Dakanalis et al., 2015), binge eating (Sehm & Warschburger, 2018) and disordered eating (Jackson & Chen, 2011, 2014). In addition, affective reactivity was found to be a positive predictor of disordered eating attitudes (Juarascio et al., 2016) and depressive symptoms were positively predicted by binge eating (Sehm & Warschburger, 2018). Importantly, binge eating and dietary restraint were reported to have a reciprocal relation (Dakanalis et al., 2015).

A further clear pattern of association across studies was evident between the internalization of socio-cultural ideals and disordered eating behavior in adolescent males. The internalization of socio-cultural ideals was positively predicted by high levels of negative affect (Dakanalis et al., 2015), an association that underscored its importance as a predictor of disordered eating behavior (Hoffmann & Warschburger, 2019). The internalization of socio-cultural ideals positively predicted self-objectification, which in turn predicted appearance anxiety together with dietary restraint and binge eating (Dakanalis et al., 2015). Further, the internalization of socio-cultural ideals interacted positively with distress intolerance to predict increases in eating disordered attitudes in adolescence (Juarascio et al., 2016). Disordered eating was influenced by media in young adolescent males (Jackson & Chen, 2011; Sehm & Warschburger, 2018). It also predicted binge eating in research by Sehm and Warschburger (2018) and weight/shape concerns and muscularity concerns were, generally, positive predictors of disordered eating (Hoffmann & Warschburger, 2017).

Appearance related factors identified in the review were somewhat more varied than those previously mentioned, however, they often appeared to work in conjunction with psychological and socio-cultural factors that predicted disordered eating and behavior in adolescent males. In addition to self-objectification, body checking and body dissatisfaction both positively predicted disordered eating behavior in mid-adolescence (Ferreiro et al., 2011; Zaitsoff et al., 2020). Sexual harassment, identified as potentially preceding self-objectification, may influence the commencement of self-surveillance and, therefore, add risk for disordered eating (Dakanalis et al., 2015; Petersen & Hyde, 2013). Body dissatisfaction, in addition to Bulimia Nervosa, was also identified as a risk factor for suicidal ideation (Perkins & Brausch, 2019). One study in particular addressed the dual themes of a drive toward increased muscularity and a drive toward increased leanness (Hoffmann & Warschburger, 2019). Weight and shape concerns were found to be prospective predictors of restrained eating and the internalization of an athletic ideal was found to prospectively predict muscularity orientated behavior (Hoffmann & Warschburger, 2019). Similarly, muscularity concerns were broadly associated with eating concerns (Hoffmann & Warschburger, 2017). Time spent watching television positively predicted subsequent BMI scores (Mougharbel et al., 2020). In turn, BMI scores positively predicted disordered eating attitudes and high loss of control eating in conjunction with high emotional eating positively predicted subsequent disordered eating (Jackson & Chen, 2014; Stojek et al., 2017).

Psychometric Assessment Measures

The studies included in this review identified factors of risk for the development of disordered eating in adolescent males; however, these factors were identified using psychometric assessment measures that may not adequately capture male adolescent eating attitudes and behaviour (Darcy & Lin, 2012; Murray et al., 2018). In the validation studies published in support of the psychometric assessment measures used in the reviewed studies, between 47 and 100% of participants were female. Of those psychometric assessment measures, only one (The Drive for Muscularity Scale; McCreary, 2007) specifically assessed features consistent with current conceptualizations of disordered eating in adolescent males. This is not to say that other assessment measures do not reflect male specific characteristics. For instance, the desire to attain leanness, currently understood as a feature of male disordered eating, may be informed by female-centric assessment measures that seek responses to items about thinness. This suggests that the attitudes and behaviors reported in response to assessment items in the identified studies may more accurately reflect the degree to which adolescent males endorse attitudes and behaviors consistent with adolescent female disordered eating. For example, the drive for thinness subscale of the EDI-3 (Garner, 2004) and the restraint subscale of the EDE-Q (Fairburn & Beglin, 1994) include items which may appropriately assess ideals traditionally associated with female disordered eating. By contrast, males may experience a desire for increased muscularity and increased leanness, and therefore experience fear of weight or muscle loss, as opposed to gain (Dakanalis et al., 2015; Mitchison & Mond, 2015). Thus, on an item-by-item comparison of the EDE-Q, and despite being diagnosed with Anorexia Nervosa, male adolescents were less likely than females to affirm wanting a flat or empty abdomen, being uncomfortable while eating in front of others, eating in private, or holding a desire to lose weight (Darcy & Lin, 2012).

Items were also identified on psychometric assessment measures that may have relevance to the assessment of disordered eating in adolescent males, but which may benefit

from refinement to account for the variability in characteristics of presentation across the sexes. For example, dieting may be characterized by calorie counting to *change* (increase or decrease) weight (Lavender et al., 2017) depending on the motivation. Similarly, food preoccupation or restriction may occur to facilitate or suppress the consumption of specific foods or food groups appropriate to the desired outcome (Griffiths et al., 2013; Murray & Touyz, 2013). By contrast, oral control may involve restricting the intake of certain foods, depending on whether increased muscle or leanness is the desired outcome (Badenes-Ribera et al., 2019). Finally, items referring to dissatisfaction with body parts, such as the hips and buttocks, may be broadened in an effort to reflect the range of potentially desired outcomes as a function of disordered eating symptomatology across the sexes (Garner, 2004; Lavender et al., 2017). The factors identified in this review as prospectively associated with the development of disordered eating in adolescent males are primarily concerned with increasing muscle and increasing leanness (Tylka, 2011). The development of psychometric assessment measures that demonstrate validity in accounting for processes that facilitate attainment of these ideals in adolescent males is essential in advancing the area (Hoffmann & Warschburger, 2019).

Limitations and Future Directions

This review has some noteworthy limitations. Inclusion and exclusion criteria were used to determine the studies that would be included in the review. Those that were reviewed were prospective longitudinal research studies and, as a result, a range of cross-sectional characteristics that are potentially important in building a comprehensive picture of adolescent male disordered eating were not reviewed. Rather, and where possible, the implications of development over time were reported. A majority of the reviewed studies spanned the timeframe where puberty likely occurred, and it was unfortunate that changes in functioning as a result of puberty could not be reviewed because the onset of puberty was reported to a limited extent in only one study (Espinoza et al., 2019). The implications of puberty for the developmental course of disordered eating in adolescent males, therefore, remain unclear. Similar concerns are present with respect to factors such as culture and ethnicity. Where it has been possible to report in an informed way on the implications of culture or ethnicity that has been included in the review. However, less than half the reviewed studies included information about participant's cultural or ethnic status limiting the generalizability of findings to non-Western populations. Thus, the implications of a range of factors for the development of disordered eating attitudes and behaviors in adolescent males remain less than clear.

A comprehensive understanding of disordered eating in adolescent males remains absent from the existing evidence-base, in large part due to limitations in psychometric assessment for this cohort. Efforts to delineate male factors require the accurate identification of those factors prior to the development of comprehensive models of male disordered eating and, subsequently, the development of comprehensive and integrated models of adolescent risk across sexes. Achieving this goal will provide an account of both male- and female-specific factors of risk, and also account for the intersection of those factors such that risk is represented at the level of a syndrome of features applicable across adolescence.

This review also has implications for the development of strategies of preventative intervention, as well as treatment. Research suggests that strategies of preventative intervention that function at a family systems level early in childhood hold promise to address subsequent social, emotional and behavioral functioning in adolescence and, therefore, adulthood. Whether indicated or selected, relationally based strategies of preventative intervention appear to have potential to mitigate both genetic and relational aspects of disordered eating. In identifying and clustering factors associated with the development of disordered eating in adolescent males, this review also informs components of treatment which are responsive to change as it occurs in adolescence. The development of psychometric assessment measures that can capture symptoms as they commence early in adolescence will be of the upmost assistance in interrupting trajectories toward diagnosable eating disorders in adolescent males. Aspects of those diagnoses, as they are developed, are also informed by this review.

Conclusion

The evidence-base regarding disordered eating in adolescence has traditionally focused on females, though literature considering the perspective of adolescent males is emerging. This review was undertaken to synthesize research findings about psychosocial risk factors that are prospectively associated with the development of disordered eating attitudes and behavior in male adolescents. The risk factors identified in the review were psychological, body appearance, sociocultural, family and peer factors, and highlight a range of characteristics that are unique to adolescent male disordered eating. The review also critically appraised the psychometric assessment measures used in the reviewed studies to identify those factors of risk. Accurate assessment is imperative in generating reliable and valid research and informing clinical practice and the review concluded that existing female-centric psychometric assessments normed predominantly on female participants may be inappropriate for use with adolescent males. Informing strategies for

preventative intervention to avert trajectories toward disordered eating and, ultimately, eating disorders in adolescent males remains a priority for research in this field.

Authors' Contributions SB conceived of the study, participated in its design, undertook the database searches, reviewed publications to determine the studies that would be retained for review, drafted the manuscript, and contributed to reviewing and producing successive drafts; CB participated in the study design, contributed to the analysis, and contributed to reviewing and producing successive drafts; JM participated in the study design, reviewed publications to determine the studies that would be retained for review, contributed to the analysis, contributed to successive drafts of the manuscript. All authors read and approved the final manuscript.

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Declarations

Conflict of interest The authors report no conflict of interests.

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CHAPTER 3: Linking Chapter

This chapter will summarize the findings of Study 1, a systematic review entitled "The Development of Disordered Eating in Male Adolescents: A Systematic Review of Prospective Longitudinal Studies" and utilize these findings as a platform upon which to develop the second study in the program of research.

Chapter 2 reported on the results of a systematic review of prospective longitudinal research that investigated predictors of the development of disordered eating (DE) in male adolescents. A seminal review conducted by Murray et al. (2010) regarding muscle dysmorphia in males, advanced research on factors associated with the onset of DE in male adolescents and provided insights into phenotypic distinctions between male and female adolescents. However, psychometric assessment measures available to researchers and clinicians to assess DE in male adolescents may be inadequate for this purpose (Murray et al., 2018). Accordingly, the present review aimed to extend current knowledge by synthesizing current evidence about factors that are associated with the development of DE in male adolescents, and by clarifying the extent to which the assessment measures used to identify those factors are appropriate for use with male adolescents. The primary aim of the review was to identify psychometrically assessed psychosocial risk factors that are prospectively associated with the development of DE attitudes and behavior in male adolescents. Its secondary aim was to assess the appropriateness of the psychometric assessment measures used to identify those factors in the included studies.

The review identified $n = 21$ eligible studies from six online databases based on inclusion and exclusion criteria outlined previously. Across eligible studies, 35 risk factors that predicted of the development of DE in male adolescents and 14 assessment measures used to identify those factors were

identified. The risk factors included psychological, body appearance, sociocultural, family, and peer concerns and influenced a range of DE outcomes identified in the reviewed studies. Psychological factors were found to predict cognitive and affective processes, regulation of distress, suicidal ideation, perfectionism and self-esteem, all of which were associated with DE attitudes and behaviors. Appearance concerns such as muscularity, weight and shape concerns, and weight status affected eating attitudes and behaviors, dietary restraint, and muscularity-focused behavior and appearance. Sociocultural factors such as engagement with mass media and engagement with peers via screen use appeared to play a role, possibly in influencing the degree to which a male adolescent internalizes socially or culturally determined appearance standards and associated self-perceptive implications. Therefore, sociocultural factors may play a significant role in determining the appearance standards to which male adolescents hold themselves, as well as the eating attitudes and behaviors that result.

Further analysis of the 14 assessment measures indicated that their published psychometric properties included data partially or completely derived from female populations. The three measures that included the greatest proportion of male participants were the ChEAT (Maloney et al., 1988), which was normed on a sample comprised of 47% females, the ChEDE (Kliem et al., 2017), which was normed on a sample comprised of 49% female participants and the DMS (McCreary, 2007), a measure primarily concerned with assessing desired increases in muscle mass, which was normed on a sample of 49% female participants. Four measures, the EAT-26 (Garner et al., 1982), the EDDS (Stice et al., 2000), the EDE-Q (Fairburn & Beglin, 2008) and the EDI-3 (Garner, 2004) were normed on samples entirely comprised of female samples. Unfortunately, the

historic exclusion of males from controlled studies of eating disorders (ED) appears to be a relatively stable characteristic, and may have inadvertently facilitated the development and maintenance of ED assessment and treatment approaches that are more oriented towards characteristics typically associated with presentations among females (Mitchison & Mond, 2015). Thus, established ED assessment measures such as the EDI-3 (Garner, 2004) or the EDE-Q (Fairburn & Beglin, 2008), may lack sensitivity in detecting and indexing ED symptoms in males, which may account for limitations in detection of EDs in males (Murray et al., 2017b).

Consequently, the review raised questions about the way in which established ED assessment measures capture risk for, or presence of, DE attitudes or behaviors in male adolescents. In one investigation of how current ED assessment measures capture body and eating concerns associated with males, Darcy et al. (2012) compared responses on the EDE-Q (Fairburn & Beglin, 2008) across a matched sample of male and female adolescents diagnosed with anorexia nervosa. In comparison to females, males in their sample scored significantly lower on the EDE-Q global score and shape concern and weight concern subdomains. An exploration of specific items on the EDE-Q also revealed that male adolescents were less likely than females to endorse the desire for a flat stomach (Darcy et al., 2012). Similarly, Stanford and Lemberg (2012) compared male and female scores on the EDI-3 (Garner, 2004) and found that males scored significantly lower than females in the area of body dissatisfaction. This result added to existing evidence that males with EDs have lower levels of body dissatisfaction yet contradicted previous findings suggesting that increased use of anabolic steroids, excessive exercise, and DE is linked to heightened dissatisfaction amongst males (Kinnaird et al., 2018; Sangha et al., 2019). The

implications of variable findings such as these suggest male DE and EDs are areas of significant clinical concern that are necessarily continuing to evolve.

Clinical norms on several leading symptom indices have also revealed substantially different scores in male and female ED patients (Smith et al., 2017). Items such as that on the body dissatisfaction subscale of the EDI-3 (Garner, 2004), “I think my buttocks are too large,” and “I think my hips are too big,” are likely not typical of the concerns that men may demonstrate when reporting about discontent they have with their bodies. Thus, traditional ED measures such as the EDE-Q (Fairburn & Beglin, 2008) and EDI-3 (Garner, 2004) may not fully capture domains of relevance to the overall severity of ED psychopathology among males. As a result, they may underestimate or, more importantly, misconstrue, male ED symptoms.

Supplementing existing psychometric assessment measures with additional items is one way to address this concern. One psychometric assessment measure was identified in the review that included an item related to gaining, rather than losing, weight. In the WRB assessment (Dzielska et al., 2020). Participants were provided with an option of “no, I need to put on weight” in response to the questionnaire item “At present, are you on a diet or doing something else to lose weight?”, Some researchers (e.g., Lavender, 2021; Murray et al., 2017b) have suggested that whilst the development of male-specific ED assessment is still necessary, the use of broader psychometric assessment items may adequately capture male specific eating concerns such as the desire to increase their size. Importantly, the utility of the WRB for males is potentially limited by the fact that “weight” was not defined to differentiate a desire to increase overall body mass or muscularity-oriented behavior.

A second psychometric assessment measure identified in the review that

captured attitudes and behaviors reflective of the degree to which an individual is preoccupied with increasing muscularity, was the DMS (McCreary, 2007; McCreary & Sasse, 2000). Built on current theoretical models and assessment measures, this research suggested that it was the internalization of an "athletic" ideal (Hoffmann & Warschburger, 2019, p. 160) rather than the "thin" ideal (Hoffmann & Warschburger, 2019, p. 160) that predicted muscularity-oriented behavior in both male and female adolescents. As such, the inclusion of assessment items relating to a desire to be heavier, stronger, fitter and/or more muscular may enable clinicians to more accurately assess weight, shape and eating concerns when assessing males (Lavender, 2021). It is also likely that while scores for males with EDs on the measures such as the EDI-3 and EDE-Q differ from those of females, they likely remain much higher than males without diagnosed EDs (Darcy et al., 2012). A distinction between muscularity-oriented behavior and weight reduction behavior appears necessary in accurately accounting for adolescent female *and* male adolescent DE, particularly within normative populations.

In an effort to further explore these concerns we undertook the study presented in Chapter 4 of this dissertation. This study sought to recruit a normative sample of male adolescents and gain their responses on a range of psychometric assessment measures. The dependent measure was the EDI-3 (Garner, 2004). The EDI-3 is a self-report psychometric assessment questionnaire that assesses the presence of ED characteristics. In the current study we utilized seven of the original twelve EDI-3 subscales in order to address concerns of a generalized rather than clinical population of adolescents, namely, the Drive for Thinness, Body Dissatisfaction, Low Self- Esteem, Personal Alienation, Interoceptive Deficits, Interpersonal Alienation, Emotional Dysregulation and Perfectionism

subscales. The EDI-3 was normed in the US on a sample of *n* = 355 adolescent females in 2004. There have been numerous studies that have reviewed the original normative data (Smith et al., 2017), however the original norms remain associated with the measure.

Current interest in this study pertained to examining the relation between DE attitudes and behaviors in male adolescents and pertinent psychosocial characteristics of family relational quality; child social, emotional, and behavioral functioning; and child social media use. By identifying distinct latent classes of DE, it was hoped this study would assist in classifying male adolescents who are particularly vulnerable or resilient to developing EDs. As a result, we may contribute to more targeted and personalized eating prevention and intervention programs being developed that are tailored to the specific needs of different subtypes of male adolescents. As previously stated, limitations in gaining previously approved entry into secondary schools during periods of COVID-19 lockdown between 2020 and 2022 meant that the participant recruitment strategy did not include a comparative female cohort. The study addresses this limitation, together with present findings and suggestions for future directions of research.

CHAPTER 4: Latent Class Segmentation Study in a Normative Sample of Australian Male Adolescents

Latent Class Segmentation Study in a Normative Sample of Australian Male Adolescents

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Abstract

Limited research has been undertaken into the relation between psychosocial characteristics and disordered eating attitudes and behaviors in male adolescents. This study utilized a normative sample of *n* = 338 male adolescents who reported their eating attitudes and behaviors using the Eating Disorders Inventory-3 (Garner, 2004). Latent class analysis revealed a three-class solution best fit the data. The association between the three classes and three additional areas of psychosocial functioning were then assessed. Parent-child relational quality was assessed using the Parent Bonding Inventory – Brief Current form (Klimidis et al., 1992); social emotional and behavioral functioning was assessed using the Strengths and Difficulties Questionnaire (Goodman, 2001); and social media use as assessed using the Sociocultural Internalization of Appearance Questionnaire for Adolescents (Keery et al., 2004). Hypotheses that positive relationships would be evident between scores on psychosocial variables and the Eating Disorders Inventory-3 classes were partially supported. Parent child relational quality and internalization of appearance ideals, but not child social emotional and behavioral difficulties, demonstrated positive relationships with Eating Disorders Inventory-3 (Garner, 2004) classes. Whilst the hypothesized statistical significance of these relationships was generally not supported, findings are discussed in terms of their relation to existing research, limitations, and future research potential.

Key words: male**;** adolescent; disordered eating; eating disorders; latent class; male eating.

Introduction

Recent research interest has highlighted the need to explore the development of disordered eating (DE) attitudes and behaviors amongst male adolescents (Ganson et al., 2021). Research indicates that the DE behaviors that females commonly engage in, are directed toward achieving a 'thin' body ideal (Lavender et al., 2017). Conversely, males may focus on attaining increased muscularity and increased leanness (Nagata et al., 2019a; Tylka, 2011). Thus, DE in male adolescents may involve practices such as food and supplement restriction/consumption, the use of muscle enhancing substances, and excessive exercise regimes in order to achieve a "muscular ideal" (Lavender et al., 2017; Murray et al., 2017b). Yet, research with normative samples of male adolescents that seeks to establish factors of risk for the development of DE remains relatively rare. Further research to clarify factors associated with male adolescent DE attitudes and behaviors is necessary (Byrne et al., 2023).

Research has shown that DE attitudes and behaviors in adolescence vary as a function of a range of demographic and psychosocial characteristics (Chapman et al., 2021; Rodgers et al., 2014). In particular, family factors may influence mental health outcomes in adolescence and adulthood (Chapman et al., 2021; Van Durme et al., 2018). Early research has reported positive and statistically significant relationships between parenting style, feeding practices, and eating-related behaviors (Brown et al., 2016; Pace et al., 2018). However, the significance of parenting factors as they relate specifically to DE in this population is yet to be fully understood. For example, research has shown that maternal and paternal parenting style is differentially associated with weight control behaviors in male adolescents, while paternal parenting characteristics during early adolescence are associated with eating attitudes and behaviors (Pace

et al., 2018; Zubatsky et al., 2015). The inconsistent findings in this area may be due, in part, to variations in the definition and measurement of DE across studies. Further research is necessary to identify specific parenting factors associated with the development and maintenance of DE in male adolescents (Murray et al., 2017b).

Research has demonstrated that child social, emotional, and behavioral functioning and DE attitudes and behaviors are related (Bacopoulou et al., 2018). For instance, it has been reported that DE in male adolescents is associated with mood dysregulation (Griffiths et al., 2014). Across studies, elevated negative affect has been found to be associated with restriction and purging (Dakanalis et al., 2015; Sehm & Warschburger, 2018). Similarly, increased reactivity has also been associated with increases in DE attitudes (Juarascio et al., 2016; Lavender et al., 2014). As a result, it has been proposed that dysregulation of emotion may be central in perpetuating already established DE (Cooper et al., 2014). Scores on the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) have been found to increase amongst adolescents displaying DE (Bentley et al., 2015; Sparti et al., 2019) and adolescents with heightened emotional reactivity who experience invalidation may use DE behavior to address increased emotional arousal, low self-esteem, and negative affect (Haynos & Fruzzetti, 2011). Given the variability in findings, however, additional research is needed to clarify the relation between affect and DE in particular, and social emotional and behavioral functioning and DE in general.

A growing body of evidence suggests that a significant association may exist between male adolescents' experience of culturally idealized images displayed on social media and the development of DE (Pace et al., 2018; Rodgers et al., 2020b). Western social media emphasizes appearance standards for males

that are characterized by leanness and muscularity (Rodgers et al., 2018; Rodgers et al., 2012) . Therefore, DE and muscle building practices may develop as male adolescents pursue a *muscular ideal* displayed through social media, including a drive to gain muscle, disproportionate consumption of protein or supplements, and maladaptive concern about weight or muscle loss (Murray et al., 2018; Tylka, 2011). Early research has demonstrated a minor but significant association between social media use, body image problems, and DE for male adolescents (de Vries et al., 2016; Holland & Tiggemann, 2016). This finding offers preliminary support for a hypothesized link between social media use and the internalization of appearance standards among male adolescents (Kim & Chock, 2015; Rodgers et al., 2020a). However, further research is needed to clarify the relation between the internalization of muscular ideals via social media use and subsequent engagement in DE.

Aims and Objectives

This study aims to examine the relation between DE attitudes and behaviors in a normative sample of male adolescents and pertinent psychosocial characteristics of family relational quality; child social, emotional, and behavioral functioning; and child social media use. Addressing these aims is essential in building a platform of research capable of informing the development, maintenance, and treatment of eating disorders (ED), as well as informing efforts directed at prevention and early intervention into them. To this end, it was anticipated that it would be possible to identify an optimal number of latent classes on the basis of participant responses to the Eating Disorders Inventory-3 (EDI-3; Garner, 2004). In addition, (H1), it was hypothesized that a statistically significant and positive association would be evident on mean scores on the EDI-3 subscales and identified classes. Second (H2), it was hypothesized that a

statistically significant and positive association would be evident between mean scores on the Parent Bonding Inventory – Brief Current form (PBI-BC; Klimidis et al., 1992) and EDI-3 classes such that mean PBI-BC subscale scores would increase as EDI-3 class increased and that these scores would be statistically significantly different across classes. Third (H3), it was hypothesized that a statistically significant and positive association would be evident between scores on the Strengths and Difficulties Questionnaire – Youth self-report version (SDQ; Goodman, 2001) and EDI-3 classes such that mean SDQ subscale scores would increase as EDI-3 class increased and that these scores would be statistically significantly different across classes. Finally (H4), it was hypothesized that a statistically significant and positive association would be evident between scores on the Sociocultural Internalization of Appearance Questionnaire for Adolescents (SIAQ-A; Keery et al., 2004) and EDI-3 classes such that mean SIAQ-A subscale scores would increase as EDI-3 class increased and that these scores would be statistically significantly different across classes. The research was approved by the University of Technology Sydney Medical Ethics Research Committee (approval number: ETH18-2552, Amendment number: ETH21-6521). The research report has been prepared according to the STROBE statement guidelines for cohort study findings (Von Elm et al., 2014).

Materials and Methods

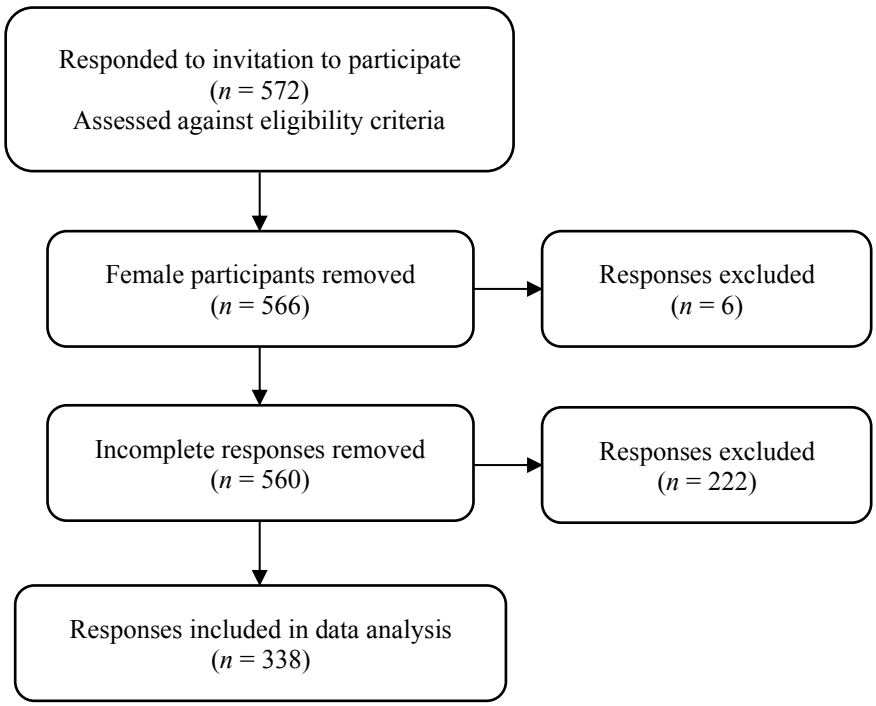
Participants

Participants were male adolescents recruited from an independent boy's high school in NSW, Australia. Agreement to participate was gained from $n = 338$ adolescents ($M_{age} = 14.38$, $SD = 1.67$). Participants were included in the research if they identified as male, were aged 11-19 years, had not previously been diagnosed with an ED or a neurodevelopmental disorder and had not previously been the

subject of a child protection concern or placed in out of home care or detention. Participants who did not meet inclusion criteria or who met criteria but failed to complete psychometric assessment in its entirety (n = 222) were excluded from the study as shown in Figure 1.

Figure 1

Participant selection flowchart



Procedure

Participants were recruited into the research study following a three-stage process that initially required communication with, and agreement from, the principal and wellbeing coordinator of an independent boy's high school in NSW, Australia. Subsequently, parental informed consent was sought from all parents of male adolescents in the school who were aged between 11 and 19 years. Where parents consented to the participation of their sons, individual male adolescents were then approached en masse by school staff within the school. With both the school's agreement, and parent's agreement, the researchers provided study information forms to adolescents and sought their assent to opt into the study.

Those who opted in were then invited to participate online at a time decided upon by the school. Data collection was completed in January 2022. Participant's efforts in participating in the research were acknowledged by them being placed in a draw for one of five $200 digital MasterCard vouchers.

Measures

All items identified below were included in the assessment battery completed by high school students.

Demographic Information Measure

Participants were first asked to provide demographic information including their age, ethnicity, preferred gender and parental structure. Following this, they were asked to complete a range of psychometric assessment measures to assess the association between these measures and identified classes.

Eating Disorder Inventory-3 (EDI-3; Garner, 2004)

The EDI-3 is a 91-item self-report questionnaire that assesses the presence of psychological and behavioral characteristics related to EDs. It consists of twelve scales, however in the current study seven of these twelve scales were utilized, namely the Drive for Thinness, Body Dissatisfaction, Low Self- Esteem, Personal Alienation, Interoceptive Deficits, Interpersonal Alienation, Emotional Dysregulation and Perfectionism in order to address concerns of a general rather than clinical population of adolescents. Items are rated on a 6-point Likert scale (always, usually, often, sometimes, rarely, or never), however total scores are calculated using a 0–4 scale, with higher scores representing more severe symptoms. Internal consistency was excellent in the current sample ($\alpha = .92$).

The Strengths and Difficulties Questionnaire — Youth self-report version (SDQ-s; Goodman, 2001)

The SDQ is 25 item self-report screening instrument for psychological

problems among adolescents as experienced in the previous six months. It consists of four subscales of hyperactivity–inattention, emotional symptoms, conduct problems, peer problems and one prosocial scale, with each scale containing five items. Items are rated on a 3-point Likert scale (not true, somewhat true, sometimes true or certainly true), and then summed to generate a Total Difficulties score. Higher scores indicate greater psychological difficulties. Internal consistency was good in the current sample (α = .77).

The Parental Bonding Instrument- Brief Current form (PBI-BC; Klimidis et al., 1992)

The PBI-BC is a 16-item self-report questionnaire used to assess the perceived quality of relationship with both the mother and father in the first 16 years of an individual's life. It consists of 8 items related to the adolescents' mother and father respectively, with items divided into two subscales: parental care (4 items) and parental overprotection (4 items). Items are rated on a 3-point Likert scale (never, sometimes, usually). A combined score can be calculated to reflect parental care and parental overprotection with higher scores indicating greater perceived care or overprotection from both parents. Internal consistency was very good in the current sample (α = .88).

Sociocultural Internalization of Appearance Questionnaire for Adolescents (SIAQ-A; Keery et al., 2004)

The SIAQ-A is a brief 5-item measure that assesses the extent to which adolescents adopt media-presented appearance ideals for themselves. Items are rated on a 5-point Likert scale (definitely disagree, mostly disagree, neither agree nor disagree, mostly agree or definitely agree), and then summed. Possible scores range from 5 to 25, with higher scores indicating greater internalization of appearance ideals. Internal consistency was excellent in the current sample (α =

.95).

Statistical Analyses

Consistent with the aims of the study, Latent Class Segmentation in Stata 17 (StataCorp, 2019) was employed to identify an optimal number of latent classes using the EDI-3 mean data for each of the EDI-3 subscales included in the study. This segmentation was based on two key statistics: an optimal number of classes with a marginal probability as close to and below 0.06 as possible, and the separation of classes based on an entropy statistic of less than 0.905 (Goodman, 2002). Secondly, the relation between each EDI-3 class, and the mean values of each of the subscales of the psychosocial measures used in the study was assessed. Thus, analyses included subscales assessing family relational quality (PBI-BC), child social, emotional, and behavioral functioning (SDQ) and child social media use (SIAQ-A).

Results

Demographic information and psychometric data for the sample is presented in Table 1. Table 2 provides Akaike's Information Criterion (AIC; Akaike, 1979), Bayesian Information Criterion (BIC; Schwarz, 1978) and minimum class marginal probability statistics for each of the six latent class solutions included in the analysis. On the basis of these indices, a 3-class solution was selected as it best fit the data. Means for each class in the 3-class solution on each of the 7 subscales from the EDI-3 included in this study are presented in Table 3.

Table 1

Sample demographic information and psychometric data

Variable	Categories	N (%/SD)
Age		14.34 (1.69)
Ethnicity	Australian	219 (64.8%)
	Indigenous Australian	3 (0.9%)

	African	2 (0.6%)
	China/SE Asian	7 (2.19%)
	South Asian	4 (1.2%)
	European	48 (14.2%)
	Middle Eastern	9 (2.7%)
	New Zealand	2 (0.6%)
	South American	2 (0.6%)
	UK/USA	26 (7.7%)
	Other	2 (0.6%)
Parents	Two parents	318 (94.1%)
	Single parent	20 (5.9)
Siblings	No	22 (7%)
	Yes	316 (93.5%)
SDQ	M (SD)	19.06 (6.31)
PBI-BC Mo	M (SD)	7.25 (3.22)
PBI-BC Fa	M (SD)	6.66 (3.84)
SIAQ-A	M (SD)	11.38 (5.28)

Note. EDI=Eating Disorder Inventory, PB-BC Mo= Parental Bonding Instrument Mother Total score, PBI-BC Fa= Parental Bonding Instrument Father Total score, SDQ= Strengths and Difficulties Questionnaire, SIAQ-A= Sociocultural Internalization of Appearance Questionnaire for Adolescents.

Table 2

Comparative model fit and feasibility statistics for the six latent classes included in the analysis

Number of classes	AIC	BIC	Minimum class marginal probability
1	14898.13	14952.10	1
2	14640.71	14724.35	0.20
3	**14494.27**	**14608.25**	**0.069**
4	14332.69	14477.06	0.009
5	14309.33	14484.08	0.017
6	14251.52	14456.68	0.009

Note. AIC= Akaike's Information Criterion (Akaike, 1979), BIC= Bayesian Information Criterion (Schwarz, 1978).

Table 3

Post estimation means for each EDI-3 sub-scale for each of the three classes identified in the three-class solution

	Margin (mean)	Std. err.	z-score	P>z	95% confidence interval
Class 1					
EDIBDt1	19.90035	1.556812	12.78	0	16.84906-22.95165
EDIDTt1	14.44409	1.828636	7.9	0	10.86003-18.02815
EDIEDt1	11.90738	1.482416	8.03	0	9.001901-14.81287
EDIIAt1	17.62366	1.158754	15.21	0	15.35255-19.89478
EDIIDt1	16.69676	2.462227	6.78	0	11.87088-21.52264
EDILSEt1	12.99918	0.921148	14.11	0	11.19376-14.80459
EDIPt1	13.9082	1.688506	8.24	0	10.59879-17.21762
Class 2					
EDIBDt1	30.96894	0.368611	84.02	0	30.24648-31.69141
EDIDTt1	18.93269	0.389906	48.56	0	18.16849-19.69689
EDIEDt1	14.88667	0.432293	34.44	0	14.03939-15.73394
EDIIAt1	25.46602	0.275576	92.41	0	24.9259-26.00614
EDIIDt1	22.63677	0.517516	43.74	0	21.62246-23.65108
EDILSEt1	20.19228	0.231619	87.18	0	19.73832-20.64625
EDIPt1	20.95989	0.441535	47.47	0	20.0945-21.82528
Class 3					
EDIBDt1	35.05795	1.147316	30.56	0	32.80925-37.30665
EDIDTt1	27.74349	1.40263	19.78	0	24.99439-30.4926
EDIEDt1	27.22202	1.283478	21.21	0	24.70645-29.73759
EDIIAt1	28.05847	0.830892	33.77	0	26.42995-29.68699
EDIIDt1	37.92284	1.815835	20.88	0	34.36387-41.48181
EDILSEt1	24.49492	0.988344	24.78	0	22.5578-26.43204
EDIPt1	26.74626	1.20615	22.17	0	24.38225-29.11027

Note. EDIBD= Body Dissatisfaction, EDIDT= Drive for Thinness, EDIED= Emotion Dysregulation, EDIIA= Interpersonal Alienation, EDIID= Interoceptive Deficits, EDILSE= Low Self-Esteem, EDIP= Perfectionism.

A graphical representation of the results of the 3-class solution on each of the 7 EDI-3 subscales is presented in Figure 2. In addition, graphical

representations of the relation between mean scores on the subscales of the PBI-BC, the SDQ, and the SIAQ-A, are also presented in Figure 2. Analysis of the statistical significance of differences between mean scores on each subscale on each of the classes is provided in Table 4.

Figure 2

Radar graphs depicting the association between each of the three identified latent classes and DE symptoms on EDI-3 subscales, male adolescent social, emotional and behavioral functioning as assessed on the SDQ, media-presented appearance ideals as assessed on the SIAQ-A; and perceived quality of parental relationships as represented by the PBI-BC

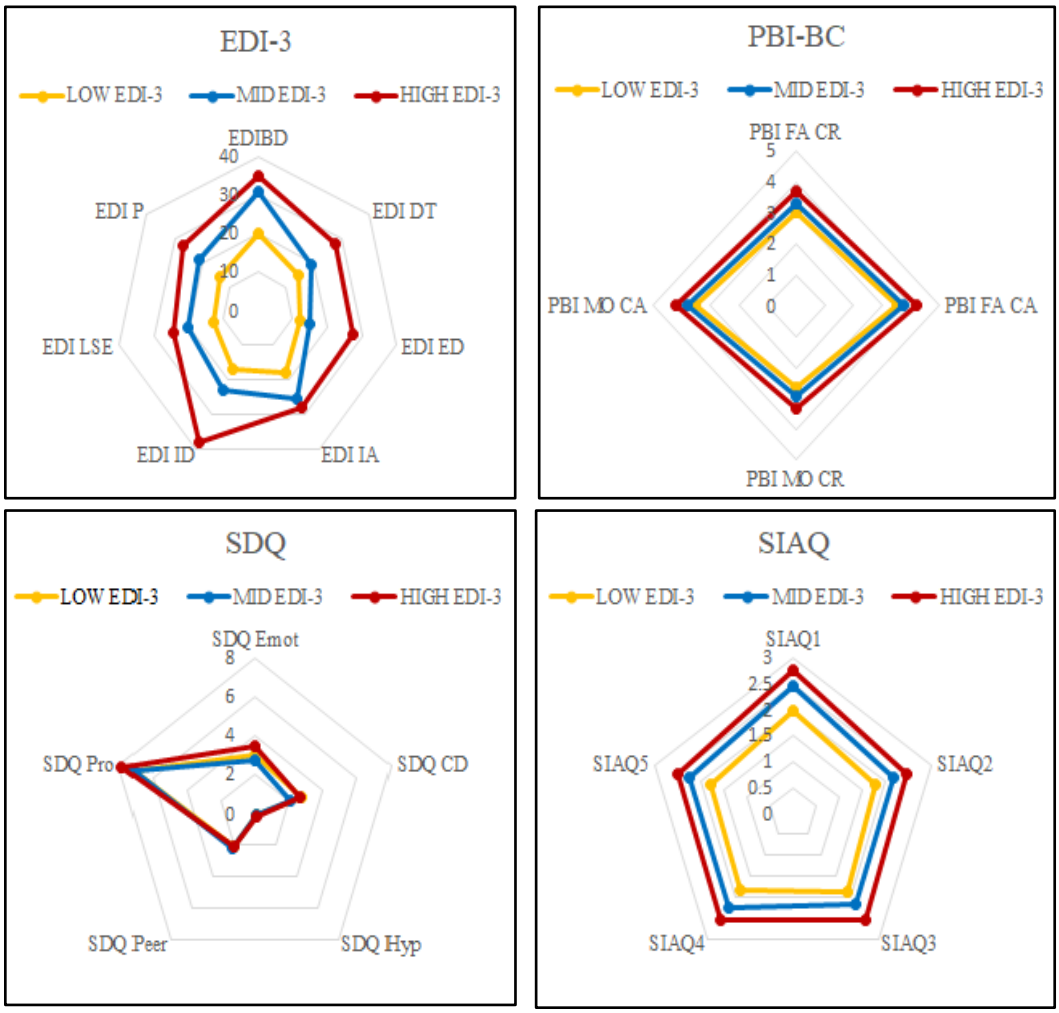


Table 4

t-scores, effect sizes and 95% confidence intervals for the relation between latent classes on the EDI-3, PBI-BC, SDQ and SIAQ-A.

	Class 1- Class 2			Class 2- Class 3			Class 1-Class 3		
	t	*Cohens d*	95% CI	*t*	*Cohens d*	95% CI	*t*	*Cohens d*	95% CI
			Lower - Upper			Lower - Upper			Lower - Upper
edilse	-7.03	-.94	-1.22 - -.66	-7.65	-1.02	-1.29 - -.74	-13.18	5.34	-2.06 - -1.45
ediia	-7.03	-.53	-.79 - -.27	-4.63	-.61	-.88 - -.35	-7.76	3.64	-1.31 - -.75
ediid	-4.00	-1.33	-1.62 - -1.04	-10.28	-1.37	-1.65 - -1.08	-19.37	6.64	-2.93 - -2.22
edied	-4.00	-.69	-.97 - -.44	-7.85	-1.04	-1.32 - -.76	-12.17	6.14	-1.92 - -1.32
edip	-5.72	-.77	-1.04 - -.49	-3.53	-.47	-.73 - -.20	-9.45	6.39	-1.54 - -.97
edidt	-7.33	-.98	-1.26 - -.70	-5.08	-.68	-.94 - -.41	-12.27	6.01	-1.93 - -1.33
edibd	-7.18	-.96	-1.24 - -.68	-7.72	-1.02	-1.30 - -.75	-14.62	7.57	-2.261 - -1.63
PBIFaCR	-.54	-.07	-.34 - .19	.35	.05	-.22 - .31	-.15	-.02	-.28 - .24
PBIMoCR	-.69	-.09	-.36 - .17	.39	.05	-.21 - .32	-.22	-.03	-.29 - .23
PBIFaCA	.09	.01	-.26 - .28	-1.86	-.25	-.52 - .02	-1.84	-.25	-.52 - .02
PBIMoCA	-.20	-.03	-.30 - .24	-1.54	-.21	-.48 - .06	-1.83	-.25	-.52 - .02
SDQE	1.34	.18	-.08 - .44	1.36	.18	-.08 - .44	2.82	.38	.11 - .64
SDQC	-1.98	-.27	-.53 - -.01	-3.62	-.48	-.74 - -.22	-5.40	-.72	-.99 - -.45
SDQH	-1.78	-.24	-.50 - .03	-6.11	-.81	-1.08 - -.54	-7.62	-1.01	-1.29 - -.74
SDQPe	-2.78	-.37	-.65 - -.11	-3.73	-.49	-.76 - -.23	-6.49	-.86	-1.14 - -.59
SDQPro	-5.81	-.78	-1.05 - -.51	-6.55	-.87	-1.14 - -.59	-11.89	-1.58	-1.88 - -1.28
SIAQ1	-.79	-.12	-.37 - .16	-3.39	-.45	-.72 - -.19	-4.10	-.55	-.81 - -.28
SIAQ2	-1.44	-.19	-.46 - .07	-4.47	-.59	-.86 - -.33	-5.91	-.78	-1.05 - -.51
SIAQ3	-2.23	-.29	-.56 - -.04	-4.38	-.58	-.85 - -.32	-6.71	-.89	-1.17 - -.62
SIAQ4	-1.41	-.19	-.45 - .07	-4.84	-.64	-.91 - -.38	-6.30	-.84	-1.11 - -.57
SIAQ5	.57	.08	-.19 - .34	-4.67	-.62	-.89 - -.35	-3.87	-.52	-.78 - -.25

Note. EDIBD= EDI Body Dissatisfaction, EDIDT= EDI Drive for Thinness, EDIED= EDI Emotion Dysregulation, EDIIA= EDI Interpersonal Alienation, EDIID= EDI Interoceptive Deficits, EDILSE= EDI Low Self-Esteem, EDIP= EDI Perfectionism, PBIFaCA= PBI Father Care, PBIFaCR= PBI Father Control, PBIMoCA= PBI Mother Care, PBIMoCR= PBI Mother Control, SDQE= SDQ Emotional symptoms, SDQC= SDQ Conduct problems, SDQH= SDQ Hyperactivity, SDQPE= SDQ Peer relationships, SDQPro= SDQ Prosocial behaviour, SIAQ= Sociocultural Internalisation of Appearance Questionnaire for Adolescents.

Results provide qualified support for H1. As anticipated, the data indicated that as the class increases, the means for each subscale of the EDI-3 increased. However, with the exception of the interpersonal alienation subscale, all class 2, and class 3 EDI-3 means were statistically significantly different. Similarly, with the exception of the drive for thinness, emotional dysregulation and interoceptive deficits subscales, class 2 EDI-3 means were statistically significantly different to class 1 EDI-3 means. Again, class 2 EDI-3 means were consistently higher than class 1 EDI-3 means. Finally, without exception, class 3 EDI-3 means were statistically significantly different to class 1 EDI-3 means and class 3 EDI-3 means were consistently higher than class 1 EDI-3 means.

While the direction of results were the same, similar patterns of statistically significant difference were rare in the remainder of the results. Contrary to H2, no statistically significant differences were evident on the PBI-BC results between class 3 and class 2, class 2 and class 1 or class 3 and class 1. Similarly, and contrary to H3, no statistically significant differences were evident on the SDQ results between class 3 and class 2, class 2 and class 1 or class 3 and class 1. Finally, and contrary to H3, no statistically significant differences were evident on the SIAQ-A results between class 3 and class 2, or between class 2 and class 1. However statistically significant differences were evident between class 3 and class 1 on SIAQ-A item 1 (I would like my body to look like the bodies of people on social media); item 4 (looking at social media makes me want to change my appearance) and item 5 (I would like my appearance to be like the appearance of people on social media).

Discussion

This study examined the relation between distinct profiles of DE attitudes and behaviors in a normative sample of male adolescents, and pertinent

psychosocial characteristics of family relational quality; child social, emotional, and behavioral functioning; and child social media use. The study determined the most appropriate number of latent classes that could be derived from the sample on the basis of scores on subscales of the EDI-3 (Garner, 2004). Based on multiple criteria, the results of the analysis revealed that a three-class solution provided the best fit to the data. The three classes were named class 1 (low EDI-3 scores), class 2 (medium EDI-3 scores), and class 3 (high EDI-3 scores). The subscale score means on the EDI-3 (Garner, 2004) increased as the class solution increased, indicating a clear gradient in the severity of ED symptoms across the classes. This suggests that the identified classes represent meaningful subgroups of male adolescents with distinct levels of ED symptomatology.

The pattern of association between the remaining psychometric assessment measures and the three EDI-3 classes is somewhat more complex. Contrary to expectations, parenting quality was found not to differ significantly across the three EDI-3 classes. This finding is important in light of previous research indicating that relational experiences with parents and carers has potential to influence DE attitudes and behavior in male adolescents (Pace et al., 2018). Parental DE and parenting style have been demonstrated to influence child development generally and DE in particular (Brown et al., 2016; Pace et al., 2018). However, further research on parenting has returned discrepant findings about the relation between the sex of a parent and male adolescent eating outcomes. For instance, an association between maternal and not paternal parenting and male adolescent eating control behaviors has been documented (Zubatsky et al., 2015). However, paternal parenting characteristics and not maternal parenting characteristics have been associated with eating attitudes and

behavior in male adolescents (Pace et al., 2018). The results of the present study suggest that parenting may in fact not be associated with DE attitudes and behavior in male adolescents. Clearly, this area requires further research.

Also contrary to expectations, child social, emotional, and behavioral functioning was not found to differ significantly across the three EDI-3 classes. The primary processes of interest in social, emotional, and behavioral functioning are the internalized experience of anxiety and affective characteristics and the externalizing or observable phenotypic characteristics associated with them (Verschueren et al., 2020). Evidence confirms that the establishment of both anxiety and affective processes occurs early in relational contexts (Feldman, 2012; Hudson et al., 2019). Affective characteristics have previously been associated with DE in male adolescents (Dakanalis et al., 2015) and depressive symptoms have been associated with binge eating (Sehm & Warschburger, 2018). Similarly, anxiety has previously been associated with increases in DE (Schaumberg et al., 2019) and anxiety about one's appearance can lead to self-objectification (Dakanalis et al., 2015). The finding in the present study that, at the subscale level, SDQ scores increased non-significantly across EDI-3 classes, suggests not only that externalizing characteristics were not associated with EDI-3 class, but perhaps more importantly, that anxiety and affect were not associated with EDI-3 class.

With the exception of three items in the comparison between class 3 and class 1 on the SIAQ-A, no statistically significant differences were evident across the three EDI-3 classes. This finding is important in light of the growing body of evidence suggesting that social media has potential to influence the development of DE in male adolescents (Jackson & Chen, 2014; Rodgers et al., 2020b). The internalization of appearance ideals has been demonstrated to positively and

significantly predict DE across studies (Byrne et al., 2023). Results from the present study demonstrate a linear increase in SIAQ-A scores across EDI-3 classes, however, the lack of significant difference across classes is noteworthy. It suggests that internalization of appearance ideals may not bear a relation to DE attitudes and behavior in male adolescents. Further research is required to clarify the role of social media in the internalization of appearance ideals and the subsequent influence on disordered attitudes and behavior in male adolescents.

The current study expands on existing research by emphasising the importance of identifying subgroups of male adolescents on the basis of ED data (Murray et al., 2017b). Findings suggest that meaningful subgroups of male adolescents with different levels of vulnerability to ED development can be identified in a normative sample. Perhaps most importantly, this study segments a class with intermediate levels of DE symptomatology for whom targeted interventions may be of benefit in reducing attitudes and behaviors characteristic of DE and therefore interrupting trajectories toward Es (Verschueren et al., 2020).

Limitations and implications for future research

A number of limitations are noteworthy with respect to the present study. Findings are based on responses to the EDI-3 (Garner, 2004) and concern has been reported about the validity of the EDI-3 with male participants (Byrne et al., 2023). However, despite often scoring lower on psychometric assessment measures aligned with female DE criteria, male adolescents continue to endorse items on measures such as the EDI-3 (Carey et al., 2019; Smith et al., 2017). Indeed, some males show comparable levels of endorsement to females (Smith et al., 2017). On this basis, the EDI-3 was maintained for use in the current sample.

This notwithstanding, data were derived from self-report which may limit reliability due to recall bias. Nevertheless, participants likely demonstrated a

heightened interest in matters concerning body image and DE behaviors, consequently opting to engage in the study. This is in contrast to male adolescents who abstained from participation, potentially suggesting a greater readiness to explore these concerns. Further, the sample was normative, cross-sectional, and predominately comprised of well-educated Australian males from middle class families. Thus, findings may be limited in their potential to describe anything other than the association between variables. Data do not describe developmental relationships and may not be generalizable to populations with greater ethnic, socioeconomic, or symptomatic diversity. Replication of this study using prospective longitudinal methods and demographically and clinically diverse populations of male adolescents is warranted.

Finally, the present study focuses on middle adolescence because it is a crucial developmental period for the emergence of body image concerns and DE in males (Panton & Garzon Maaks 2021). However, in order to develop age-appropriate preventive interventions for adolescents of differing ages, future research must identify specific markers of risk for the development of DE attitudes and behaviors at developmentally appropriate periods.

Despite these limitations, the findings of the present study have important implications for the identification and prevention of EDs in male adolescents. The study contributes to the literature by providing novel insights into subgroups of male adolescents based on their DE attitudes and behaviors (Keel et al., 2012; Verschueren et al., 2020). The present findings shed light on the potential heterogeneity within this population and may be important in the future development of targeted interventions for specific subgroups of male adolescents with varying levels of DE. Through the identification of distinct classes of ED symptomatology, clinicians and researchers can gain a more nuanced

understanding of the varying levels of eating concerns amongst male adolescents (Verschueren et al., 2020). This understanding may increase the likelihood of successful ED intervention, prevention and treatment outcomes for male adolescents.

Conclusions

This study provides valuable insight into the heterogeneity of ED symptomatology and highlights the importance of identifying subgroups of male adolescents with differing levels of symptomatology. Identifying distinct latent classes of DE can help classify male adolescents who are particularly vulnerable or resilient to developing EDs. In this way, more targeted and personalized DE prevention and intervention programs may be developed. These may be tailored to the specific needs of different subtypes of male adolescents.

CHAPTER 5: Linking Chapter

This chapter will summarize the findings of Study 2, a latent class segmentation study entitled "Latent Class Segmentation Study in a Normative Sample of Australian Male Adolescents" and draw findings from this as a platform upon which to develop the third study in the program of research.

Chapter 4 reported on the results of a latent class segmentation conducted within a normative sample of n = 338 Australian male adolescents. Few existing latent class analyses conducted within normative samples of male adolescents were identified in recent literature, supporting the notion that much remains unknown about trajectories toward or away from disordered eating (DE) in non-clinical populations of male adolescents and variables associated with such trajectories (Mitchison et al., 2013; Murray et al., 2017a).

Accordingly, the latent class analysis was conducted with the intention of identifying subgroups in a non-clinical sample of male adolescents. It was anticipated that it would be possible to identify an optimal number of latent classes on the basis of participant responses to the Eating Disorders Inventory-3 (EDI-3; Garner, 2004). In addition, (H1), it was hypothesized that a statistically significant and positive association would be evident between mean scores on the EDI-3 subscales and EDI-3 classes. Second (H2), it was hypothesized that a statistically significant and positive association would be evident between mean scores on the Parent Bonding Inventory – Brief Current form (PBI-BC; Klimidis et al., 1992) and EDI-3 classes such that mean PBI-BC subscale scores would increase as EDI-3 class increased and that these scores would be statistically significantly different across classes. Third (H3), it was hypothesized that a statistically significant and positive association would be evident between scores on the Strengths and Difficulties Questionnaire – Youth self-report version (SDQ;

Goodman, 2001) and EDI-3 classes such that mean SDQ subscale scores would increase as EDI-3 class increased and that these scores would be statistically significantly different across classes. Finally (H4), it was hypothesized that a statistically significant and positive association would be evident between scores on the Sociocultural Internalization of Appearance Questionnaire for Adolescents (SIAQ-A; Keery et al., 2004) and EDI-3 classes such that mean SIAQ-A subscale scores would increase as EDI-3 class increased and that these scores would be statistically significantly different across classes.

Consistent with the aims of the study, the results of the analysis revealed that a three-class solution provided the best fit to the data. The three classes were named class 1 (low EDI-3 scores), class 2 (medium EDI-3 scores), and class 3 (high EDI-3 scores). The subscale score means on the EDI-3 (Garner, 2004) increased as the class solution increased, indicating a clear gradient in the severity of eating disorder (ED) symptoms across the classes. The identification of three distinct latent classes suggests that meaningful subgroups of male adolescents with different levels of vulnerability to ED development can be identified in a normative sample. Importantly, this research identifies a class with moderate levels of DE symptoms, suggesting that future research directed at the development of targeted interventions could be valuable in reducing attitudes and behaviors associated with DE (Murray et al., 2017b). This, in turn, could disrupt the progression towards EDs (Verschueren et al., 2020).

However, contrary to expectations there were no significant differences in parenting quality across the three classes, contradicting previous research suggesting that parental relationships could impact DE attitudes and behaviors in male adolescents (Brown et al., 2016; Pace et al., 2018). Thus, the study indicated that the association between parenting and DE may be limited in this population.

Similarly, and also contrary to expectations, child social, emotional, and behavioral functioning did not significantly differ across the EDI-3 classes, contrary to expectations. Thus, findings indicated no association between child social, emotional, and behavioral functioning and the EDI-3 classes suggesting that anxiety, affect, and externalizing characteristics may not play a significant role in DE attitudes and behaviors within this context. Finally, there were only minor differences between two EDI-3 classes in terms of social media internalization as measured by the SIAQ-A. However, overall, there were no significant differences across the three classes. This finding is noteworthy considering the growing body of evidence suggesting that social media can influence the development of DE in male adolescents (Jackson & Chen, 2014; Rodgers et al., 2020b). The lack of significant differences in internalization of appearance ideals across the EDI-3 classes suggests that this factor may not be strongly associated with DE attitudes and behaviors in male adolescents. Thus, further research is needed, particularly through longitudinal designs, to clarify the role of parent-child relationships, child social, emotional, and behavioral functioning, and social media in the internalization of appearance ideals. Additionally, it is important to investigate the influence these factors may exert on DE attitudes and behavior in male adolescents.

Considerable complexity characterizes these processes in the development of DE and Eds (Byrne et al., 2023; Gorrell & Murray, 2019). For instance, psychological factors have been found to predict cognitive, affective, and regulatory processes (Sehm & Warschburger, 2018; Verschueren et al., 2020). They also predicted perfectionism and self-esteem (Byrne et al., 2023; Ferreiro et al., 2011). By contrast, appearance concerns such as muscularity, weight and shape status influenced eating attitudes and behavior including dietary restraint

and muscularity orientated behavior (Byrne et al., 2023; Hoffmann & Warschburger, 2019). Sociocultural factors including the engagement of mass media and engagement of peers via screen use were instrumental in determining appearance standards and the eating attitudes and behavior that resulted (Dakanalis et al., 2015; Hoffmann & Warschburger, 2019). This included eating regulation, binge eating, and muscularity orientated eating behavior outcomes (Dakanalis et al., 2015; Sehm & Warschburger, 2018). Developmentally important relationships may be predictive of subsequent eating attitudes and behavior; however, this association appears to be relatively complex (Byrne et al., 2023; Larsen et al., 2015). For instance, affect regulation (Juarascio et al., 2016), internalizing characteristics (Verschueren et al., 2020) and appearance-related anxiety (Dakanalis et al., 2015; Juarascio et al., 2016) develop in the context of early, developmentally important, relationships (Van Durme et al., 2018) and predict DE (Larsen et al., 2015).

In an effort to further explore these concerns, the study presented in Chapter 6 of this dissertation was conducted. This utilized the same sample of male adolescents identified in Study 2. Once again, the dependent measure was the EDI-3 (Garner, 2004), a self-report psychometric assessment questionnaire that assesses the presence of ED characteristics. In the current study, seven of the original twelve EDI-3 subscales were utilized to assess eating related concerns of a normative rather than a clinical population of adolescents. These were the drive for thinness, body dissatisfaction, low self- esteem, personal alienation, interoceptive deficits, interpersonal alienation, emotional dysregulation and perfectionism subscales. The EDI-3 was normed in the US on a sample of $n = 355$ adolescent females in 2004. Several studies that have reviewed the original normative data (Smith et al., 2017), however the original norms remain associated

with the measure.

The association between parent-child relational quality and symptoms of DE in male adolescents was examined as it occurs within a context of child social, emotional, and behavioral functioning and social media. By doing so, it was hoped that this study would add to the existing body of work elucidating the pivotal role that parents play in encouraging healthy social, emotional, behavioral and cognitive growth in their sons as they enter adolescence (Chaplin et al., 2022). It was also hoped that the study would inform understanding of the links between the individual psychological characteristics of male adolescents and their engagement with social media as potential influences on the development of DE. As outlined previously, limitations in gaining previously approved entry into secondary schools during substantial periods of COVID-19 lockdown between 2020 and 2022, meant that the participant recruitment strategy did not include a comparative female cohort or any potential for the collection of longitudinal data. The study addresses this limitation, together with present findings and suggestions for future directions of research.

CHAPTER 6: Testing a Cross-Sectional Model of the Development of Disordered Eating in a Normative Sample of Male Adolescents

Testing a Cross-Sectional Model of the Development of Disordered Eating in a Normative Sample of Male Adolescents

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Abstract

The identification of factors associated with trajectories toward disordered eating in male adolescents is crucial in eating research. This study investigated the association between psychosocial factors and male adolescents disordered eating behaviors. A normative sample of n = 338 males aged 11 and 19 years completed psychometric assessment measures related to eating attitudes and behavior; social, emotional and behavioral functioning; and parent-child relational quality. Regression models were used to test initial relationships between variables and, with data subsequently divided into tertiles, structural models were developed and tested for invariance across groups. The association between social media and male adolescent disordered eating behaviors was also assessed. Results indicated the hypothesized structural model was invariant across tertiles and indicated an association between parent-child relational quality, social, emotional, and behavioral functioning, and eating attitudes/behavior, as well as between parent-child relational quality, internalization of body ideals, and eating attitudes/behavior. Social media related to body image was significantly associated with male adolescent appearance concerns, but non-significantly associated with personal or interpersonal functioning. Importantly, higher perceived parental care was associated with lower levels of disordered eating behavior. The implications of this study, particularly in laying the groundwork for future longitudinal research, are discussed.

Key words: male**;** adolescent; disordered eating; eating disorders; cross-sectional; male eating.

Introduction

Current estimates indicate that the prevalence of disordered eating (DE) is increasing faster in males than it is in females (Gorrell & Murray, 2019; Murray et al., 2017b). In addition, research into the features characterizing DE and eating disorders (ED) in male adolescents remains limited compared to females, likely due to historical differences in prevalence rates by sex and insufficient attention to developmental influences on DE in males (Byrne et al., 2023; Murray et al., 2018). For instance, father's influence resulting from interactions with their sons, and the potential impact of father-son relationships on the development of DE, has received relatively little research attention (Gander et al., 2015; Hazzard et al., 2020). Areas of additional developmental importance in adolescence extend to mood and emotional concerns (Egbert et al., 2022b) and the internalization of appearance ideals, particularly in the context of social media use (Lavender et al., 2017).

Much remains unknown about the role that parents play in influencing the relation between male adolescent risk and the development of eating related difficulties (Murray et al., 2017b). Parent characteristics, including parenting styles and the quality of parent-adolescent interactions, have been shown to affect adolescent eating behaviors (Pace et al., 2018; Zubatsky et al., 2015), with some evidence suggesting variations by parent gender (Hochgraf et al., 2017). For example, Romm and Alvis (2022) proposed that adolescents interpret maternal and paternal psychological control differently, with maternal control involving three factors-personal attack, invalidation of feelings, and love withdrawal- while paternal control is seen as unidimensional. Namely, maternal invalidation of adolescents' feelings was positively associated with under-eating, whilst maternal personal attacks on adolescents was positively associated with over-eating (Romm

& Alvis, 2022). In contrast, only paternal psychological control was linked to both under- and over-eating behaviors in adolescents, building on early research, which revealed that decreased maternal acceptance and increased paternal conflict predict weight concerns for adolescents one year later (Lam & McHale, 2012; Romm & Alvis, 2022). Further research by Hochgraf et al. (2017) suggested that differing sources of parental hostility are linked to distinct patterns of eating difficulty, with paternal hostility being positively associated with ED symptoms, regardless of maternal hostility.

Parenting style has also been studied as potentially implicated in child eating outcomes. Authoritative parenting, characterized by high control and warmth, appears protective against DE, whereas authoritarian and neglectful styles may heighten susceptibility to EDs by enforcing rigid control or exhibiting disengagement (Gouveia et al., 2019; Ramsewak et al., 2022). This is consistent with findings that the development of DE in adolescents may be particularly influenced by the absence of positive parental elements, such as communication and trust, rather than the presence of negative traits (Laporta-Herrero et al., 2021). In contrast, authoritarian and neglectful parenting styles can increase adolescents' susceptibility to EDs through excessive control or disengagement (Gouveia et al., 2019; Ramsewak et al., 2022). Such research suggests that the quality of parenting relationships and their impact on child eating, may therefore vary by parent gender as well as parenting characteristics (Hochgraf et al., 2017). Yet, additional research is necessary to clarify how father-son relationships specifically shape DE risk in male adolescents, an area that has received limited investigation thus far (Gander et al., 2015; Litchford et al., 2020).

Psychological adjustment has also been found to be closely related to DE (Bacopoulou et al., 2018). Numerous psychological characteristics have been

identified as risk factors for the emergence and persistence of DE attitudes and behaviors in adolescents, including affective symptoms and body image characteristics (Byrne et al., 2023; Goldschmidt et al., 2015). Various processes have been proposed to elucidate the intricate relationship between emotional traits and DE, particularly focusing on constraints in emotion regulation, emotional volatility, and resulting constraints in behavioral management (Egbert et al., 2022b; Lavender et al., 2014). Although there is evidence indicating that emotional eating may act as a coping mechanism in hostile family environments, instability stemming from fluctuating positive and negative emotions may also contribute to the emergence of DE behaviors during adolescence (Egbert et al., 2022b; Gilbert, 2012).

Behaviorally driven strategies to regulate emotions, such as self-induced vomiting, weight reduction exercise, and fasting, offer temporary relief but are associated with significant affective problems (Trompeter et al., 2021; Weinbach et al., 2018). Research by Sparti et al. (2019) revealed that adolescents with subclinical depression were found to be three times more likely to report suicidal thoughts, with even higher odds among those with a suspected or lifetime ED diagnosis. Thus as DE severity increases, so do the percentages of adolescents with “borderline” and “abnormal” SDQ scores, reflecting the link between DE, increased psychological distress, and lower quality of life (Bentley et al., 2015; Sparti et al., 2019). The developmental link between adolescent emotional and behavioral functioning and DE requires further research, particularly to clarify associations with related characteristics.

Body appearance imagery, historically linked to female EDs, is now recognized as relevant to the development of DE in males (Lavender et al., 2017). Sociocultural theory suggests that body dissatisfaction arises from unrealistic

Western societal standards that most adolescents cannot meet (Thompson et al., 1999; Tylka, 2011). In addition, DE symptoms have been linked to the internalization of body ideals (Rodgers et al., 2020a). For example, early research has demonstrated a minor but significant association between social media use, body image problems, and DE in male adolescents (de Vries et al., 2016; Holland & Tiggemann, 2016). Appearance standards conveyed in Western social media, that traditionally concentrate on female thinness, now focus increasingly on muscularity and leanness; two essential components of appearance ideals for both males and females (Rodgers et al., 2018; Rodgers et al., 2020b). Preliminary evidence suggests that male adolescents internalize these appearance standards through social media use (Rodgers et al., 2020a), leading to DE behaviors such as exercising and dieting to achieve muscle gain (Lavender et al., 2017).

In light of the aforementioned factors, the current study sought to assess the association between parent-child relational quality and symptoms of DE in a normative sample of male adolescents as they occur via child social, emotional, and behavioral development, and social media. By doing so, the current study intends to add to the existing body of evidence elucidating the pivotal role that parents play in encouraging healthy social, emotional, behavioral and cognitive growth in their sons. In addition, the study sought to assist in understanding links between individual psychological characteristics in male adolescents and their engagement with social media as potentially associated with the development of DE (Rodgers et al., 2020a).

Aims and Objectives

The primary aims of this study were to:

1) assess the relation between parent-child relational quality and symptoms of DE as they occur in association with child social, emotional, and

behavioral functioning, and

2) assess the relation between parent-child relational quality and symptoms of DE as they occur in association with social media.

Consistent with this, four hypotheses were developed. First (H1), it was hypothesized that statistically significant relationships would be evident between parent-child relationship quality; child social emotional and behavioral functioning; child social media; and child age, and the dependent variable measuring DE symptoms. Second (H2), it was hypothesized that child social emotional and behavioral functioning would be significantly associated with symptoms of DE. Third (H3), it was hypothesized that the variables identified as associated with DE could be used to develop a structural model based on whole sample data and that this model would demonstrate invariance across the three tertiles previously described. Finally (H4), it was hypothesized that the association between social media and DE symptoms would vary across EDI-3 subscales. The research was approved by the UTS Human Research Ethics Committee (approval number: ETH18-2552, Amendment number: ETH21-6521). The research report has been prepared according to the STROBE statement guidelines for cohort study findings (Von Elm et al., 2014).

Materials and Methods

Participants

Participants were male adolescents recruited from an independent boy's high school in NSW, Australia. Agreement to participate was gained from a final sample of n = 338 adolescents (M_{age} = 14.38, SD = 1.67). Participants were included in the research if they identified as male, were aged 11-19 years, had not previously been diagnosed with an ED or a neurodevelopmental disorder and had not previously been the subject of a child protection concern or placed in out of

home care or detention. Participants who did not meet inclusion criteria or who met criteria but failed to complete psychometric assessment in its entirety (n = 222) were excluded from the study as shown in Figure 1.

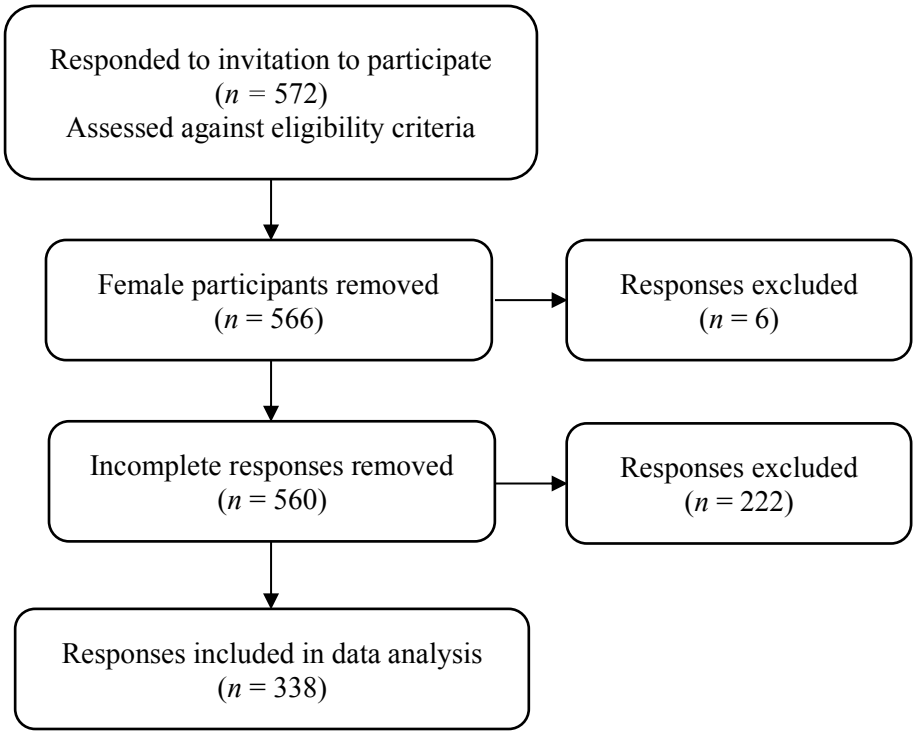

Figure 1

Participant selection flowchart

Procedure

Participants were recruited into the research study following a three-stage process that initially required communication with, and agreement from, the principal and wellbeing coordinator of an independent boy's high school in NSW, Australia. Subsequently, parental informed consent was sought from all parents of male adolescents in the school who were aged between 11 and 19 years. Where parents consented to their son's participation; individual male adolescents were approached en masse by school staff within the school. With both school agreement, and parent agreement, the researchers provided study information forms to adolescents and sought their assent to opt into the study. Those who opted in were then invited to participate online at a time decided upon by the

school. Data collection was completed in January 2022. Participant's efforts in participating in the research were acknowledged by them being placed in a draw for one of five $200 digital MasterCard vouchers.

Measures

All items identified below were included in the assessment battery completed by high school students.

Demographic Information Measure

Participants were first asked to provide demographic information including their age, ethnicity, preferred gender, and parental structure. Following this, they were asked to complete a range of psychometric assessment measures to assess the association between these measures and identified classes.

Eating Disorder Inventory-3 (EDI-3; Garner, 2004)

The EDI-3 is a 91-item self-report questionnaire that assesses the presence of psychological and behavioral characteristics related to Eds. It consists of twelve scales, however in the current study seven of these twelve subscales were utilized, namely low self-esteem, emotion dysregulation, interpersonal alienation, interoceptive deficits, perfectionism, drive for thinness, and body dissatisfaction in order to address concerns of a generalized rather than clinical population of adolescents. Items are rated on a 6-point Likert scale (always, usually, often, sometimes, rarely, or never), however total scores are calculated using a 0–4 scale, with higher scores representing more severe symptoms. Internal consistency was excellent in the current sample ($\alpha = .92$).

The Strengths and Difficulties Questionnaire — Youth self-report version (SDQ; Goodman, 2001)

The SDQ is 25 item self-report screening instrument for psychological problems among adolescents as experienced in the previous six months. It

consists of four subscales of hyperactivity–inattention, emotional symptoms, conduct problems, peer problems and one prosocial scale, with each scale containing five items. Items are rated on a 3-point Likert scale (not true, somewhat true, sometimes true or certainly true), and then summed to generate a Total Difficulties score. Higher scores indicate greater psychological difficulties. Internal consistency was good in the current sample (α = .77).

The Parental Bonding Instrument- Brief Current form (PBI-BC; Klimidis et al., 1992)

The PBI-BC is a 16-item self-report questionnaire used to assess the perceived quality of relationship with both the mother and father in the first 16 years of an individual's life. It consists of 8 items related to the adolescents' mother and father respectively, with items divided into two subscales: parental care (4 items) and parental overprotection (4 items). Items are rated on a 3-point Likert scale (never, sometimes, usually). A combined score can be calculated to reflect parental care and parental overprotection with higher scores indicating greater perceived care or overprotection from both parents. Internal consistency was very good in the current sample (α = .88).

Sociocultural Internalization of Appearance Questionnaire for Adolescents (SIAQ-A; Keery et al., 2004)

The SIAQ-A is a brief 5-item measure that assesses the extent to which adolescents adopt the media-presented appearance ideals for themselves. Items are rated on a 5-point Likert scale (definitely disagree, mostly disagree, neither agree nor disagree, mostly agree or definitely agree), and then summed. Possible scores range from 5 to 25, with higher scores indicating greater internalization of appearance ideals. Internal consistency was excellent in the current sample (α = .95).

Statistical Analyses

All analyses were performed using SPSS Version 28 (IBM Corp, 2020) and SPSS AMOS Graphics version 28 (Arbuckle, 2019). Prior to conducting analyses, cases with incomplete data on study variables were excluded list-wise from the dataset and data was cleaned (Little & Rubin, 2019) and applicable assumptions were evaluated (Shrestha, 2020; Tabachnick et al., 2013). Specifically, Q-Q Plots indicated that assumptions of normality were met and data were within acceptable values for skewness (±2) and kurtosis (±7) (Byrne, 2016; Hair et al., 2018). Tests of equality of covariance matrices and equality of error variances were outside statistical significance and forty-one potential outliers were identified (Field & Miles, 2010; Tabachnick et al., 2013). These were retained for analysis on the basis that they made a potentially valid contribution to the analysis. Univariate and multivariate analyses were used to test initial relationships between variables within regression models and subsequent analyses that concerned the development of structural models were undertaken in SPSS AMOS Graphics version 28 (Arbuckle, 2019). Goodness of Fit statistics for the models were estimated using Root Mean Square Error of Approximation (RMSEA), model comparison metrics included the Comparative Fit Index (CFI) and Tucker–Lewis Index, (TLI), and information theory metrics included Akaike's Information Criterion, AIC). RMSEA values less than 0.05 were regarded as desirable and values between 0.05 and 0.08 acceptable. CFI and TLI values larger than .95 were taken to indicate relatively good fit (Hu & Bentler, 1999). The AIC represents an indication of model flexibility and complexity. As this varies across models and populations, it is difficult to provide cut point for the AIC (Chang et al., 2017; Chen et al., 2008; Fabrigar et al., 1999).

Results

Pearson's correlations undertaken on whole sample data and are reported in Table 1.

Table 1

Pearson's correlations undertaken on whole sample data between total scores of the EDI-3, mother and father total PBI-BC scores, total SDQ scores and total SIAQ-A scores

	EDItotal	PBItotalMo	PBItotalFa	SDQtotal	SIAQtotal
EDItotal	1				
PBItotalMo	-.01	1			
PBItotalFa	.11	.72**	1		
SDQtotal	.53**	.13*	.19**	1	
SIAQtotal	.34**	.27**	.36**	.29**	1

Note. EDI=Eating Disorder Inventory, PBIMo= Parental Bonding Instrument Mother Total score, PBIFa= Parental Bonding Instrument Father Total score, SDQ= Strengths and Difficulties Questionnaire, = Sociocultural Internalization of Appearance Questionnaire for Adolescents.
* $p < .05$, *** $p < .001$

In addition to whole sample data, the data was transformed into tertiles based on total EDI-3 scores. The tertiles, previously developed in Stata version 16.1 (StataCorp, 2019), are used in subsequent analyses however demographic characteristics of the whole sample, together with characteristics of each of the three tertiles, are presented in Table 2.

Table 2

Demographic information and psychometric data for the whole sample and each tertile samples

Variable	Categories	WS n (%/*SD*) *n* = 338	UT n (%/*SD*) *n* = 115	MT n (%/*SD*) *n* = 112	LT n (%/*SD*) *n* = 111	Sig
Age		14.34 (1.69)	14.47 (1.71)	14.34 (1.69)	14.32 (16.12)	*ns*
Ethnicity	Australian	219 (64.8%)	69 (59.1%)	64 (57.1%)	87 (78.4%)	

	Indigenous Australian	3 (0.9%)	1 (0.9%)	0 (0%)	2 (1.8%)	
	African	2 (0.6%)	0 (0%)	0 (0%)	0 (0%)	
	China/SE Asian	7 (2.19%)	3 (2.6%)	0 (0%)	1 (0.9%)	
	South Asian	4 (1.2%)	4 (3.5%)	0 (0%)	0 (0%)	
	European	48 (14.2%)	21 (18.3%)	20 (17.90%)	7 (6.3%)	
	Middle Eastern	9 (2.7%)	2 (1.7%)	5 (4.5%)	2 (1.8%)	
	New Zealand	2 (0.6%)	2 (1.7%)	0 (0%)	0 (0%)	
	South American	2 (0.6%)	1 (0.9%)	1 (0.9%)	0 (0%)	
	UK/USA	26 (7.7%)	9 (7.9%)	11 (9.8%)	6 (5.4%)	
	Other	2 (0.6%)	0 (0%)	0 (0%)	2 (1.8%)	
Parental Structure	Two parents	318 (94.1%)	109 (94.07%)	105 (93.80%)	104 (93.7%)	
	Single parent	20 (5.9)	6 (5.2%)	7 (6.5%)	7 (6.3%)	
Siblings	No	22 (7%)	12 (10.4%)	7 (6.3%)	3 (2.7%)	
	Yes	316 (93.5%)	103 (86.6%)	95 (103.8%)	108 (97.3%)	
Disordered Eating	*M (SD)*	135.67 (34.86)	173.45 (24.75)	132.41 (8.83)	99.19 (12.76)	a b c e f
SDQ	*M (SD)*	19.06 (6.31)	22.12 (6.10	12.24 (5.19)	15.64 (5.10	a c d e
Mother Bonding	*M (SD)*	7.25 (3.22)	7.23 (3.45)	7.45 (3.06)	7.28 (2.81)	*ns*
Father Bonding	*M (SD)*	6.66 (3.84)	7.23 (4.06)	7.40 (4.28)	6.39 (3.51)	a
Social Media	*M (SD)*	11.38 (5.28)	13.36 (5.09)	10.53 (5.01)	9.67 (4.81)	a c d e

Note. WS=whole sample, UT= upper tertile sample, MT= middle tertile sample, LT= lower tertile sample, [a]= statistically significant differences between WS and UT samples $p<.05$, [b]= statistically significant differences between WS and MT samples $p<.05$, [c]= statistically significant differences between WS and LT samples $p<.05$, [d]= statistically significant differences between UT and MT samples $p<.05$, [e]= statistically significant differences between UT and LT samples $p<.05$, [f]= statistically significant differences between MT and LT samples $p<.05$, ns= non-significant.

H1: First, it was hypothesized that initial and statistically significant relationships would be evident between variables that assessed parent-child relational quality; child social emotional and behavioral functioning; child social media; and child age, and the dependent variable measuring DE symptoms. Simple linear regression was used to explore the relationship between the whole

sample variables. The results indicated that the regression model was significant overall, (R^2 = .33, $F(5, 303) = 29.12$, $p < .001$). Next, a hierarchical regression model was developed by entering age, total SDQ scores, total father PBI-BC scores, total mother PBI-BC scores, and total SIAQ-A scores in five separate blocks. The dependent variable was EDI-3 total scores. The results are presented in Table 3 and indicate that SDQ total scores, mother total PBI-BC and SIAQ-A scores were significantly associated with the dependent measure EDI-3. However, age and father total PBI-BC scores were not significantly associated with EDI-3 scores. As evident in Table 1, both mother and father total PBI-BC scores were retained for further analysis due to the strong correlation between mother and father total PBI-BC scores. Age, however, was discarded from the model.

Table 3

Summary of the hierarchical regression analysis of independent variables and their relation to male adolescent EDI-3 scores

Variable	*R*	R^2	ΔR^2	β	*t*
Age	.083	.007	.007	.083	1.45
SDQ total	.517	.268	.261	.511	10.44***
Father Bonding	.518	.268	.000	.017	3.47
Mother Bonding	.531	.282	.014	-.169	.016*
Social media	.570	.325	.043	.234	4.38***

Note. PBI= Parental Bonding Instrument, SDQ= Strengths and Difficulties Questionnaire, SIAQ-A= Sociocultural Internalization of Appearance Questionnaire for Adolescents.
* $p < .05$, *** $p < .001$

H2: It was hypothesized that child social emotional and behavioral functioning would be significantly associated with symptoms of DE. The multivariate association between subscales of the independent variable SDQ, and those of the dependent variable EDI-3 were explored to assess this hypothesis. Results of analyses undertaken on whole sample data indicated the multivariate association between two of the SDQ subscales and the EDI-3 were statistically

significant. These were SDQ conduct problems: Pillai's Trace, $F(7, 293) = 1.94$, $p<.001$; and SDQ emotional problems: Pillai's Trace, $F(7, 293) = 2.37$, $p<.001$. The univariate analyses indicated that the SDQ emotional problems scale was statistically significantly associated with all seven EDI-3 subscales that were utilized in the present study. The SDQ hyperactivity scale, conduct problems scale and peer problems scale were each statistically significantly associated with a single EDI-3 subscale, as shown in Table 4.

Table 4

Between subject's effects of multivariate analysis of variance

Independent (SDQ subscales)	**Dependent (EDI-3 subscales)**	**F**	***p***	***ηp 2***
SDQ Hyperactive	Low Self Esteem	F(10, 290) = 2.595	<.01	.082
SDQ Conduct	Emotion Dysregulation	F(9, 290) = 6.278	<.001	.163
SDQ Peer	Low Self Esteem	F(8, 290) = 2.843	<.01	.073
SDQ Emotion	Low Self Esteem	F(10, 290) = 7.135	<.001	.197
SDQ Emotion	Interpersonal Alienation	F(10, 290) = 3.197	<.001	.099
SDQ Emotion	Interoceptive Deficits	F(10, 290) = 10.09	<.001	.258
SDQ Emotion	Emotion Dysregulation	F(10, 290) = 3.012	<.01	.094
SDQ Emotion	Perfectionism	F(10, 290) = 3.622	<.001	.111
SDQ Emotion	Drive for Thinness	F(10, 290) = 3.239	<.001	.10
SDQ Emotion	Body Dissatisfaction	F(10, 290) = 3.477	<.001	.107

Note. SDQ= Strengths and Difficulties Questionnaire.

H3: In an effort to test the third hypothesis, that the variables identified as associated with the EDI-3 could be used to develop a structural model, the association between total PBI-BC scores and total EDI-3 scores was initially tested. The results of a linear regression indicated that a very small positive, statistically non-significant association existed between these two variables (R^2=.004, $F(1, 307) = 1.237$). This association was therefore not included in subsequent model development. An initial structural model was developed and assessed in SPSS AMOS Graphics version 28 (Arbuckle, 2019) that was consistent with preliminary analyses presented in Tables 3 and 4. The hypothesized model assessed the relation between the measured variables SDQ emotional problems scale, SDQ hyperactivity scale, SDQ conduct problems scale

and SDQ peer problems scale as well as mother and father PBI-BC total scores and SIAQ-A social skills, on total EDI-3 total scores. The model is presented in Figure 2, the variable *edi-3 total* is comprised of the subscales reported in Table 7.

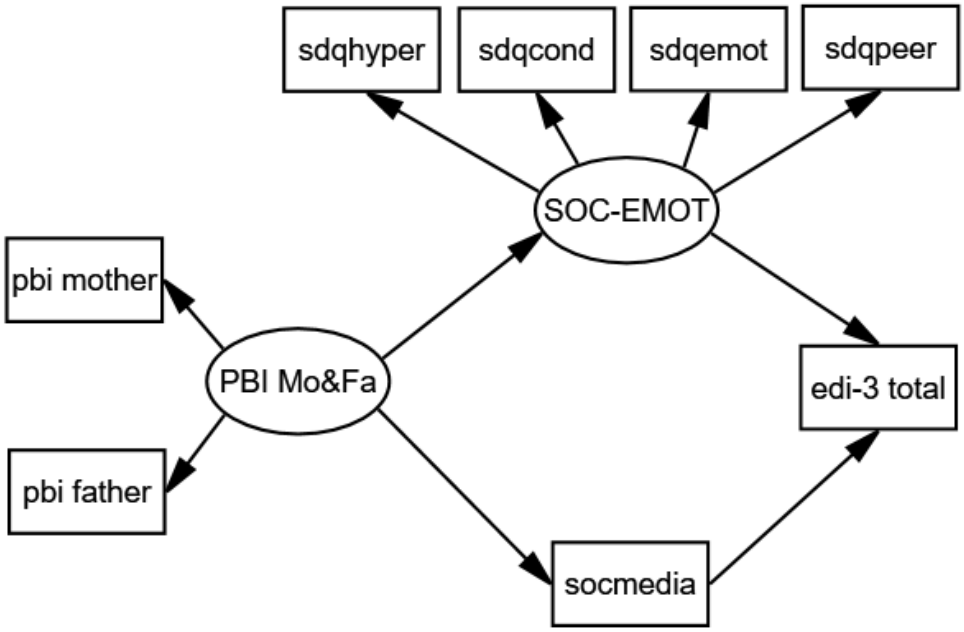

Figure 2

Hypothesized structural model accounting for the relation between male adolescent SDQ scores, PBI-BC scores, SIAQ-A scores and EDI-3 scores.

The model was tested using whole sample data and the three tertiles of participants previously identified within the sample. The indices selected to demonstrate the fit of the model to the data included relative Chi², an index of discrepancy derived from the relation between the Chi² value and degrees of freedom, and the Root Mean Square Error of Approximation (RMSEA). Model comparison indices used included the Comparative Fit Index (CFI) and the Tucker Lewis Index (TLI), and the Akaike Information Criterion (AIC) value, which is appropriate when using maximum likelihood estimation (Anderson et al., 1998; Tucker & Lewis, 1973). The hypothesized model was fit to the whole sample data and to each of the identified tertiles. Results are presented in Table 5 and indicate that the model fit the whole sample data well and, in addition, that it demonstrated

invariance across the tertiles. With a minor exception in the lower tertiles, Relative Chi² values all fell within the range of 0-2 (Ullman, 2001). Similarly, RMSEA and TLI values were indicative of close fit, and in one case reasonable fit of the data to the model (Bentler & Bonett, 1980; Browne & Cudeck, 1989; Hu & Bentler, 1999). The AIC value (Anderson et al., 1998) is also presented. In addition, standardised regression weights for each relationship assessed in the model are presented for whole sample data, the lower tertile, middle tertile and upper tertile are presented in Table 6,

Table 5

Fit statistics of the hypothesized model to whole sample data, and to each of the tertiles, with results demonstrating invariance across tertiles.

	Discrepancy Function		**Model Comparison**		**Information Theory**
	Relative Chi²	**(RMSEA)**	**(CFI)**	**(TLI)**	**(AIC)**
WS data	1.59	.042	.987	.972	81.56
Upper tertile	0.84	.035	.984	.967	73.31
Middle tertile	1.33	.055	.956	.906	76.64
Lower tertile	2.01	.055	.978	.951	88.27

Note. Akaike's Information Criterion (Akaike, 1979), CFI= Comparative Fit Index, RMSEA= Root Mean Square Error Of Approximation, TLI= Tucker–Lewis Index, WS= Whole Sample

Table 6

Standardised regression weights for whole sample data, the lower tertile, middle tertile and upper tertile

			WS	Lower	Mid	Upper
Social Media	←	Bonding Total	.96	.96	.40	.63
SDQ	←	Bonding Total	.32	.33	.16	.25
EDI	←	Social Media	.13	.12	.12	.04
Hyperactivity	←	SDQ	.41	.42	.35	.34
Eating	←	SDQ	.68	.70	.23	.50
Peer Problems	←	SDQ	.58	.56	.50	.55
Emotion Problems	←	SDQ	.82	.80	.61	.62
Conduct Problems	←	SDQ	.61	.61	.50	.59
Mother Bonding	←	Bonding Total	.27	.27	.63	.67
Father Bonding	←	Bonding Total	.37	.37	.51	.61

H4: Finally, the extent to which the relation between SIAQ-A and EDI-3 scores varied as a function of EDI-3 subscale was assessed. As invariance of the hypothesized model across tertiles was demonstrated, whole sample data was used to assess the relation between EDI-3 scores and social media. The results indicated that social media related to body image was statistically significantly and positively associated with EDI-3 subscales pertinent to appearance such as perfectionism, drive for thinness and body dissatisfaction. By contrast, subscales pertaining to personal or interpersonal functioning such as low self-esteem, interpersonal alienation, interoceptive deficits and emotion dysregulation, were negatively or non-significantly associated with social media.

Table 7

Whole sample fit statistics, standardized weights and level of significance of each EDI-3 subscale in relation to the association between SIAQ-A and EDI-3 subscales

	Discrepancy Function		**Model Comparison**		**Information Theory**	**Social Media => EDI-3 Standardized Weights**
	Relative Chi²	**RMSEA**	**CFI**	**TLI**	**AIC**	
Low Self Esteem	2.68	.072	.961	.913	99.63	-.003*
Interpersonal Alienation	2.19	.060	.968	.928	91.41	.054
Interoceptive Deficits	2.06	.056	.977	.948	89.01	.017
Emotion Dysregulation	1.95	.053	.979	.952	87.27	-.001
Perfectionism	2.07	.056	.971	.935	89.13	.188***
Drive for Thinness	2.26	.061	.966	.924	92.27	.185***
Body Dissatisfaction	2.43	.065	.962	.916	94.94	.112**
EDI total	2.04	.055	.978	.951	88.27	.118**

Note. Akaike's Information Criterion (Akaike, 1979), CFI= Comparative Fit Index, EDI= Eating Disorder Inventory, RMSEA= Root Mean Square Error Of Approximation, TLI= Tucker–Lewis Index.

Discussion

The primary aims of this study were to assess the relation between parent-

child relational quality and symptoms of DE, and to assess the association between parent-child relational quality and symptoms of DE as they occur in association with social media. Consistent with the first hypothesis, SDQ total scores, mother total PBI-BC scores, and SIAQ-A scores, were significantly associated with scores on the EDI-3. Importantly, age and father total PBI-BC scores were found not to be significantly associated with EDI-3 scores, however, given the strong correlation found between mother and father total PBI-BC scores, both mother and father total PBI-BC scores were retained in the model. These results are noteworthy for several reasons. Initially, it was demonstrated that maternal and not paternal relational quality was significantly associated with adolescents' overall perceptions of parent relational quality. These results build on existing research that has suggested differential effects on eating behavior as a function of the gender of parents (Hochgraf et al., 2017; Romm & Alvis, 2022).

However, the results also contrast with research suggesting that fathers' influence on the development of Eds in males may be growing compared to that of mothers, due to increased involvement of fathers in child feeding (Litchford et al., 2020; Rahill et al., 2020). In this way it appears that mothers may exert greater influence over aspects of the family environment that increase risk for adolescent weight control behaviors and DE (Romm & Alvis, 2022; Zubatsky et al., 2015). Importantly, in the tertile characterized by high scores on the EDI-3, the association between mother's and father's scores and overall parental relational quality were not statistically significantly different. Mothers demonstrated a statistically significantly greater association with adolescents than fathers did in the middle tertile, however in the low tertile, the association between mother's and adolescents was less than that demonstrated by fathers. In the tertile characterized by high scores on the EDI-3, there was greater difference between

adolescent reported mother and father scores, and greater similarity between scores in the tertile characterized by low scores on the EDI-3. This supports existing research that suggests that higher levels of parental agreement in home environments may function to protect against poor child outcomes (Andrews et al., 2021; Frosch et al., 2021).

In line with the second hypothesis, multivariate analysis undertaken on whole sample data showed that two SDQ subscales, namely, conduct problems and emotional problems, were significantly associated with the EDI-3. In addition, further analysis indicated that emotional problems were significantly associated with all seven EDI-3 subscales, while hyperactivity, conduct problems, and peer problems were each associated with a single EDI-3 subscale. These results reflect findings highlighting emotion regulation as a key risk factor for the development of DE as a means to manage negative emotions by adolescents (Egbert et al., 2022b; Griffiths et al., 2014). As such DE may develop for male adolescents as a way to regulate negative internal mood states or cope with negative feelings they have towards their bodies or physical appearance (Espinoza et al., 2019; Juarascio et al., 2016). On the other hand, hyperactivity, conduct problems, and peer problems may have a more specific relationship with certain aspects of ED symptomatology. Individuals with hyperactivity and peer problems may experience negative feedback in their social environments due to behavioral issues or issues with social interactions and turn to eating as a means of improving their appearance and therefore self-esteem (Paulus et al., 2021). As such, it is important for future research to consider how male adolescents' decreased ability to effectively regulate their emotions and relate to others in social settings, may contribute to the development of DE (Egbert et al., 2022b; Zachrisson & Skårderud, 2010). Previous research suggests that male adolescents who struggle

with emotional dysregulation may be more likely to engage in DE as a maladaptive coping strategy, rather than externalizing their emotions through inappropriate social conduct (Griffiths et al., 2014; Paulus et al., 2021).

The third hypothesis involved developing and testing a structural model to account for the cross-sectional association between variables. The association between total PBI-BC scores and total EDI-3 scores was statistically non-significant. However, the hypothesized model of the association between SDQ emotional problems subscale, hyperactivity subscale, conduct problems subscale and peer problems subscale, mother and father PBI-BC total scores, and SIAQ-A internalization of body appearance imagery on total EDI-3 total scores, fit whole sample data well. In addition, the model demonstrated invariance across tertiles. The results suggest two primary paths of association between perceived quality of parenting as assessed by the PBI-BC (Klimidis et al., 1992) and symptoms of DE as assessed by the EDI-3 (Garner, 2004). The first of these is indicated by the association between parenting and adolescent social emotional and behavioral functioning as assessed by the problem related subscales of the SDQ (Goodman, 2001). This association is, in turn, indicated by the significant association between adolescent social emotional and behavioral functioning and symptoms of DE. The second path is indicated by the association between parenting and adolescent social media use as assessed by the SIAQ-A (Keery et al., 2004). This association is indicated, in turn, by the relation between SIAQ-A scores and symptoms of DE.

Across models, all regression coefficients in the first path were highly significant. It is noteworthy that, in this first path, the strongest association between parenting influence and child functioning was in the low tertile, the weakest was in the middle tertile. Similarly, the strongest association between child functioning and DE was in the low tertile, the weakest in the middle tertile.

These findings support previous research that suggests that parenting is strongly determinant of child social, emotional and behavioral functioning (Hochgraf et al., 2017) and, therefore, strongly associated with adolescent eating behavior (Pace et al., 2018; Zubatsky et al., 2015). It may be suggested that the model demonstrates a potential way to foster protection against DE in familial settings through the presence of high levels of parental care vs rejection and high levels of child autonomy vs parental control, and the concomitant association between this and child social, emotional and behavioral functioning.

With respect to the second path, the association between parenting, adolescent social media use and DE, similar patterns of response were observed as in the first path. The strongest association between parenting and the use of online body appearance imagery was in the low tertile, and the weakest was in the middle tertile. By contrast, the strongest association between the use of online body appearance imagery and DE was in the low and middle tertiles and the weakest in the high tertile. These findings are of note because they suggest that while adolescents who report low DE are engaging online body appearance imagery to a high degree, their developmental or familial context is protective of them developing a significant association between this and DE. Perhaps more importantly, adolescents with high levels of reported DE are engaging online body appearance imagery even less. This may be taken to suggest that the difficulties with eating that participants in the high tertile are reporting, are driven by online body appearance imagery to a relatively low extent.

Finally, the relation between online body appearance imagery and each subscale of the EDI-3 that was employed was assessed using whole sample data. It was found that the engagement of such imagery was statistically significantly and positively associated with EDI-3 subscales pertinent to appearance namely,

drive for thinness, body dissatisfaction, and perfectionism, however, it was negatively or non-significantly associated with subscales pertaining to personal or interpersonal functioning namely, low self-esteem, interpersonal alienation, interoceptive deficits and emotion dysregulation. The findings suggest that body appearance imagery, while differentially associated with parenting, is also clearly associated with characteristics of DE reported by male adolescents. Recent research has highlighted the positive association between social media use and body dissatisfaction in males (Holland & Tiggemann, 2016; Rodgers et al., 2020b). However, the current study highlights that social media use was only associated with specific domains of ED psychopathology relevant to appearance, such as body dissatisfaction and drive for thinness, but not with other domains such as interpersonal functioning or emotion dysregulation (Trompeter et al., 2021; Weinbach et al., 2018).

Limitations and implications for future research

When interpreting these findings, certain limitations of the present study must be considered. Firstly, findings are based on responses to the EDI-3 (Garner, 2004) and concern has been reported about the validity of the EDI-3 with male participants (Byrne et al., 2023). However, although male adolescents frequently score lower on psychometric assessment measures orientated toward female DE criteria, they still endorse items on measures like the EDI-3, with some minority male populations demonstrating comparable levels of endorsement to females (Smith et al., 2017). Thus, the EDI-3, was utilized within the current sample.

Due to the cross-sectional nature of the data, it was not possible to examine the directionality of the relationships between psychological difficulties, family and peer relationships, internalization of appearance standards through social media, and DE behaviors within this study. This notwithstanding, data were

derived from self-report which may limit reliability and generalizability of the study findings. It may, for instance, be that those who participated in the research exhibited an increased awareness of or interest in body image, DE, and mental health generally. Unfortunately, exploring characteristics of difference between male adolescents who participated and those who chose not to, are beyond the scope of the research.

Further, the sample was normative and predominately comprised of well-educated Australian males from middle class families. Thus, findings may be limited in their potential to describe anything other than the association between variables in the sampled population. As a result, it is evident that we may not be able to describe developmental relationships and that the association between the variables of interest may not be generalizable to populations with greater ethnic, socioeconomic, or symptomatic diversity. As was our original (pre-COVID-19) intention, the development of this research protocol using longitudinal methodologies in demographically diverse populations of adolescents is warranted.

Finally, the study focuses on middle adolescence because it is a crucial developmental period for the emergence of body image concerns and DE in males (Panton & Garzon Maaks 2021). However, it will be essential for future research to examine whether relationships between social media use, psychological issues, family and peer interactions, and DE, vary across developmental trajectories. This may inform the development of age-appropriate preventive interventions to target younger children as well as early or late male adolescents.

Future research may also investigate further the potential for peer relationships to mediate the relation between hostile parental environments and the development of male adolescent DE. Current evidence indicates that although

parental intrusiveness and control elevate the risk of Eds, adolescents may mitigate this risk by seeking support from peers in navigating parental challenges, potentially reducing the likelihood of developing Eds (Pace et al., 2018). The role of peer support in mediating the impact of negative parenting styles and influences on developing Eds appears promising, particularly for males with negative parent relationships (Pace et al., 2018). Thus, further research on the mediational potential of parenting styles on the development of DE for male adolescents, may be appropriate. In addition, these findings may help to inform prevention programs aimed at reducing the vulnerability toward DE late childhood/early adolescence. Such programs may target parent-child relational quality in an effort to address the often-functional nature of dysregulated emotion or limitations in behavioral control demonstrated by toddlers and consider adolescents' emotional reactivity (Calkins, 2007; McAloon & Lazarou, 2019).

Conclusions

This study aimed to investigate the association between psychosocial factors and DE behaviors among male adolescents. Associations were demonstrated between parent-child relational quality; child social, emotional and behavioral functioning; and eating attitudes and behavior, as well as between parent-child relational quality; internalization of body ideals; and eating attitudes and behavior. Importantly, higher perceived parental care was associated with lower levels of DE behaviors. Preventative interventions in childhood have potential to address some of the associations demonstrated in the present study - particularly those related to affect regulation and behavioral control. Addressing these may also assist in addressing vulnerability represented by social media use in adolescence. Above all, the present study highlights the need for additional prospective research to further current knowledge about DE development in male adolescents.

CHAPTER 7: Linking Chapter

This chapter will summarize the findings of Study 3, a cross-sectional study entitled "Testing a cross-sectional model of the development of disordered eating in a normative sample of male adolescents" and draw findings from this as a platform upon which to develop the fourth study in the program of research.

Chapter 6 reported on the results of a cross-sectional study that investigated the association between psychosocial factors and disordered eating (DE) behaviors among male adolescents. The study was developed in light of the dearth of studies that investigate how familial and individual variables, such as affective issues, are associated with the emergence of eating concerns for male adolescents specifically (Hochgraf et al., 2017). Accordingly, the current study aimed to address these gaps and further understanding of trajectories towards DE in male adolescents. As such, the primary aim of the cross-sectional study was to assess the relation between parent-child relational quality on symptoms and features of DE in male adolescents, and then to assess this as it occurs within a context of child social, emotional, and behavioral functioning and social media. Consistent with this, four hypotheses were developed, which are explored below.

The first hypothesis stated that statistically significant relationships would be evident between parent-child relationship quality, child social emotional and behavioral functioning, child social media, and child age, and the dependent variable measuring DE symptoms (i.e., the EDI-3; Garner, 2004). Simple linear regression showed a significant relationship, and a hierarchical regression model revealed that mother's total PBI-BC scores (Klimidis et al., 1992), SIAQ-A scores (Keery et al., 2004), and SDQ totally scores (Goodman, 2001) were significantly associated with DE symptoms, while age and father's total PBI-BC scores were not.

The second hypothesis stated that all SDQ (Goodman, 2001) subscales, with the exception of that which measured prosocial behavior, would be associated with symptoms of DE. The researchers analyzed the data from the entire sample to explore this hypothesis. The results showed that two SDQ (Goodman, 2001) subscales, namely, conduct problems and emotional problems, were significantly associated with the EDI-3 (Garner, 2004). Further analysis showed that emotional problems were significantly associated with all seven EDI-3 (Garner, 2004) subscales, while hyperactivity, conduct problems, and peer problems were each associated with a single EDI-3 (Garner, 2004) subscale.

The third hypothesis stated that the variables identified as associated with DE could be used to develop a structural model based on whole sample data and that this model would demonstrate invariance across the three latent classes previously described. The study tested a model using the whole sample data and three identified participant classes, using fit indices including Relative Chi^2, RMSEA, CFI, TLI, and AIC values. The results showed that the model fit well for the whole sample and across the three classes, with minor exceptions in one class.

Finally, the fourth hypothesis stated that the association between social media and DE symptoms would vary as a function of the severity of self-reported DE symptoms. The results showed that social media related to body image was positively associated with appearance-related subscales but negatively or non-significantly associated with subscales related to personal or interpersonal functioning.

The results of study three ultimately highlighted the impact of mother-child relationship quality, the internalization of gendered appearance ideals and adolescents own social, emotional and behavioral functioning on the development of DE in males. Consequently, addressing parent-child relationship health as well

as individual adolescent psychological wellbeing seems important to prevent the development of DE for males.

However, whilst this research adds to a growing body of literature exploring DE in normative samples of male adolescents, much remains unknown about the experiences of male adolescents once they attempt to seek treatment for an eating disorder (ED) within clinical settings (Kinnaird et al., 2019; Thapliyal et al., 2020). Indeed recent research has indicated that males seeking access to ED treatment may experiences a range of difficulties including perceived stigma related to seeking mental health treatment amongst males (Griffiths et al., 2015; Grillot & Keel, 2018), a lack of insight into pathological nature of their own eating and weight control behaviors (Burton et al., 2022; Fatt et al., 2020). Additionally, males may also face issues with s receiving accurate ED diagnosis and treatment within clinical settings (Ganson et al., 2021; Lindvall Dahlgren et al., 2017). This occurrence is often linked the oversight of male-specific concerns in existing ED assessments (Murray et al., 2018) and a lack of training for health professionals in screening and treating EDs in male adolescents, leading to varying treatment outcomes (Ganson et al., 2021).

Further investigation of male adolescents' experiences in ED treatment is necessary, as data extrapolated from studies with adult males may not fully grasp the complex interplay of risk factors and vulnerabilities shaping their experiences and behaviors (Byrne et al., 2023; Darcy, 2011). Additionally, the sociocultural landscape surrounding body image ideals, masculinity norms, family influence and peer influences undergoes significant evolution during adolescence (Hellström & Beckman, 2021; Verschueren et al., 2020). In this way, tailored research approaches are necessary to elucidate the specific mechanisms underlying DE behaviors amongst male adolescents as well as their attitudes

towards engagement in treatment compared to adults (Darcy, 2011; Ganson et al., 2021). Finally, different ED treatment approaches for EDs exist for adolescents compared to adults (Hay et al., 2014). As such, the differing impacts of including family members in FBT for adolescents, compared to individual treatment for adults, on engagement, intervention benefits, and overall experiences of male adolescents with EDs warrant further qualitative investigation (Räisänen & Hunt, 2014; Thapliyal et al., 2020).

In an effort to further explore these concerns the study presented in Chapter 8 of this dissertation was conducted. This study sought to recruit a clinical sample of male adolescents and gain insight on their experiences of ED treatment via semi-structured interviews. Current interest in this study pertained to capturing qualitative data on the experiences of male adolescents undergoing treatment for an ED.

The study aimed to gather data on the development of DE in male adolescents and their experience of treatment. Qualitative semi-structured interviews were conducted to further explore the unique experiences of male adolescents in ED treatment settings. Participants were asked about their specific ED behaviors, comorbid mental health concerns, rapport with their therapist, knowledge of the treatment they underwent, issues and benefits they experienced with treatment (E.g. “What worked well in treatment for you?”), personal suggestions for future changes that could be made to ED treatment and ongoing psychological support they may need. This study was undertaken as an initial step in exploring distinct experiences of male adolescents undergoing treatment for an ED and the ways in which they may or may not benefit from ED diagnosis, therapist interactions and treatment methodology. The study addresses this issue, together with present findings and suggestions for future directions of research.

CHAPTER 8: Navigating Treatment: A Framework Analysis of Perspectives of Male Adolescents with Disordered Eating in Clinical Settings

Navigating Treatment: A Framework Analysis of Perspectives of Male Adolescents with Disordered Eating in Clinical Settings

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METHODOLOGICAL ARTICLE

Navigating Treatment: A Framework Analysis of Perspectives of Male Adolescents With Disordered Eating in Clinical Settings

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Despite an increase in the number of male adolescents experiencing disordered eating, the number entering treatment remains low. Accordingly, significant gaps continue to exist in our understanding of male adolescents' experience within treatment. This may result from limitations in the amount of research undertaken in the area; however, it may also result from the continued influence of established theoretical models of disordered eating. While models such as Fairburn et al.'s (2003) transdiagnostic model of eating disorders have been foundational in the classification, assessment, and treatment of disordered eating, they may also have inadvertently skewed perceptions of adolescent eating disorders. Evidence suggests that the traditional focus on a "thin" body ideal may apply more to females than males. By contrast, male adolescents may pursue a larger body with increased emphasis on muscularity and, therefore, weight gain. This study aimed to investigate the experiences of 10 male adolescents aged between 13 and 19 years who were undergoing treatment for eating disorders. The study explored participants' diagnosis and treatment experiences using a demographic survey and semistructured interview. Framework analysis revealed five eating disorder themes and 11 subthemes. These may assist our understanding of male adolescents' experience of eating disorders, their identification, diagnosis, and treatment. The findings highlight the influence of current theoretical models with respect to diagnostic labeling and individualized treatment approaches. They underscore the importance of the client–psychologist connection and the stigma and isolation that male adolescents may experience prior to and during treatment for eating disorders.

Keywords: male, adolescent, eating disorder, qualitative, clinical treatment

Supplemental materials: https://doi.org/10.1037/qup0000299.supp

Despite the growing number of male adolescents experiencing disordered eating (DE), the rates of male adolescents entering treatment for eating-related concerns remains alarmingly low (Ganson et al., 2021; Limbers et al., 2018). As such, much remains unknown about the experiences of male adolescents once they attempt to seek treatment for an eating disorder (ED) within a clinical setting (Räisänen & Hunt, 2014).

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Prevalence

Rates of prevalence of DE and EDs in male adolescents are difficult to determine and likely underestimate the proportion of those affected by DE (Murray et al., 2018). While the often-quoted gender ratio of 9:1 for ED diagnosis between females and males holds true for adults presenting for treatment, epidemiological studies provide estimates of prevalence that are closer to 4:1 (American Psychiatric Association [APA], 1994; Madden et al., 2009). In a study of 2,495 Australian male adolescents, 12.8% met criteria for various ED diagnoses, including other specified feeding and eating disorder (8.5%), night eating syndrome (4.9%), bulimia nervosa (1.8%), purging disorder (1.6%), unspecified feeding and eating disorder (1.3%), and atypical anorexia nervosa (1.2%; Mitchison et al., 2020). Despite this, male adolescents are less likely to present for treatment for an ED compared to female adolescents and may therefore be left underdiagnosed and undertreated (Ganson et al., 2021; Strother et al., 2012).

Thus, in accordance with APA guidelines (APA, 2020, p. 135) this qualitative study employs the term "male adolescent" to specify focus on the unique experiences of young individuals who identify as male and are in the developmental stage of adolescence in the context of ED treatment. Additionally, the decision to differentiate between "male" and "female" in this study is grounded in the recognition of nuanced gender differences. We acknowledge the distinction between "male" and "female" as descriptors for biological sex, while "man" and "woman" encompass broader considerations of gender identity. We utilize the terms "males" and "females" in this research when referring to groups that include individuals with a broad age range, as outlined in the APA guidelines (APA, 2020, p. 135). This approach that recognizes that male adolescents' experiences in ED treatment may differ from that of females adheres to APA guidelines to promote transparency and precision, ensuring accurate representation of the distinct aspects of the male adolescent experience.

Lack of Males Adolescents Presenting for Treatment

Less than 1 in 10 male adolescents experiencing DE seek treatment and, if they do, it may occur late in their ED trajectory, potentially leading to more severe medical complications (Forrest et al., 2017; Limbers et al., 2018). Additionally, male adolescents' presentation to clinical settings was often found to occur for treatment of comorbid conditions, such as anxiety and depression, rather than for an ED (Burton et al., 2022). This is problematic as the effectiveness of therapeutic interventions decrease and the risk of serious health consequences increase as time in treatment increases (Coffino et al., 2019). Male adolescents' late entry into treatment may be due to stigma about seeking mental health treatment, particularly where male gender roles traditionally imply self-reliance, independence, and resilience (Griffiths et al., 2015; Grillot & Keel, 2018). Additionally, given the historical assumption that EDs primarily affect females, male adolescents may be less likely to recognize their own weight- and appearance-related behaviors as DE (Burton et al., 2022; Fatt et al., 2020). This is concerning as males who were reticent to receive care for an ED and were unaware of their ED symptoms were more likely than females to have an untreated ED (Fatt et al., 2020; Griffiths et al., 2015). Outcomes such as these may, in part, have resulted from the paucity of research into characteristics of presentation, screening, and treatment for male adolescents with DE (Murray et al., 2017).

Male Adolescent Representation in ED Research

Throughout the 20th century, EDs have largely been characterized by female phenotypic characteristics. For example, the diagnostic criteria of amenorrhea, included in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; APA, 1994), does not apply to males (Lavender et al., 2017). As such, many of our current assumptions regarding EDs in males may originate from research appropriately developed with female participants yet generalized to males (Darcy, 2011; Ganson et al., 2021). A significant proportion of existing ED research has focused on adult males and females and employed quantitative research methods to collect data on their treatment (Thapliyal et al., 2020). Several recent studies have addressed this issue by exploring the treatment experiences of adult males; however, there is limited recent qualitative research about male adolescents' experiences of ED treatment (Kinnaird et al., 2019; Thapliyal et al., 2020). Thus, we identified only

one qualitative study conducted by Mitrofan et al. (2019), which investigated the experiences of young adults undergoing ED treatment. This study did not, however, examine male-specific eating concerns and instead targeted male and female adolescents and young adults aged 16–25 years. Examining male adolescent EDs through the lens of the female gender risks ignoring unique characteristics of the male experience and may, therefore, have significant implications for the development of treatments and their effectiveness (Darcy, 2011). Similarly, generalizing assumptions developed within adult research and treatment literature may be inappropriate due to differences in prevalence, characterization, and trajectories of eating difficulties across early to late adolescence (Byrne et al., 2023; Darcy, 2011).

Conceptual Models of Male Adolescent ED Risk Factors

The tendency to consider male adolescent EDs from the perspective of ED characteristics of females may have also been perpetuated by the influence of established theoretical models (Byrne et al., 2023). For example, according to Fairburn et al.'s (2003) transdiagnostic model of eating disorders, it is the overvaluation of a "thin" body weight and shape, in particular, that underpins many of our current treatment approaches, assessment measures, and diagnostic criteria (Lavender et al., 2017). However, contrary to the model, early studies of male body dissatisfaction have revealed that males may overvalue a larger body and report a desire to gain muscle instead of lose fat (Murray et al., 2017). According to the sociocultural theory (Thompson et al., 1999), this dissatisfaction results from unrealistic standards that are set in Western society that a majority of adolescents fail to meet. Appearance standards conveyed in Western social media that traditionally concentrate on female thinness now focus increasingly on muscularity and leanness, two essential components of appearance ideals for both males and females (Rodgers et al., 2018, 2020).

For males, the characteristics of muscularity and low body fat may serve as dual standards against which ideal male appearance is evaluated (Murray et al., 2017). Thus, the internalization of the muscular ideal by male adolescents may result in the engagement of a unique variety of DE attitudes and behaviors to achieve this standard (Lavender et al., 2017). While females may more commonly engage in eating restriction and purging to achieve the thin ideal, males more commonly engage in behaviors directed at achieving leanness and muscularity, including exercising and dieting to enhance muscle gain (Lavender et al., 2017). Nevertheless, there is a notable lack of established diagnostic criteria for EDs that specifically address DE centered around a focus on muscularity rather than thinness (Murray et al., 2016).

Assessment of Male Adolescents With EDs

Male adolescent patients are diagnosed with EDs by medical professionals less frequently than adolescent females (Ganson et al., 2021; Lindvall Dahlgren et al., 2017). This may reflect the limitations of prominent ED assessment measures. For instance, the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 2008) and the Eating Disorders Inventory (Garner, 2004) may be limited in their capacity to capture male-specific eating related characteristics. Despite recent research indicating the appropriateness of such ED measures with males (Carey et al., 2019; Smith et al., 2017), some evidence suggests that limitations may result from their continued use with female DE and ED populations (Limbers et al., 2018; Smith et al., 2017). For example, male adolescents with DE may pursue an increase in muscularity rather than a decrease in body weight. This, together with an overemphasis on exercise, may limit their ability to satisfy the initial body mass index criterion prescribed for ED diagnoses (Lindvall Dahlgren et al., 2017; Nagata et al., 2019). Thus, the accurate diagnosis of male adolescents may not be precluded; however, it may follow later in a presentation to treatment than is the case for females and may result in more severe ED symptomatology than is the case for females (Thapliyal et al., 2018).

Identification and Diagnosis of Male Adolescents With EDs

The timely assessment and treatment of DE and EDs is essential for optimal treatment outcomes; however, limitations in research can have significant implications for the training of medical and health professionals (Ganson et al., 2021). Research shows that many medical practitioners are unprepared to identify and treat EDs, with 70% receiving fewer than 5 hr of training in child and

adolescent EDs (Ganson et al., 2021; Girz et al., 2014). As such, access to ED treatment may also be more difficult for male adolescents due to specialists' limited knowledge about their symptoms and the concerns that underlie their presentations (Robinson et al., 2013). An accurate appraisal of presenting symptoms and the provision of pertinent and suitable information on EDs have both been demonstrated to proceed as a function of the sex of the patient (Räisänen & Hunt, 2014; Robinson et al., 2013). In addition, more than 92% of doctors indicated that they believed they missed an ED diagnosis in male patients, and 68% reported that they did not do additional screening for an ED because it was not the presenting issue (Linville et al., 2012).

Indeed, more than half of the male adolescent ED patients' first outpatient visits have been reported to require urgent hospitalization, due to inadequate assessment and identification of ED symptoms (Vo et al., 2016). These findings are concerning as medical practitioners are commonly the first point of contact for individuals with EDs, and they play an essential role in identifying, assessing, and medically treating EDs (Ganson et al., 2021). Yet, doctors report a lack of clarity about the assessment and treatment of male eating concerns, potentially leading to delays in treatment and exacerbating health complications (Linville et al., 2010). Consequently, male adolescents may encounter challenges in obtaining an accurate ED diagnosis even when seeking treatment, as research suggests that they are often diagnosed with other mental health conditions, such as affective and anxiety disorders, rather than EDs (Burton et al., 2022).

ED Treatment Outcomes for Male Adolescents

When detected and managed early by trained and knowledgeable health professionals, approximately 72% of individuals with EDs achieve full recovery and a good quality of life (Butterfly Foundation, 2017). The most influential aspects of male adolescence treatment experience have been identified as the therapist's personality, the quality of the therapeutic interactions they fostered, and the trust and confidence in them (Dearden & Mulgrew, 2013; Thapliyal et al., 2017). Young adult males diagnosed with EDs have also reported that attending treatment groups comprised solely of males decreased feelings of isolation and increased their perception of safety about discussing their food and body image concerns (Robinson et al., 2013; Thapliyal et al., 2018). As such, health practitioners supporting and treating male adolescents with EDs may extend existing treatment parameters to challenge "masculine" ideals of strength, power, and control that coincide with male eating difficulties (Griffiths et al., 2015; Thapliyal et al., 2018).

Aims and Objectives

Existing conceptual models, such as the transdiagnostic model of EDs (Fairburn et al., 2003), emphasize cognitive and emotional factors associated with female EDs. By contrast, the sociocultural theory (Thompson et al., 1999) highlights societal factors hypothesized to influence body image, but their applicability to the experiences of male adolescents with EDs is underexplored. Further qualitative research may inform existing theoretical frameworks as well as processes of identification, diagnosis, and treatment of male adolescents with EDs (Räisänen & Hunt, 2014; Thapliyal et al., 2020). Therefore, the aim of this study was to explore the relation between cognitive, emotional, and sociocultural characteristics of male adolescents' experience of EDs within the context of psychological treatment for EDs.

Method

Study Design

This research study used semistructured interviews to gain a comprehensive understanding of the male adolescents' thoughts, feelings, and beliefs about their experiences in seeking treatment for DE and EDs (Creswell & Clark, 2017; DeJonckheere & Vaughn, 2019). Given the personal and sensitive nature of some of the issues that adolescents may face with their eating behaviors, and in treatment for such, it was felt that individual interviews would provide a safe and open environment for participants to express themselves.

Participants

Participants were male adolescents recruited from two private psychology practices in New

South Wales, Australia. Agreement to participate in the demographic survey and semistructured interview was gained from $N = 10$ male adolescents ($M_{age} = 16.00$, $SD = 2.79$). Participants who met inclusion criteria were included in the research: Criteria were that participants identified as male, were aged 11–19 years, had not previously been diagnosed with a neurodevelopmental disorder, and had not previously been the subject of a child protection concern or placed in and out of home care or detention. Female participants ($n = 9$) were excluded from the study, and despite providing initial consent, three male adolescent participants declined to participate in the semistructured interview. Figure 1 presents details about the participant selection process. Eligible participants described their ethnicity as Asian ($n = 1$), Australian ($n = 4$), European ($n = 1$), Greek ($n = 1$), Indian ($n = 1$), Irish ($n = 1$), and Russian ($n = 1$). Demographic details of the participants and pseudonyms to which their personal quotes are attributed are presented in Table 1. Treatment and diagnostic data for those included in the study are presented in Table 2.

Procedure

Recruitment and Data Collection

Ethical approval for the study was granted by the University of Technology Sydney Human Research Ethics Committee (approval number: ETH21-5909). Male adolescents were invited to participate in the research following discussion with the first author. This discussion was undertaken with the treating psychologist present to ensure no prior relationships between the first author and participants existed. Informed consent to participate in the research was gained from participants, and if they were under the age of 18 years ($n = 7$), parental informed consent was also gained. Purposive sampling was employed to identify participants undergoing ED treatment across a diverse range of age, ED types, and comorbid diagnostic characteristics. An evolving matrix of participant characteristics guided the sampling process, with recruitment continuing until a comprehensive range of characteristics was achieved.

Participants were provided with a link to the online survey that was hosted on Qualtrics. Completion of that survey took approximately 10 min. Following completion of the survey, participants were able to opt-in to a one-to-one semistructured interview with the first author by providing their contact details. Interviews were conducted in person ($n = 9$) or via the online teleconference platform Zoom ($n = 1$; Zoom Video Communications, 2016), at an agreed time. All interviews were conducted by the first author, a clinical psychologist experienced in clinical work with individuals with EDs. Interviews were conducted between October 2022 and February 2023 and varied between 15 and 27 min in length ($M = 21$ min, $SD = 4.13$ min).

Figure 1
Participant Selection Flowchart

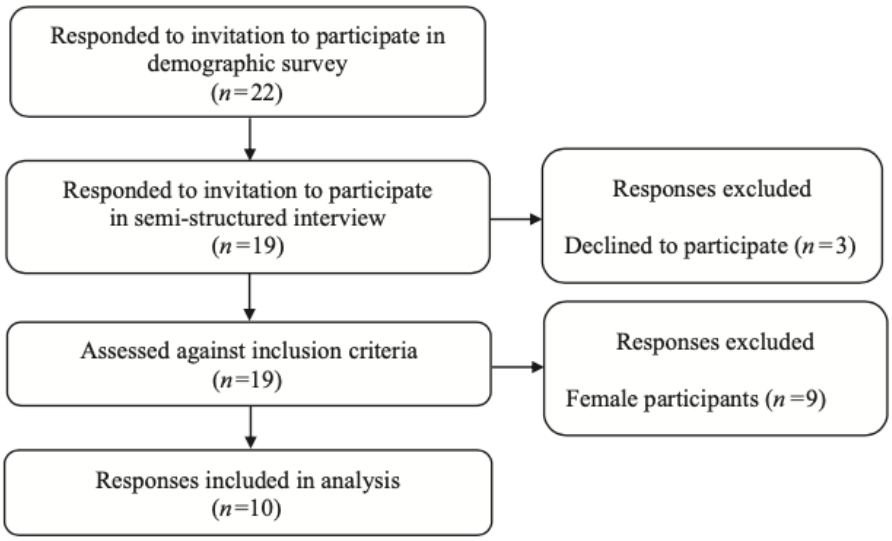

Table 1
Demographic Information and Pseudonyms

Interview	Pseudonym	Age	Gender	Nationality
1	Mark	18	Male	Australian
6	Lucas	19	Male	Australian
7	Ben	19	Male	Australian
8	Sean	16	Male	Irish
9	Alex	17	Male	Russian
10	Kieran	19	Male	Greek
11	Ryan	14	Male	Australian
12	Michael	12	Male	Asian
13	Peter	13	Male	Indian
16	Chris	13	Male	European

Materials

Demographic Information Questionnaire

Participants were first asked to provide a range of demographic information including age and ethnicity.

Eating Disorder Treatment and Diagnosis Information Questionnaire

This survey was developed for the present study to gain insight about the experiences of male adolescents undergoing psychological intervention for an ED. The survey contained 16 items in free-response and multiple-choice formats and included the age of ED commencement and help seeking, the health professionals they had consulted, the number of treatment sessions they had completed, their ED diagnoses, the number of sessions it took before their ED was diagnosed, their comorbid mental health diagnoses, the treatment plans and treatment modalities utilized, and their report of the impact of their ED on their life.

Semistructured Interview

The semistructured interview schedule was developed by the first author following discussion between the authors. To ensure that questions were sensitive and relevant to the participants' treatment experience, insights from the online survey, such as characteristics of the participants' treatment experience, were used to identify key areas of interest and to shape the interview questions. Individual interview questions were further refined based on a review of current research and treatment evidence and clinical experience. This approach was designed to elicit nuanced insights from the participants and allow for a comprehensive understanding of their perspectives and experiences beyond those that may be gained using traditional multiple-choice questionnaires.

The interview consisted of 10 open-ended questions that sought participant responses about specific ED behaviors, their comorbid mental health concerns, their rapport with their therapist, their knowledge about the treatment they received, the limitations and benefits they experienced with treatment, and participant suggestions for improvements to ongoing ED treatment and psychological support. Participant responses to the interview schedule enhanced the quality of the data collected, and on completion of the interview, participants were asked to add anything they believed to be important or meaningful that had not yet been discussed.

Reflexivity

To engage in reflexivity, the first author examined her own biases and assumptions as a White, female, clinical psychologist with experience working with EDs. As such, she was conscious of bracketing her own conceptual lens and explicit and implicit assumptions, preconceptions and values, to ensure that her prior knowledge of the practices and participants did not bias her results (Lincoln et al., 1985). To do this, she kept a reflexive journal, detailing her thoughts after each interview, while reading transcripts, and during the data analysis process (Lincoln & Guba, 1982; Vicary et al., 2017). She engaged in debriefing sessions with fellow research team members to enrich the analysis and bolster its credibility (Creswell & Miller, 2000; Lincoln & Guba, 1985). This process involved integrating various team perspectives and insights, which in turn helped in scrutinizing and honing initial ideas, resulting in a deeper comprehension of the data (Spillett, 2003). Additionally, peer validation of the first author's initial interpretations assisted in mitigating potential biases, contributing to a more robust analysis and ensuring that the final themes accurately reflected the experiences of the participants (Lietz & Zayas, 2010; Lincoln & Guba, 1985).

Data Management and Analysis

Quantitative demographic data were entered into SPSS Version 28 (IBM Corp, 2020) to

Table 2
Eating Disorder Treatment and Diagnosis Characteristics of Male Adolescents

ED treatment and diagnosis characteristic	Male (n = 10) n (%)
Age DE Began	
5–8 years	1 (10.0%)
9–12 years	8 (80.0%)
17–19 years	1 (10.0%)
Age first sought professional help for DE	
9–12 years	1 (10.0%)
13–16 years	6 (60.0%)
17–19 years	3 (30.0%)
First health professional seen	
Counsellor	2 (20.0%)
ED specialized psychologist	1 (10.0%)
GP	6 (60.0%)
Psychologist	1 (10.0%)
Overall number of sessions with a psychologist	
Three sessions	2 (20.0%)
Five sessions	1 (10.0%)
More than six sessions	2 (20.0%)
More than 10 sessions	2 (20.0%)
More than 20 sessions	3 (30.0%)
ED diagnosis	
Anorexia nervosa	3 (30.0%)
ARFID	0
Atypical anorexia nervosa	3 (30.0%)
Binge eating disorder	3 (30.0%)
Bulimia nervosa	3 (30.0%)
UFED	1 (10.0%)
Number of psychology sessions before ED diagnosed	
0 sessions	1 (10.0%)
One session	3 (30.0%)
Two sessions	1 (10.0%)
Three sessions	3 (30.0%)
Four sessions	2 (20.0%)
More than 10 sessions	0
Comorbid mental health diagnoses	
ADHD	5 (50.0%)
Anxiety	6 (60.0%)
ASD	0
Depression	1 (10.0%)
Medicare plan provided	
Mental health care plan	8 (80.0%)
Eating disorder plan	7 (70.0%)
Treatment methods	
CBT-E	2 (20.0%)
FBT	6 (60.0%)
Hospitalization needed	1 (10.0%)
Inpatient hospital	1 (10.0%)
Outpatient hospital	0
Weight regain needed	7 (70.0%)
Unsure of treatment method	3 (30.0%)
Life areas impacted by ED	
Education	5 (50.0%)
Friendships	9 (90.0%)
Hobbies	8 (80.0%)
Job	1 (10.0%)
Mental health	9 (90.0%)
Parent relationships	9 (90.0%)
Physical health	8 (80.0%)
Sibling relationships	5 (50.0%)

Note. DE = disordered eating; ED = eating disorder; GP = general practitioner; ARFID = avoidant restrictive food intake disorder; UFED = unspecific feeding and eating disorder; ADHD = attention deficit hyperactivity disorder; ASD = autism spectrum disorder; CBT-E = cognitive behavior therapy for eating disorders; FBT = family behavior therapy.

generate descriptive statistics. To analyze the qualitative data, interview recordings were transcribed by an independent professional transcription service and were then checked against the voice recordings for accuracy by the first author. The final transcripts were then uploaded into Nvivo12 (Lumivero, 2020). The interview data were then analyzed using five key activities of framework analysis (FA) outlined by Ritchie and Spencer (1994). FA belongs to a family of qualitative methods known as thematic analysis (Gale et al., 2013) and shares many features with Braun and Clarke's (2006) popular reflexive approach to thematic analysis (e.g., the ability to code data inductively or deductively: (Braun & Clarke, 2021; Gale et al., 2013). The FA method was chosen to analyze the qualitative data as it provided flexibility and freedom in the analysis process because it is not constrained by a specific epistemological position (Gale et al., 2013). This approach is popular among researchers as it enables them to tailor their approach to fit the aims of their research (King & Brooks, 2018; Ritchie & Spencer, 1994). Additionally, FA is appropriate for exploring contextual research questions that relate to the nature of the individuals' experiences, making it a good fit for the present study (King & Brooks, 2018; Ritchie & Spencer, 1994). The five FA activities were carried out in the present study in the following way. Initially, the first author read and reread the interview transcripts to immerse herself in the overall content of the data, while taking notes on her initial impressions using the Nvivo12 (Lumivero, 2020) memo feature (familiarization). Next, the first author and a student researcher used the interview questions

as an a priori guide to develop a thematic framework by identifying and assigning initial open codes to recurring themes and concepts in the raw data in each participant transcript (developing an analytical framework). The first author then reread the data and systematically indexed the data by assigning codes to specific sentences across the entire data set. These indices related to the identified themes and subthemes (indexing). The indexed data was then sorted into charts in Excel, with themes and subthemes charted in columns and participant responses charted in rows. This process allowed the researcher to compare different themes across participants and identify patterns in the data (charting). Finally, identified patterns in the data facilitated a broader understanding of it and allowed the researchers to draw conclusions about commonalities and differences across participant responses and identified themes (mapping and interpretation).

Rigor and Trustworthiness

The study's trustworthiness was established in accordance with standards outlined by Lincoln et al. (1985), through an evaluation of its credibility, transferability, dependability, and confirmability. Regarding credibility, researcher triangulation was implemented, whereby all transcripts were examined by the first author, followed by examination of a subset of transcripts by a student researcher, and findings were repetitively discussed between the coauthors (Onwuegbuzie & Leech, 2007). Participant quotes from original interviews were also included in results to accurately articulate the participants' experiences and reinforce credibility (Graneheim & Lundman, 2004). All participant quotes were verbatim, but where abbreviation occurred, it was identified by an ellipses and substantive meaning was not altered. Additionally, in the FA of the qualitative data, trust was established between the first author and participants through engagement in the data collection process, and the credibility of the analysis was enhanced through the first author's prolonged engagement with the data (Bitsch, 2005; Krefting, 1991).

In order to enhance the applicability of the study's findings to similar contexts, transferability was established through a detailed description of the study's context, participants, recruitment process, and interview procedure (Li, 2004). To ensure the dependability of the study, the study procedure has been described in detail to provide a retraceable path from the beginning of the study to the development and documenting of the findings (Bowen, 2009; Li, 2004). Records of the raw data, transcripts, and a reflexive journal made through memos in NVivo12 also enabled the first author to systematize, convey and cross-reference data to establish confirmability and dependability (Koch, 1994; Vicary et al., 2017). Finally, a thorough justification of the study's choices regarding purpose, participants, methodology, analysis, and conclusions was incorporated in reporting to establish confirmability of the study findings (Bowen, 2009; Koch, 1994).

Results

Five main themes were identified following thematic analysis of the interviews. These were (a) identification of the ED, (b) diagnosis of the ED, (c) benefits of ED treatment, (d) issues with ED treatment, and (e) future treatment needs. Based on the views of the participants, these themes are further divided into 11 subthemes. Illustrative quotes for each theme and subtheme are presented in Table 3.

Theme 1: Identification of the ED

The first theme explored the male adolescents' experiences of ED symptoms and the processes that they underwent to receive professional treatment for such. These experiences are explored in subthemes related to the participants' engagement in ED thoughts or behaviors and their awareness of the disordered nature of these behaviors. Additionally, their experiences of seeking professional help for their ED concerns and receiving ED diagnoses, were explored in context of their presentation to health professionals for support with comorbid mental health concerns.

Awareness of ED Symptoms

In the first subtheme, awareness of ED symptoms, a majority of participants discussed ED symptoms, including reducing food intake, binge eating, purging behavior, and laxative use. They also discussed their lack of understanding of their symptoms and ways they dealt with this prior to receiving professional assistance. For example: "I didn't think I was bad enough" (Ryan). Chris also shared that he was noticing abnormal behavior regarding eating; however, he

Table 3
Illustrative Quotes Related to Themes and Subthemes

Theme	Subtheme	Illustrative quote
1. Identification of the ED	1.1: Awareness of ED symptoms	Lucas: There was a few times where I would always just give all my food to everyone else so then I could pretend, like I ate, because I ate breakfast, starved myself throughout the entire day. … I gave out, chucked out whatever I could … so that there was perception that I ate it.
	1.2: Prioritization of comorbid mental health concerns	Sean: I honestly felt like I had depression way before anything was wrong with my eating. … I thought like exercising would actually make me feel better about myself.
2. Diagnosis of ED	2.1: Resistance to ED diagnoses	Ben: I think, maybe, subconsciously, I was aware of it but didn't want to accept the diagnosis.
	2.2: Misunderstanding of male-specific issues	Kieran: I think the sensitivity and understanding is definitely important. Like I've been through a couple of psychologists. … It's been a bit too concrete and they haven't shown enough compassion. … I didn't feel understood or heard.
3. Benefits of ED treatment	3.1: Individualized approach	Alex: We can talk about obviously things like vomiting and all of that kind of stuff but then we can also talk about just my normal kind of stuff … my anxiety … and um ways to help that as well … so I don't have to feel like pressure just to talk about the eating … we kind of leave it open and then go from there each session.
	3.2: Rapport with psychologist	Michael: Yeah they're really good, we do fun activities together as well … they help me understand different food things so we do some work in the kitchen and work on my eating and my tastes as well trying to get used to different tastes and foods
	3.3: Helpful treatment components	Peter: It was good to have my parents there because they helped me to actually stop vomiting at times when I really wanted to.
4. Issues with ED treatment	4.1: Disconnection with psychologist	Mark: I sort of didn't really love going because I felt like I was sort of like getting examined by them. … I genuinely didn't enjoy coming in.
	4.2: Difficulty adhering to treatment components	Ben: I'm like, "I don't really like CBT." But I was willing to give it a go, but it felt a bit like gaslighting myself.
5. Future needs	5.1: Further treatment required	Alex: Oh yeah like I will still need help with my anxiety probably … and I haven't fully like stopped vomiting just yet so still need to work on that … probably some other stuff like, you know, around my weight and my body or things like that and building up my confidence around my friends as well that would probably be important too … so yea I still need to do work on that stuff.
	5.2: Tailored treatment for males	Chris: I think it would be good to have some kind of support group. … Like I know they are out there but not at the clinic I was at … because none of my friends could really understand why I just wouldn't eat. They would just ask triggering questions and stress me out so having some people who understood around would be good I think. … I mean besides family, like other people that get it.

Note. ED = eating disorder; CBT = cognitive behavior therapy.

did not recognize these behaviors were a problem at first as he stated, "I was getting anxiety around counting calories so I could lose fat, I think that's what the psychologist helped me to realize, it is actually a problem."

During the discussion, various participants revealed that they employed several different methods to manage their eating habits and that they initially began to control their food-related behaviors on their own. Alex described it in the following way:

> I've done some research on some of these websites to try to lose weight and one of them said to take laxatives I guess to make sure that I didn't absorb the food that I was eating. So, I actually ended up buying those.

Tracking calories was another method cited by participants trying to gain control over their diet or to maintain or reduce weight. Kieran described it as:

> Hyper-fixating on numbers and energy values, and that sort of thing. … I was binging a lot, at first … there was also purging behaviors, so I would chew and spit for food instead of swallowing it to restrict my calories. I would also eat, feel guilty, then exercise for over an hour.

It was also reported by some participants that they were concerned with maintaining exact measurements of food groups and calories to facilitate their exercise and muscle-building goals. For example, Chris shared that he had stopped eating out because he "couldn't measure properly and count the calories fully." Additionally, Sean expressed concern about missing workouts after eating as he stated, "I ended up just doing lots of workouts at home but that was a bit of an issue for me because I was worried about missing a workout too."

Prioritization of Comorbid Mental Health Concerns

In addition, participants were asked if they had sought professional help for conditions other than EDs. A majority reported receiving support for anxiety and depression. During the discussion, it was reported that general practitioners (GPs) assisted participants in initially assessing other mental health concerns, wherein they also obtained a preliminary understanding of their ED behaviors and attitudes and were encouraged to see an independent psychologist. For instance, Kieran stated "I went to my GP when I was feeling low, and they screened me with questionnaires and basically told me I have signs of binging and bulimia behaviors."

Some of the participants who initially visited psychologists for anxiety or depression reported that they were also informed that they were experiencing an undiagnosed ED that was impacting their mental health, yet they were unable to identify that until they sought professional care. Mark expressed gaining a better understanding of his ED after seeing a psychologist as he stated "I sort of went to see a psychologist mainly because of depression … but the depression was also a catalyst for the eating disorder … food was a comfort thing."

Participants in Theme 1 recounted their experiences of ED symptoms, initially unaware of the disorder, and resorted to self-implemented management strategies such as calorie tracking and purging behaviors. As they sought assistance from health professionals for co-occurring mental health issues like anxiety and depression, participants gradually acknowledged their ED concerns through engagement and information they received in ED treatment.

Theme 2: Diagnosis of ED

As the participants entered treatment, some described mixed responses to receiving an ED diagnosis. For some, the label of ED was perceived as feminine and inappropriate to their experience. Others considered that their behaviors were severe enough to be regarded as EDs. These experiences were explored in subthemes related to the participants' resistance to the diagnostic labeling of EDs and feeling their specific concerns were not accurately captured in the assessment and treatment process.

Resistance to ED Diagnoses

Various participants in the study expressed dissatisfaction with the diagnostic labeling of their ED. They reported that they were aware that something was wrong but had difficulty accepting that they had an ED when their psychologist identified it. For example, Ben perceived it as stigmatizing and was consequently unhappy to have received an atypical anorexia diagnosis as he stated, "The diagnosis of like atypical anorexia. … I think it's a horrible way to name it … and from the get-go it just felt layered in stigma to me."

Similarly, Alex said that he felt an ED diagnosis was a female problem and found it difficult to

accept it was something he was experiencing as he stated, "I just found it confronting to have to go cool I have like an anorexia diagnosis or a bulimia diagnosis because that felt really like a girl problem to me."

Additionally, Sean expressed confusion and disbelief after receiving an ED diagnosis. At first as he felt that it did not apply to him:

> At the beginning I think I was a little bit like standoffish because I was aware that I had depression but to have someone actually say you've got an eating disorder. … I wasn't too happy about that because I didn't really believe them. … I didn't realize that that was like an actual disorder that someone could have, so I didn't really think that they were understanding me at first.

Misunderstanding of Male-Specific Issues

A proportion of participants expressed feelings of frustration that they were misunderstood when being assessed, diagnosed, or treated. For example, Lucas expressed frustration with completing the Eating Disorder Examination Questionnaire diagnostic assessment measure as he did not feel it was relevant to the males generally or to his (male-specific) eating concerns. He stated:

> I never found it useful because it would ask the same question five different ways. It was very female-oriented because it's asking, do I like the size of my hips? … do I like the size of my thighs? And I just look at it and go, this doesn't apply to me so I'm like, no.

Additionally, Ben said that he did not feel that his anorexic eating behaviors were understood by his psychologist, who assumed that because he was male and not underweight, he wanted to be more muscular. Following engagement with a psychologist he stated:

> I think when we focus on men, I still think there's this presumption by psychologists that the disorder is going be around muscle and wanting to look muscly … but I still think there is some of that stuff of just wanting to be as small as physically possible … for me it's like, I don't want muscles, I want to be so small that when I turn to the side I disappear.

Participants in Theme 2 described varied responses to their diagnosis, with some perceiving it as feminine and stigmatizing, while others struggled to accept it due to its perceived lack of relevance to male-specific concerns. Such responses highlight issues of resistance to diagnostic labeling and misunderstanding of male-specific issues which participants experienced within the ED assessment and treatment process.

Theme 3: Benefits of ED Treatment

In this theme, participants discussed the various approaches that their psychologist employed that helped them the most while undergoing ED treatment. These experiences are explored in subthemes related to the participants' appreciation of their treatment individualized to their specific capabilities and concerns, the rapport they developed with their psychologist, and specific components of ED treatment that they found particularly helpful.

Individualized Approach

A majority of participants reported that having treatment goals adjusted to their individual capabilities and needs allowed for increased ability to progress through stages of treatment. For instance, Mark acknowledged the benefits of his psychologist's flexibility in the treatment plan. He said that it was difficult for him to discuss personal concerns in front of his parents, but he found individual sessions with his psychologist were beneficial for his understanding of his ED:

> It's just like having a genuine conversation. It let me vocalize my feelings and then after vocalizing them, I could sort of see them in a more open way. It also helped me to understand why I think certain things.

Additionally, some participants did not feel comfortable with their families participating in their sessions within family-based therapy and wanted privacy to discuss personal matters with their therapist. Participants shared that an individualized approach by their psychologist allowed them to articulate their emotions. For instance, Alex stated:

> I think that was really important because otherwise I don't think I would have spoken about anything in front of my parents … that would have just been too embarrassing for me. … I didn't really talk about anything personal until I was just alone without them in the room … so that was really helpful I was pretty grateful for that, that the psychologist did allow more time for that.

Rapport With Psychologist

During the study, participants were asked if they felt comfortable communicating their concerns with their psychologist and if they felt supported in treatment. The majority of study participants had positive relationships with their psychologists,

reporting that their psychologists were understanding and supportive in allowing them to work collaboratively. For instance, Alex expressed:

> It's pretty good … we can talk about things like vomiting and all of that kind of stuff but then we can also talk about my anxiety and ways to help that as well. I don't have to feel pressure just to talk about specific things … we kind of leave it open and then go from there each session.

Some participants also reported that their psychologists were helpful in guiding family members to understand their experiences in session and that this was beneficial for recovery overall. Chris reported that his psychologist provided clarity for his parents, particularly for his father's understanding of his ED:

> I think my psychologist was pretty good at getting my parents to understand that I was actually quite worried about getting lean … rather than just thinking that I was just exercising because all my mates exercise. … I think with dad, he does lots of exercise as well, so I think he just saw it as a positive thing … they didn't realize that's actually why I was stressed … so I think that was a really good part … me trusting the psychologist to explain things and explain the cycle.

Helpful Treatment Components

A majority of the participants underwent family-based therapy in treatment. Treatment included family members and, wherever possible, involved parents in assisting adolescents in maintaining a balanced diet and eating schedule and in reducing disordered behaviors. Participants reported involving their families in their treatment was important in providing them with support and preventing them from engaging in ED behaviors. For example, Chris stated:

> We did family treatment … my parents were helping me to have meals without counting calories and without being so worried about if I'm eating too much or all the types of food … mum would just prepare everything for me and then I would just have to eat it which was helpful for me because then I didn't have to worry about making the right choices all the time.

Similarly, Peter expressed that his family's involvement prevented him from engaging in disordered compensatory behaviors, such as purging after eating, as he stated, "It was good to have my parents there because that helped me to actually stop vomiting at times when I really wanted to." Some participants expressed that having family present also enabled them to talk about concerns that they would otherwise have had difficulty expressing due to anxiety or inability to accurately describe their experiences. For example, Michael stated "I found that pretty helpful to have mum there because sometimes when I get nervous, I can't really say things too well so having mum there really helped me to talk more."

Some participants also discussed various aspects of the treatment they received including structured eating, reducing unhelpful behaviors such as binge eating, and learning about food groups. Regarding binge eating, in particular, Sean cited that portion control and learning about eating in moderation benefited him greatly:

> Things like portioning … an issue with my binging was that I would be eating straight from a source, like a jar of peanut butter. The psychologist said you know maybe put some aside like a piece of toast on the plate and then eat that portion first.

Exercise, which was utilized by some participants as a compensatory behavior, was also addressed during recovery. For instance, Ryan stated "I had to cut down on my exercise as well just because the amount I was doing was not helpful when I was trying to focus on my eating. … I needed to stop the exercise to keep weight on."

Participants in Theme 3 reported an appreciation of individualized approaches tailored to their capabilities, the establishment of positive rapport with psychologists, and the effectiveness of treatment components, such as family-based therapy and structured eating. These elements facilitated open communication and collaboration between participants, their psychologists, and their families and helped to address specific ED behaviors like binge eating and excessive exercise during treatment.

Theme 4: Issues With ED Treatment

In this theme, participants discussed the aspects of their treatment plan that they disliked or found difficult to follow as well as concerns that they experienced with their treating psychologist. These experiences are explored in subthemes related to the participants' experiences of feeling disconnected from their psychologist, as well as experiencing difficult adhering to specific ED treatment components or requirements.

Disconnection With Psychologist

As discussed in Subtheme Rapport with psychologist section, a majority of participants

felt supported and understood by their psychologists. However, some participants discussed experiencing negative interactions and comments from their psychologists. For instance, Kieran described feeling that his previous psychologist did not understand his concerns with eating and instead provided irrelevant information and strategies:

> I didn't feel understood. I felt like she was providing insight into an issue that was not mine. I just felt like we weren't on the same page. … I just remember it didn't feel right. I felt like it didn't really help. So, I felt like I was coming into the room and walking out confused.

Additionally, Ben stated that his psychologist made unhelpful comments by mentioning a goal weight number that Ben had previously disclosed drove his food restriction:

> My psychologist ended up moving but before he left, he was like "goodbye and I hope you get to eighty kilos like you wanted." And I was like, that doesn't sound like something you're meant to say. … Right, because we'd spoken about eighty as being a really rigid, bad number for me. … I just felt really abandoned.

Difficulty Adhering to Treatment Components

Several participants mentioned constant supervision and monitoring of their eating by members of their family as a component that caused difficulty for them. As part of this monitoring, family members were often required to supervise meals that participants consumed at school. Peter stated that having his mother monitor his school meals had become embarrassing for him as it resulted in unwanted attention from his peers:

> My friends found out that something was going on with me. … I didn't tell them exactly what the problem was, but my mates would ask why I wouldn't eat with them and why I had to sit and eat with my mum at lunch, so that was embarrassing.

Lucas also expressed that, throughout treatment, he felt he that did not want his family to participate in the sessions or monitor and oversee his eating routines as it created tension at home, and he fought with his mother around mealtimes. He stated:

> Not so much that it didn't work, but all the responsibility being put on mum, definitely strained our relationship. Because I mean, when someone's in that headspace like they just kind of lash out regardless of who it is. I mean it's a lot to put one person through, when they have to be the sole gatekeeper of your behaviors … but if she didn't do it then I wasn't going to recover.

Additionally, while beneficial for recovery from an ED, participants expressed that they disliked having to immediately abstain from disordered behaviors once treatment began or engage in treatment components, such as increasing meal frequency and tracking weight gain or loss via weighing in session. For instance, Sean stated "I didn't really enjoy having to do weigh-ins … because I found that pretty stressful and if it was different to what I expected I'd find it pretty hard not to want to stop eating again."

Similarly, Lucas, who was diagnosed with bulimia nervosa, was not permitted to use scales, which he previously used after eating. He found this difficult and stated "Cold turkey no scales whatsoever. … I know it was necessary because I was at such a drastic weight, but having no scales was not a fun experience."

Participants in Theme 4 discussed their struggles with feeling disconnected from psychologists, instances of unhelpful comments, and experiences of a lack of understanding, which hindered their therapeutic progress. Moreover, they detailed the challenges of treatment components, such as constant family supervision of meals, immediate cessation of disordered behaviors, and strict restrictions like abstaining from using scales, all of which posed significant hurdles in their path to recovery from EDs.

Theme 5: Future Treatment Needs

In this theme, participants discussed their future treatment needs and made suggestions for changes to ED treatment approaches that they would consider helpful. These experiences are explored in subthemes related to the participants' understanding that they may need ongoing professional support for their ED as well as their opinions on changes to ED treatment that could be made to increase engagement and improve treatment outcomes for male adolescents.

Further Treatment Required

Most participants stated that they would still require a psychologist's assistance in the future, as they did not feel fully recovered from their ED. Despite reporting improvement, they believed that they still needed to work on translating their changed eating behaviors into everyday life and reengaging in social settings. For example, Peter stated:

> I'm pretty okay. I've got to do a little bit more work around cutting down vomiting and eating a little bit more, so I'll probably see my psychologist for longer just because I haven't really got the hang of that just yet.

Similarly, Chris described wanting further treatment to enable him to better deal with difficult conversations with his peers and reengaging in social situations with his friends that involved eating:

> I still probably need some help with eating out with friends especially because they are still going to talk about their gym progress and eating certain things … they all still talk about it even now in group messages and things like that, so I think I'll probably need some more support with just trying to ignore that.

Tailored Treatment for Males

When asked about future treatment needs, a consistent theme that emerged among participants was the desire for more tailored treatments for male-specific issues. Suggestions included developing male-only treatment groups to assist participants to feel more validated within ED treatment settings and developing interventions in response to male-specific disordered eating characteristics. For example, Peter stated "It's pretty hard as a guy so maybe just like giving me different ways to feel better about my body or healthier ways to do that would probably be a good idea."

Ben also expressed a desire for current treatment methods to be more inclusive of males and males-specific characteristics in order that he could feel more validated within treatment settings:

> I think the only thing is just the importance of intervention to really be framed around males, like I've never met another man who has an eating disorder. … I've never spoken about an eating disorder with another man, and I still really think a lot of the imagery that we have around eating disorder recovery is framed around women.

Some participants felt that knowing other males with EDs or attending male-only treatment settings may have helped them discuss their concerns without feeling judged or isolated. For instance, Alex mentioned feeling embarrassed about discussing his ED in treatment:

> I found it really hard to talk about my problems because I don't know any other guy that vomits their food up. … I don't know any other guy that just doesn't eat … my mates eat so much food, so it was embarrassing for me to actually admit what I was doing.

Similarly, Lucas described feeling isolated in treatment due to his diagnoses and not knowing other males with anorexia or bulimia:

> I don't know anyone else that's a male that has either of these problems. … I mean, I have female friends that have eating disorders but when it comes to male friends I was like, no. So, I already knew when I was coming in, I was like, I'm part of a very small minority just because I have Bulimia. But then being both bulimic and anorexic, I would be in an even smaller percentage of guys.

Participants in Theme 5 expressed ongoing treatment needs for their EDs, emphasizing the necessity for continued professional support to address lingering challenges. They also highlighted the need for tailored treatments specifically designed for male adolescents, emphasizing the importance of validation and inclusivity within treatment settings.

Discussion

The aim of this study was to investigate the experiences of male adolescents undergoing treatment for an ED. Ten male adolescents from two private psychology practices in New South Wales, Australia, were interviewed individually. Through framework analysis, five themes were identified (a) identification of the ED, (b) diagnosis of the ED, (c) benefits of ED treatment, (d) issues with ED treatment, and (e) future treatment needs. In addition, several subthemes emerged that outlined distinctive challenges for male adolescents seeking treatment for an ED, which reflect studies of male adults, including experiencing resistance to ED diagnoses, misconceptions regarding male-specific issues, a sense of disconnection with psychologists, and a desire for tailored treatment geared toward male adolescents (Thapliyal et al., 2020). A notable theme of the analysis was that the male adolescents' experience of ED treatment were significantly influenced by their ED diagnosis, the benefits and/or challenges they encountered during treatment, the rapport established with their psychologists, and the availability of tailored approaches to address their specific concerns.

Participants generally reported that the impact of receiving an ED diagnosis was less than positive. For many, it was related to perceived stigma about EDs, the perception that EDs were a "girls' problem," as well as reticence to disclose ED behaviors to health professionals to avoid diagnosis. Such findings reflect the principles of the sociocultural theory, which emphasizes the role of societal factors in the development of EDs

(Thompson et al., 1999). In this way, the resistance of male adolescents to ED diagnoses and the perception that gender roles dictate male self-reliance and resilience may point to the societal expectations that hinder male adolescent help seeking for EDs (Griffiths et al., 2015; Grillot & Keel, 2018). Indeed, findings by Räisänen and Hunt (2014) indicate that males frequently delay seeking treatment for ED symptoms and have difficulty recognizing them as a problem for these reasons (Griffiths et al., 2015; Grillot & Keel, 2018).

Additionally, participants also felt that their specific eating concerns were misunderstood or not reflected in assessment or treatment. While one participant, Ben, expressed that he desired a "small" body as part of his ED, another participant, Lucas, directly questioned the relevance of the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 2008). These findings raise questions about the assumptions underlying current treatment models, their applicability to male adolescents, and the requirement in some jurisdictions to meet thresholds for an ED on the basis of specific psychometric assessment measures (Fairburn & Beglin, 2008). They also have implications for patient rebates in public health systems, for instance in the Australian Medicare system (Lavender et al., 2017). As such, while some foundational aspects of the transdiagnostic model may be appropriate for some adolescent male presentations, some may not be. For instance, the overvaluation of a "thin" body, a fear of weight gain, and the use of compensatory behaviors to prevent weight gain may not accurately capture male-specific ED concerns, such as a desire for muscle gain or ED behaviors related to gaining muscle mass (Lavender et al., 2017). Thus, in assessing and diagnosing male adolescents with EDs, health professionals may benefit from increased awareness of male-specific ED symptoms outside those stipulated by current theoretical models (Ganson et al., 2021). Similarly, broader assessment of male adolescents who present with psychiatric comorbidities may also be warranted in the interests of accurate diagnosis and differential diagnosis (Burton et al., 2022).

Male adolescents' experiences of treatment appear to be determined largely by their relationship with their psychologist. Where treatment was considered beneficial by participants, they often cited an appreciation of the rapport that they developed with their psychologists and the use of individualized approaches in their treatment. In this way, participants felt they could express emotions that they would otherwise have had difficulty doing in front of their families. While family-based therapy is the first line evidence-based treatment for adolescents with anorexia nervosa or atypical anorexia nervosa as per the Royal Australian and New Zealand College of Psychiatrists guidelines (Hay et al., 2014), this finding echoes those of Thapliyal et al. (2017), who reported that the utilization of collaborative therapy strategies and therapist knowledge, care, and trustworthiness were among the most important elements in male ED treatment experiences. Male adolescents engagement in ED treatment may result not only from the rapport and encouragement they experience but also to the extent that these aspects result in beneficial change (Dearden & Mulgrew, 2013; Thapliyal et al., 2020).

Where treatment was considered unhelpful or even detrimental by participants, they cited negative interactions with their psychologist that generally involved a misunderstanding about, or minimization of, their ED symptoms. Some male adolescents also reported that particular comments made by their psychologist were unhelpful for their recovery, which Robinson et al. (2013) suggested may be attributed to a minimization of concern that occurs among health professionals, particularly toward males seeking help for an ED. Interactions such as these may be problematic because they perpetuate gender role assumptions, for instance that males respond to mental health issues on their own. They may also decrease the likelihood that treatment will be accessed by male adolescents with EDs (Fatt et al., 2020; Griffiths et al., 2015). As such, ongoing professional development for mental health professionals working in the area of male adolescent EDs may assist in creating safe spaces in which male adolescents can discuss concerns such as DE or body image concerns (Ganson et al., 2021). In this way, knowledge of the unique and shared characteristics of adolescent male ED presentations may be improved, and more effective treatment for male adolescents with EDs may be developed (Ganson et al., 2021; Thapliyal et al., 2017).

Finally, when given the opportunity to discuss their future treatment needs, participants expressed a desire for more male-focused treatment components and settings. These requests were mainly attributed to a desire to feel less isolated as a young male experiencing an ED and receive treatment that was framed around male-specific concerns. Treatment groups comprised solely of

males may help male adolescents diagnosed with EDs to feel less isolated than they reported when participating in groups with a majority of female patients (Dearden & Mulgrew, 2013; Thapliyal et al., 2020). Feelings of isolation and perceptions of stigma may be lessened in treatment groups where male adolescents feel safe discussing their struggles with food and body image (Strother et al., 2012; Thapliyal et al., 2020). In addition, health practitioners treating male adolescents with EDs may need to consider challenging masculine ideals of strength, power, and control that coincide with eating difficulties, to better focus ED treatment on male-specific eating concerns (Thapliyal et al., 2017, 2020). Consequently, male adolescents may feel less isolated in seeking ED treatment and maintain engagement in treatment longer if their experiences are normalized (Dearden & Mulgrew, 2013; Thapliyal et al., 2020).

Limitations

When interpreting findings of the present study, certain limitations must be acknowledged. First, despite the presence of a range of EDs in the current sample, the study's limited size hindered its capacity to compare experiences of symptoms and ED treatment approaches across different diagnoses. Second, clinical assessment requires a level of psychological insight to be able to accurately capture an individual's state. The findings of this study may be limited by the adolescent-level insight that the participants had into what constituted DE, what their symptoms were, and what to expect from treatment. Findings may be further limited through the limited insight male participants may have into the symptoms of an ED and their own eating behaviors (Burton et al., 2022; Fatt et al., 2020). Third, while the study's findings may also apply to male adolescents undergoing ED treatment within countries other than Australia, future comparative studies may be required to capture a broader age range and a larger number of males. This should include early adolescent or young adult males from various countries with diverse health care and ED treatment approaches to provide a more comprehensive understanding of the experiences of male adolescents undergoing ED treatment. Finally, we did not offer participants the opportunity to review their interview transcripts for reliability purposes, which could have enhanced the rigor of the study (Doyle, 2007). Despite recognizing the potential benefits of member checking, the logistical constraints in maintaining communication with the participants due to their ongoing treatment and potential confidentiality concerns prevented us from doing so.

Implications for Research and Clinical Practice

In light of the findings of the present study, it is crucial that future research further investigates the impact of the therapeutic relationship, diagnostic labeling, and male-specific treatment settings on the experiences of young male adolescents seeking treatment for an ED. Future research may also investigate the potential benefits of male-only ED treatment programs and male-specific ED information to increase engagement in treatment and foster greater acceptance of ED as a problem relevant to male adolescents (Dearden & Mulgrew, 2013; Thapliyal et al., 2020).

In addition, these findings may help to inform training programs for GP's and psychologists to increase awareness of male-specific ED symptoms, the challenges male adolescents face when attempting to seek treatment, and the need for normalization and validation of the male adolescents' experience (Ganson et al., 2021). Such training might emphasize heightened attention and increased awareness of male-specific ED symptoms beyond those outlined in current theoretical models and assessed by existing ED psychometric measures, such as desires for increased muscularity. Therefore, it is suggested that health professionals challenge the masculine ideals of strength, power, and control linked with eating challenges (Thapliyal et al., 2018).

This approach aims to enhance the treatment of EDs by focusing on the specific concerns related to males (Thapliyal et al., 2020). It also seeks to establish safe spaces for adolescent boys to openly address sensitive topics, such as DE or body image concerns (Ganson et al., 2021). In this way, the identification of male adolescents with EDs may be increased, and the stigmatization and isolation of male adolescents within ED treatment services and the wider community may be reduced, resulting in an improvement in overall treatment outcomes.

Conclusion

Ultimately the goal of such research is to contribute to a greater awareness of the unique experiences of male adolescents undergoing treatment for an ED. Importantly, this research underscores the significance of diagnostic labeling, personalized treatment methods, and the relationship dynamics with psychologists in the treatment process for male adolescents with EDs. These factors can either enhance or hinder their progress, engagement, and feelings of stigma and isolation during treatment. Additionally, the wider availability of male-specific ED information, treatment strategies, and treatment groups may also lead to higher engagement of male adolescents in ED treatment. This outcome may assist to reduce perception of EDs as a female disorder, reduce stigma attached to EDs treatment, and improve treatment engagement and outcomes for male adolescents.

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CHAPTER 9: General Discussion

Research on disordered eating (DE) in male adolescents is growing, both in terms of its account of developmental risk, and its account of the experiences of those referred for treatment. Much remains unknown, however. For instance, there is much to learn about specific psychosocial factors associated with DE in male adolescents and the mechanisms by which they function to influence the development of self-evaluative systems based on dieting, weight and shape (Brytek-Matera & Czepczor, 2017; Byrne et al., 2023). Similarly, research activity has increased into developing an understanding about the experience of male adolescents undergoing treatment for an eating disorder (ED). Historically, this has been an area of limited understanding as evident in existing ED diagnostic criteria and research output (Brown & Keel, 2023; Lavender et al., 2017). Thus, despite rising rates of EDs among male adolescents, misconceptions of male-specific ED concerns and presentations may persist and have the potential to result in limitations in the consistency and adequacy of treatment (Murray et al., 2018; Thapliyal et al., 2018).

The program of research undertaken in this dissertation broadly sought to identify psychosocial factors associated with the development of DE in males during adolescence, the impact of these factors on DE development, and the experiences of male adolescents undergoing ED treatment. A mixed methods approach was selected to inform these research questions from both quantitative and qualitative perspectives. In light of the relative lack of research and clinical knowledge of male-centric symptoms and experiences historically (Darcy, 2011; Murray et al., 2018) and currently (Brown & Keel, 2023; Byrne et al., 2023), this program of research sought to review current knowledge about the development of DE in male adolescents, improve the identification of factors associated with

DE in male adolescents, and document their experience of diagnosis, assessment and treatment. It also sought to offer supplementary evidence for the establishment or alteration of current ED diagnostic criteria and treatment approaches for males (Cooper et al., 2020a; Thapliyal et al., 2020). In this concluding chapter, the key findings of the research reported in this dissertation will be explored in light of its strengths, limitations and clinical implications for the treatment of DE amongst male adolescents. Finally, potential future directions for research in the field of DE amongst male adolescents and a general conclusion will be provided.

Summary of results

The first aim of this program of research was to identify psychosocial factors involved in the development of DE specific to male adolescents, and the psychometric measures utilized to assess those factors. Accordingly, Chapter 2 systematically reviewed 21 studies conducted between 2010 and 2022 and identified 35 risk factors that predicted of the development of DE in male adolescents and 14 psychometric measures used to assess those factors. The risk factors included psychological, body appearance, sociocultural, family, and peer concerns and influenced a range of DE outcomes identified in the reviewed studies. However, further analysis of the 14 assessment measures indicated that they were partially or completely normed on female populations and thus could not safely be generalized to males.

Critically, this research highlighted that numerous psychosocial factors are likely implicated in the development of EDs in male adolescents, and there is a clear need for further investigation, particularly within longitudinal research, to further inform our understanding of psychosocial factors that facilitate developmental trajectories toward male adolescent eating disorders and protect

against them. Additionally, it emphasized the need for the ongoing development of psychometric assessment measures to achieve this. Research has informed, and been informed by, the development and the revision of psychometric assessment measures in an effort to reflect DE characteristics of adolescent males and the importance of muscularity in this context (Murray et al., 2019). Specific eating and body image concerns indicated by male adolescents are evolving, and research has shown they may continue to be distinct from those typically demonstrated by females (Murray et al., 2017b; Verschueren et al., 2020).

The second aim of this program of research was to examine the relation between DE attitudes and behaviors in male adolescents and pertinent psychosocial characteristics of family relational quality; child social, emotional, and behavioral functioning; and child social media use. Based on multiple criteria, the results of the analysis revealed that a three-class solution provided the best fit to the data, namely, class 1 (low EDI-3 scores), class 2 (medium EDI-3 scores), and class 3 (high EDI-3 scores). The subscale score means on the Eating Disorders Inventory (EDI-3; Garner, 2004) increased as the class solution increased, indicating a clear gradient in the severity of ED symptoms across the classes and suggesting that identified classes represent meaningful subgroups of male adolescents with distinct levels of ED symptomatology.

However, contrary to expectations there were no significant differences in parenting quality, child social, emotional, and behavioral functioning and internalization of appearance ideals across the EDI-3 (Garner, 2004) classes. Such findings contrast with previous research suggesting that parental relationships could impact DE attitudes and behaviors in male adolescents (Brown et al., 2016; Pace et al., 2018). Similarly, the present findings contrast with more recent research which suggests that anxiety, affect, and externalizing characteristics as

well as social media are associated with the development of DE in male adolescents (Rodgers et al., 2020b).

Notably, this study provides valuable insight into the heterogeneity of ED symptomatology and highlights the importance of identifying subgroups of male adolescents with different levels of vulnerability. Identifying distinct latent classes of symptomatology can help classify male adolescents who are particularly vulnerable or resilient to developing EDs, enhancing comprehension of the diverse levels of eating concerns among male adolescents (Murray et al., 2017b; Verschueren et al., 2020). For instance, generating an understanding of the sorts of information engaged on social media, or the sorts of messages received, may assist in identifying vulnerability to DE. Similarly, vulnerability to DE in the form of parenting may be identified and interrupted as a result of efforts at preventative intervention (Pace et al., 2018; Zubatsky et al., 2015). In this way, more targeted and personalized prevention and intervention programs may be developed, which are tailored to the specific needs of different subtypes of male adolescents (Dearden & Mulgrew, 2013; Thapliyal et al., 2020). However, further research, particularly through longitudinal designs, is required to clarify the role of parent-child relationships, child social, emotional, and behavioral functioning and social media in the internalization of appearance ideals and the subsequent influence of these factors on disordered attitudes and behavior in male adolescents.

The third aim of this program of research was to assess DE in a normative sample of male adolescents. Accordingly, Chapter 6 examined the association between parent-child relational quality and symptoms and features of DE in male adolescents, and assessed this as it occurs within a context of child social, emotional, and behavioral functioning and social media.

Consistent with the first hypothesis of this study, SDQ total scores

(Goodman, 2001), mother total PBI-BC scores (Klimidis et al., 1992) and SIAQ-A scores (Keery et al., 2004), were significantly associated with scores on the EDI-3 (Garner, 2004). Importantly, age and father total PBI-BC scores were not found to statistically significantly associated with EDI-3 scores however given the strong correlation found between mother and father total PBI-BC scores, both mother and father total PBI-BC scores were retained in the model.

In line with the second hypothesis, multivariate analysis undertaken on whole sample data showed that two SDQ subscales, namely, conduct problems and emotional problems, were significantly associated with the EDI-3. In addition, further analysis indicated that emotional problems were significantly associated with all seven EDI-3 subscales, while hyperactivity, conduct problems, and peer problems were each associated with a single EDI-3 subscale.

The third hypothesis involved developing and testing a structural model to account for the cross-sectional association between variables. The association between total PBI-BC scores and total EDI-3 scores was statistically non-significant. However, a hypothesized model of the relation between the SDQ emotional problems subscale, hyperactivity subscale, conduct problems subscale and peer problems subscale as well as mother and father PBI-BC total scores, and SIAQ-A internalization of body appearance imagery on total EDI-3 total scores, fit whole sample data well. In addition, the model demonstrated invariance across three identified classes.

Finally, the relation between online body appearance imagery and each subscale of the EDI-3 that was employed was assessed using whole sample data. It was found that the engagement of such imagery was statistically significantly and positively associated with EDI-3 subscales pertinent to appearance namely, drive for thinness, body dissatisfaction, and perfectionism, however, it was

negatively or non-significantly associated with subscales pertaining to personal or interpersonal functioning namely, low self-esteem, interpersonal alienation, interoceptive deficits and emotion dysregulation.

Importantly, this researched highlighted the potential importance of mother-child relationship quality, the internalization of gendered appearance ideals and adolescents own social, emotional and behavioral functioning on the development of DE in males. More broadly, Chapter 6 highlighted the need for further research addressing parent-child relationship health as well as individual adolescent psychological wellbeing, in an effort to protect against the development of DE for male adolescents.

The fourth aim of this program of research was to investigate the experiences of male adolescents undergoing treatment for an ED. Accordingly, Chapter 8 presented a qualitative assessment of semi-structured interviews to gain a comprehensive understanding of male adolescents' thoughts, feelings, and beliefs about their experiences of seeking treatment for an ED. Overall, this research highlighted key points in relation to the diagnosis and treatment experiences of male adolescents specifically. Namely, that there was significant variability in male appearance and eating concerns, they often find assessment measures do not capture those concerns, their particular symptoms may be misunderstood or stereotyped by treating professionals and that current ED treatment is not tailored to be inclusive of male adolescents or male-centric eating and appearance concerns.

As such, Chapter 8 highlighted the need for further investigation of the qualitative experiences of male adolescents with EDs as well as their experience of diagnosis and treatment. Such research may help to inform that importance of clinical interview in addition to the use of established psychometric assessment

measures in informing and classifying ED symptoms in male adolescents. This study suggested further research and training may be warranted to inform work with adolescent males entering treatment settings (Murray et al., 2018; Thapliyal et al., 2018).

Theoretical Implications

The studies included in this program of research contribute valuable insights to the theoretical foundation of literature about EDs in male adolescents.

The current program of research highlights characteristics of male adolescent DE, which challenge some existing assumptions about ED pathology, such as the overvaluation of a "thin" body, fear of weight gain, and engagement in compensatory behaviors to prevent weight gain. In this way, the included studies align with previous findings questioning the applicability of existing theoretical models of EDs to male adolescents with DE (e.g., Nagata et al., 2019b; Rodgers et al., 2020b). These findings have important potential implications for our understanding of DE and ED, in that they demonstrate that characteristics of mental ill-health evolve over time, and some of the research reviewed in this dissertation relevant to the “bulk and cut” model of DEs, may influence female attitudes and behaviours.

Such components underpin many of the current treatment models, ED diagnostic criteria and established ED psychometric assessment measures. However, the present program of research highlighted characteristics of DE that may contradict such assumptions and are specific to male adolescents (Byrne et al., 2023; Lavender et al., 2017). As such, the current program of research outlined results which were more consistent with theoretical concepts related to sociocultural impacts of the development of DE (Thompson et al., 1999; Tylka, 2011). Sociocultural theory, as outlined in the tripartite influence model

(Thompson et al., 1999; Tylka, 2011), may extend upon the factors outlined by Fairburn et al. (2003) in highlighting that male adolescents may develop DE under the influence of sociocultural factors such as pressure from family, media and psychological factors such as body image concerns and negative affect (Byrne et al., 2023; Murray et al., 2017b).

Thus, consistent with sociocultural theory (Thompson et al., 1999; Tylka, 2011), the systematic review undertaken in study one, indicated that risk factors for male adolescents developing DE include psychological factors such as depressive symptoms and low self-esteem (Dakanalis et al., 2015; Sehm & Warschburger, 2018), body appearance factors such as muscularity concerns and body checking (Hoffmann & Warschburger, 2017; Zaitsoff et al., 2020), family factors such as attachment and perceived appearance pressure (Jackson & Chen, 2014; Van Durme et al., 2018), sociocultural factors such as the internalization of appearance ideals and perceived pressure from mass media (Jackson & Chen, 2011; Mougharbel et al., 2020) and peer factors such as friends eating habits and sexual harassment via self-surveillance (Petersen & Hyde, 2013; Rosenrauch et al., 2017). Additionally, the systematic review identified 14 assessment measures utilized to identify factors of risk for the development of DE amongst males however these psychometric assessment measures may not adequately capture male adolescent eating attitudes and behavior (Darcy et al., 2012; Murray et al., 2018), as they are largely based on existing theoretical models (Fairburn et al., 2003; Lavender et al., 2017)..

Therefore, the latent class segmentation, study two, suggested that scores on an existing ED assessment measure, the EDI-3 (Garner, 2004), could be utilized to identify distinct classes of male adolescents in a normative population. These classes could be taken as Low, Medium and High ED symptomology.

Identifying distinct latent classes of ED symptomatology based on EDI-3 scores (Garner, 2004), suggests some established ED assessment measures can be used to classify male adolescents who are particularly vulnerable to or resilient against developing EDs. In this way, intervention strategies may be implemented, for example, for male adolescents in the Low or Medium classes, to prevent ED symptoms from becoming more severe (Murray et al., 2017b; Verschueren et al., 2020), which may increase the likelihood of successful ED intervention, prevention and treatment outcomes.

Based on the findings of study one and two, the correlational path analysis, study three, explored the development of male adolescent DE in a normative sample of male adolescents. Consistent with sociocultural theory (Thompson et al., 1999; Tylka, 2011), results of this analysis highlighted relation between mother-child relational quality, the internalization of gendered appearance ideals, and adolescents own social, emotional and behavioral functioning and the development of DE in males.

The structural model developed in study three also extends upon Fairburn et al.'s (2003) model and indicates two primary paths of association between perceived quality of parenting as assessed by the PBI-BC (Klimidis et al., 1992) and symptoms of DE as assessed by the EDI-3 (Garner, 2004). Namely, the association between parenting and adolescent social emotional and behavioral functioning as assessed by the problem related subscales of the SDQ (Goodman, 2001) and the association between parenting and adolescent social media use as assessed by the SIAQ-A (Keery et al., 2004).

This finding supports previous research that suggests that parenting is strongly determinant of child social, emotional and behavioral functioning (Hochgraf et al., 2017) and potentially, therefore, strongly associated with adolescent eating

attitudes and behavior (Pace et al., 2018; Zubatsky et al., 2015). As such the model developed in study three may contribute to understanding ways to foster protection against DE in familial settings through the presence of high levels of parental care vs rejection and high levels of child autonomy vs parental control, and child social, emotional and behavioral functioning. Additionally, the second path is consistent with sociocultural theory (Thompson et al., 1999; Tylka, 2011). Findings suggest that body appearance imagery, while differentially associated with parenting, is also likely associated with characteristics of DE reported by male adolescents. Overall, the findings underscore the importance of a comprehensive, multidimensional approach to the assessment and treatment of EDs in male adolescents (Ganson et al., 2021). By addressing these multiple factors, clinicians may be better equipped to provide effective treatment to male adolescents with EDs and to promote positive body image and healthy eating behaviors (Ganson et al., 2021; Thapliyal et al., 2017).

In this way, the qualitative study, study four, aimed to investigate the experiences of male adolescents currently undergoing treatment for an ED within clinical settings. The second main theme identified in study four, namely the diagnosis of ED, captured male participants concerns about the use of assessment measures such as the EDE-Q (Fairburn & Beglin, 2008) in their clinical assessment and treatment. Male adolescents expressed that they felt the items utilized in such measures did not apply to their male-body type or address their body and eating issues. This is important given the variability with which those concerns were addressed. Such findings reflect those which indicate that an overreliance on established ED assessment measures such as the EDI-3 (Garner, 2004) or the EDE-Q (Fairburn & Beglin, 2008), may mean that males are underdiagnosed or receive inaccurate ED diagnoses, leading to treatment delays

or the delivery of inappropriate treatment within clinical settings (Forrest et al., 2017; Thapliyal et al., 2018). In this way, this research highlights the impact of diagnostic labelling, individualized approaches, and disconnection with psychologists within treatment. These characteristics were demonstrated to have implications for the progress, engagement, and experience of stigma and isolation male adolescents reported in ED treatment.

Thus, the findings of the current program of research align with sociocultural theory as outlined in the tripartite influence model (Thompson et al., 1999; Tylka, 2011) and extend upon aspects of the transdiagnostic model (Fairburn et al., 2003). They suggest that increased awareness of risk factors for DE in male adolescents may have benefit in treatment terms. Further exploring the relation between the development of DE, treatment strategies and specific treatment groups, may increase male engagement and reduce stigma associated with male EDs. In short, increasing engagement in treatment that is more clearly aligned with individual characteristics, may improve long-term ED treatment outcomes and recovery rates for male adolescents.

Clinical Implications

The results of this program of research have important clinical implications for the identification, assessment and treatment of male adolescents experiencing DE and undergoing treatment for an ED. Each of the included studies increased knowledge about the development of male adolescent DE and suggested that further research and future changes to current methods of identifying, assessing, diagnosing, and treating male adolescents with EDs, may be warranted.

The systematic review, study one in this program of research, suggested that psychometric assessment measures which, demonstrate measurement invariance or better discriminant validity are needed to accurately screen, diagnose and treat

EDs in male adolescents. Currently, established assessment measures have primarily been based on female experiences and symptoms and may not fully capture the unique experiences of male adolescents (Darcy et al., 2012; Murray et al., 2018). Refining such measures has been demonstrated to require alterations in the original factor structure or items, or, alternatively, broad statements about the applicability of established measures, given qualitative differences between populations and their particular experiences of body dissatisfaction and pathology (Carey et al., 2019; Jennings & Phillips, 2017). Alternatively, the development of new psychometric assessment measures has potential not only to recognize the limitations of original conceptualizations, but also the respond to research literature demonstrating that characteristics of presentation involving DE or EDs evolve over time (Forbush et al., 2013; Murray et al., 2019). The development of new, evidence informed, psychometric assessment measures, may therefore allow more accurate diagnoses and targeted interventions for male adolescents experiencing DE (Ganson et al., 2021; Lavender, 2021).

Additionally, studies two and three, emphasized the importance of early identification of male adolescents at different levels of vulnerability to developing DE. Unfortunately, many male adolescents may not seek treatment until their symptoms are severe, and this delay can have serious consequences for their physical and mental health (Räisänen & Hunt, 2014; Richardson & Paslakis, 2021). Thus, identifying male adolescents with low or medium levels of DE symptomology may assist in the provision of early interventions (Murray et al., 2017b; Verschueren et al., 2020). Indeed, early research by Stanford and McCabe (2005) indicated that a prevention program which addressed body image concerns, body change strategies and psychological adjustment, increased levels of self-esteem, lowered levels of negative affect and increased satisfaction with

muscles amongst males in early adolescence. However, contemporary investigations of the efficacy of prevention programs designed to address other aspects of male adolescent EDs such as consuming excessive protein or supplements, and developing an unhealthy fear of losing weight or muscle (Murray et al., 2018), amongst more diverse groups of male adolescents, is warranted. Furthermore, improving the training of GP's and other healthcare professionals to better recognize risk factors associated with DE development amongst male adolescents, may enhance prevention efforts against the development of eating issues at higher levels of clinical severity (Ganson et al., 2021).

Furthermore, studies two and three underscored the need for ongoing research into the experiences of male adolescents with DE. Despite growing awareness of EDs in males, there is still much to understand about their experiences of eating difficulties amongst male adolescents and thus their specific treatment needs (Kinnaird et al., 2019; Thapliyal et al., 2020). Continued research can help to refine current understanding of these disorders and inform the development of more effective prevention and treatment strategies for male adolescents.

Finally, study four highlighted the need for greater awareness of male-specific ED symptoms as well as the difficulties male adolescents experience within clinical treatment settings. Male adolescents may experience different symptoms than females as well as a range of issues with underdoing ED treatment (Lavender et al., 2017). This may include, but not be limited to, resistance to treatment seeking for an ED, misunderstanding of their specific ED concerns by treating professionals, feelings of stigma related to ED diagnostic labelling, difficulties adhering to treatment components, feeling isolated as a male

adolescent in ED treatment programs and feeling disconnected from treating professionals. Treatment programs must be tailored to meet the specific needs of individual male adolescents, including addressing their unique symptom profiles and concerns (Dearden & Mulgrew, 2013; Thapliyal et al., 2020). Healthcare professionals must also be aware of the demonstrated range of male-specific symptoms and take steps to mitigate them, for example by educating male adolescents about healthy body image, variability in body types and promoting balanced, non-dieting approaches to nutrition and exercise (Ganson et al., 2021; Thapliyal et al., 2018).

Study four also emphasized the importance of reducing stigma surrounding male EDs. This study indicated that male adolescents may feel ashamed or embarrassed about their struggles with food and body image, and this can prevent them from seeking help, or limit treatment effectiveness (Griffiths et al., 2015; Grillot & Keel, 2018). Healthcare professionals may therefore require further training on assessment and treating male-specific ED concerns in order to reduce stigma and promote understanding of male EDs as a serious and treatable condition (Ganson et al., 2021; Thapliyal et al., 2018).

In this way, it is necessary for healthcare professionals, educators, and researchers to acquire knowledge about risks for and symptoms of male adolescent EDs, develop male-specific assessment measures and treatment programs, provide early interventions, involve family and support systems in treatment, reduce stigma, and conduct ongoing research into male-specific ED concerns. By addressing the unique needs and concerns of male adolescents with EDs, treatment outcomes may be improved and the burden of EDs on male adolescents may be reduced.

Strengths of the present research

The current program of research exhibits several notable strengths and has contributed value to the existing body of literature concerning DE amongst male adolescents. Regarding present research on EDs and DE amongst adolescents, males have been relatively overlooked compared to females (Mitchison et al., 2013; Murray et al., 2017b) however, substantive differences exist between male and female adolescents in DE attitudes and behavior (Murray et al., 2019; Verschueren et al., 2020).

As such, study one encompassed a systematic review of the psychosocial risk factors that are prospectively associated with the development of DE attitudes and behavior in male adolescents and the psychometric assessment measures used in the reviewed studies to identify those factors of risk. This review addressed gaps in the literature regarding a lack of systematic reviews of prospective longitudinal research that examines factors associated with the development of DE attitudes and behavior in male adolescents and provided the context for the latent class segmentation study, study two, and the path-analysis study, study three.

A notable strength of studies two and three is that they were able to provide valuable insight into the heterogeneity of ED symptomatology. They highlight the importance of identifying subgroups of male adolescents with differing levels of symptomatology as well as providing evidence to account for several variables related to DE in male adolescents (Murray et al., 2017b; Verschueren et al., 2020). In particular, the creation of a novel structural model of DE amongst male adolescents in study three, is noteworthy because it demonstrated potential ways to consider fostering protection against the development of DE in male adolescents in familial settings. Of importance, the study documented the

presence of high levels of parental care vs rejection and high levels of child autonomy vs parental control, and the concomitant association between this and child social, emotional and behavioral functioning.

The qualitative study, study four, presented a novel investigation of the experiences of male adolescents undergoing ED treatment via semi-structured interviews. Such research utilized framework analysis (Ritchie & Spencer, 1994), to elucidate several specific sub-themes relevant to males' experiences of ED treatment and thus highlighted the impact of diagnostic labelling, individualized approaches and disconnection with psychologists within treatment to either benefit or detriment the progress, engagement and feelings of stigma and isolation for male adolescents in ED treatment. Qualitative research into male experiences of ED treatment is limited (Kinnaird et al., 2019; Thapliyal et al., 2020), and even less exists regarding male adolescents, thus study four in particular adds to a small but growing body of literature which contributes to a greater awareness of the unique experiences of male adolescents undergoing ED treatment.

Additionally, all studies within this program of research focused on male participants aged between 11-19 years, which encompasses the period of greatest risk for development of an ED (Mitchison et al., 2013; Panton & Garzon Maaks 2021), and utilized both non-clinical and clinical samples of male adolescents in quantitative and qualitative analysis respectively. The adoption of such a strategy allowed for a more comprehensive exploration of the data, generating rich and in-depth insights into male adolescents experiencing eating difficulties within and outside of clinical treatment. It also elucidated factors of ED risk which are specific to male adolescents, rather than female or adult male populations, as focused upon in existing literature (Breton et al., 2022; Darcy, 2011).

A significant contribution of the current thesis is that the program of

research encompasses a range of study designs including a systematic review, cross-sectional research and qualitative research. Throughout the present program of research, diverse approaches of analysis were utilized to gather both cross-sectional and qualitative data. These included latent-class analysis, correlational path analysis, and framework analysis. As such, the triangulation of the data sets facilitated a deeper and more nuanced understanding of male DE and clinical treatment experiences, thereby contributing to the existing body of quantitative and qualitative literature on DE and EDs among male adolescents.

Limitations of the present research

The results of this program of research should be considered in light of several limitations. Firstly, due to substantial periods of COVID-19 lockdown between 2020 and 2022, the processes of recruitment and data collection were severely interrupted as restrictions were placed on access to high schools by the Australian government and previously approved entry into secondary schools was prohibited. Thus, whilst data collection was planned to occur within public and private high schools across Australia in 2020, research was not permitted to proceed in any high school to reduce the impact on students and teachers as they were adjusting to snap lockdowns and rolling out online learning. In this way, the collection of the planned data from $n = 2000$ time-one participants and the collection of the time-two longitudinal data was prohibited and as such, a lack of the longitudinal data impacted inferences possible to be made within this program of research. Additionally, a comparative female cohort could not be obtained due to such restrictions.

Secondly, the program of research was limited by the heterogeneity or small sample size within the studies, related to the impact of COVID-19 restrictions on research. As such, most of the data for studies two and three were

obtained from a private boys' high school and two private practices in NSW, and the sample was consisted mostly of well-educated Australian males from upper-income families. Similarly, in study four, data was obtained from a small sample of 10 male adolescent participants. Thus, the generalizability and transferability of the findings to populations with greater ethnic and socioeconomic diversity and larger clinical populations of male adolescents with varying levels of ED symptom severity may be limited. Nonetheless, the results of program of research are highly pertinent to male adolescents experiencing DE and dissatisfaction with their appearance, especially those seeking treatment for an ED. To its credit, the program of research was able to maintain the statistical analyses and methodological rigor that was intended to be demonstrated in the original program of research. We regard this as a strength of the program of research that was undertaken in an extremely challenging social and health related environment.

Thirdly, the use of the EDI-3 (Garner, 2004) in studies 2 and 3 presents a notable limitation. While the EDI-3 (Garner, 2004) is a widely used and validated tool, its focus primarily on traditional ED symptoms may overlook nuanced aspects of male adolescent DE, such as concerns related to muscularity and body image (Murray et al., 2017b). However, despite often scoring lower on psychometric assessments aligned with female DE criteria (Carey et al., 2019), male adolescents still endorse items on measures such as the EDI-3 (Garner, 2004), with some minority male populations showing comparable levels of endorsement to females (Carey et al., 2019; Smith et al., 2017). Therefore whilst the EDI-3 (Garner, 2004) was utilized to the assess DE in the current program of research, the omission of measures like the EPSI (Forbush et al., 2013), or adjunctive items specifically targeting muscularity concerns (Lavender, 2021), may limit a comprehensive understanding of the complexities of DE behaviors in

male adolescents. Future research would benefit from incorporating a more diverse range of measures, including those that address concerns related to muscularity or body image dissatisfaction (Cooper et al., 2020b; Murray et al., 2019), or adjusting items on existing measures (Carey et al., 2019; Lavender, 2021), to capture the multifaceted nature of male adolescent DE.

Finally, the program of research relied primarily on self-report measures to operationalize psychological constructs, which may introduce certain limitations due to self-report and mono-method bias. It is essential to note that self-report measures and interviews require a certain level of psychological insight from the participants to accurately capture their experiences. In studies two, three and four, participants' insight into EDs, their own symptoms, and expectations of treatment, may have led to study limitations (Burton et al., 2022; Fatt et al., 2020). In addition, societal stigma associated with EDs as a female concern and limited research on male DE may have impacted male participants' self-awareness and understanding of their own eating behaviors (Burton et al., 2022; Fatt et al., 2020). Despite these limitations, self-report methods remain common in collecting data on large scale research and clinical contexts. Furthermore, incorporating semi-structured interviews in the program of research allowed the investigators to evaluate male adolescents' ED treatment experiences outside of standardized measures, which may have assisted in reducing self-report bias and increase the reliability of the findings.

Future Directions

In light of the findings of this program of research, there are several key areas that could be explored to advance the field of male ED research. Firstly, there is a need for further research on the risk factors for EDs in male adolescents. While some factors appear to be similar for both males and females, such as

societal pressure to conform to certain body types, there are other factors that appear to relate more specifically to males. For example, masculine gender roles for males may include stoicism and self-reliance, making it difficult for male adolescents to seek help for EDs (Griffiths et al., 2015; Grillot & Keel, 2018). Thus, future interventions could be designed to address these barriers and promote help-seeking behaviors. Understanding the factors that influence help-seeking behaviors among male adolescents, including the role of social support networks and mental health literacy, could inform the development of targeted interventions aimed at reducing stigma and increasing access to appropriate care. This holistic approach to research could contribute significantly to improving the well-being and outcomes of male adolescents with eating and body image concerns.

Additionally, future research could explore the unique symptom profiles and presentations of EDs in male adolescents. While some symptoms are similar for both genders, such as restriction of food intake and preoccupation with weight and body shape, male adolescents may also experience symptoms that are less commonly seen in females, such as a preoccupation with muscularity rather than thinness (Murray et al., 2017b; Nagata et al., 2019b). Further research could investigate the prevalence of these symptoms in male adolescents, their impact on mental and physical health outcomes, and may assist in responding to the demonstrated range of characteristics of ED presentation evident in male adolescents.

Additionally, future research may add to existing investigations of the long-term outcomes and course of EDs in normative populations of male adolescents (Allen et al., 2013b). Whilst early research has suggested that males with EDs may have a better prognosis than females (Støving et al., 2011), further research is needed to confirm these findings amongst male adolescent with subclinical levels

of ED symptoms and explore the factors that contribute to positive outcomes. Longitudinal studies conducted within normative populations of male adolescents could explore the development of subclinical ED symptoms, factors contributing to their exacerbation to clinical severity, or their remission. These studies could also examine the influence of peer and family support, as well as psychological resilience, on positive outcomes among male adolescents with eating and body image concerns. Such investigations have the potential to enhance current understanding of male adolescent EDs, potentially aiding in the further development of early intervention and prevention strategies tailored for this population.

Moreover, there is a need for further qualitative investigation of the experiences of male adolescents within treatment programs for EDs, as current treatment methods may not adequately address the unique needs and symptoms of male adolescents (Murray et al., 2018; Thapliyal et al., 2018). Early research has suggested that gender-specific treatment may improve outcomes for male adults with EDs (Dearden & Mulgrew, 2013; Strother et al., 2012). However, further qualitative research is needed to explore male adolescents' insights and experiences of ED treatment programs and thus to recognize the variability in their presentations and identify specific components and approaches that might be most effective. Such research could investigate the effectiveness of variable assessment approaches, the use of all-male treatment groups, male-focused psychotherapy approaches and interventions that address male-specific factors associated with male adolescent symptom profiles (Dearden & Mulgrew, 2013; Thapliyal et al., 2020).

Finally, future research could delve into the effectiveness of integrating male-based ED psychometric measures such as the Muscularity-Oriented Eating

Test (Murray et al., 2019) or the Eating for Muscularity Scale (Cooper et al., 2020b) into the current diagnostic and assessment procedures used by GPs. Alternatively, adjusting or rephrasing existing questionnaire items such as those targeting thinness or dissatisfaction with gendered body parts (e.g. thighs) (Lavender, 2021, p. 96), may allow health professionals to gain a more nuanced understanding of the diverse experiences and symptoms of male adolescents with EDs. This approach could provide valuable insights into the diagnostic accuracy and effectiveness of identifying and addressing EDs amongst male adolescents.

General Conclusion

The current program of research has contributed to a relatively limited literature surrounding factors of risk for the development of DE amongst male adolescents, the associations between such, as well as limited qualitative research which has explored the unique and individual experiences of male adolescents undergoing treatment for an ED. Overall, the findings of the current program of research suggest that there is a need for greater awareness and understanding of EDs among male adolescents, as well as additional research to identify and investigate the developmental trajectories at both population and individual levels, and effective treatments amongst normative and clinical populations of this population. The available literature highlights the importance of addressing gender-specific factors and experiences in the assessment and treatment of EDs in male adolescents. Future research and clinical practice should strive to improve the accessibility and effectiveness of interventions for male adolescents affected by EDs, to ensure early intervention, prevention, as well as best possible treatment outcomes. This program of research represents an important contribution to this process and expands on existing literature that emphasizes the importance of continuously re-evaluating current approaches to identifying, assessing, and

treating EDs to ensure tailored, accurate and effective clinical outcomes for male adolescents.

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Appendices

Appendix A: UTS HREC Ethics Approval Letters (Studies 2 and 3)

From: research.ethics@uts.edu.au
Subject: HREC Approval Granted - ETH18-2254
Date: 7 January 2019 at 3:49 pm
To: John.McAloon@uts.edu.au, Shauna.Byrne@student.uts.edu.au, Research.Ethics@uts.edu.au

Dear Applicant

Thank you for your response to the Committee's comments for your project titled, "Factors that influence the longitudinal development of eating disorders in adolescents". The Committee agreed that this application now meets the requirements of the National Statement on Ethical Conduct in Human Research (2007) and has been approved on that basis. You are therefore authorised to commence activities as outlined in your application.

You are reminded that this letter constitutes ethics approval only. This research project must also be undertaken in accordance with all UTS policies and guidelines including the Research Management Policy (http://www.gsu.uts.edu.au/policies/research-management-policy.html).

Your approval number is UTS HREC REF NO. ETH18-2254.

Approval will be for a period of five (5) years from the date of this correspondence subject to the submission of annual progress reports.

The following standard conditions apply to your approval:

- Your approval number must be included in all participant material and advertisements. Any advertisements on Staff Connect without an approval number will be removed.

- The Principal Investigator will immediately report anything that might warrant review of ethical approval of the project to the Ethics Secretariat (Research.Ethics@uts.edu.au).

- The Principal Investigator will notify the UTS HREC of any event that requires a modification to the protocol or other project documents, and submit any required amendments prior to implementation. Instructions can be found at https://staff.uts.edu.au/topichub/Pages/Researching/Research%20Ethics%20and%20Integrity/Human%20research%20ethics/Post-approval/post-approval.aspx#tab2.

- The Principal Investigator will promptly report adverse events to the Ethics Secretariat (Research.Ethics@uts.edu.au). An adverse event is any event (anticipated or otherwise) that has a negative impact on participants, researchers or the reputation of the University. Adverse events can also include privacy breaches, loss of data and damage to property.

- The Principal Investigator will report to the UTS HREC annually and notify the HREC when the project is completed at all sites. The Principal Investigator will notify the UTS HREC of any plan to extend the duration of the project past the approval period listed above through the progress report.

- The Principal Investigator will obtain any additional approvals or authorisations as required (e.g. from other ethics committees, collaborating institutions, supporting organisations).

- The Principal Investigator will notify the UTS HREC of his or her inability to continue as Principal Investigator including the name of and contact information for a replacement.

I also refer you to the AVCC guidelines relating to the storage of data, which require that data be kept for a minimum of 5 years after publication of research. However, in NSW, longer retention requirements are required for research on human subjects with potential long-term effects, research with long-term environmental effects, or research considered of national or international significance, importance, or controversy. If the data from this research project falls into one of these categories, contact University Records for advice on long-term retention.

You should consider this your official letter of approval. If you require a hardcopy please contact Research.Ethics@uts.edu.au.

If you have any queries about your ethics approval, or require any amendments to your research in the future, please do not hesitate to contact Research.Ethics@uts.edu.au.

Yours sincerely,

Dr Tim Luckett
(Acting) Chairperson
UTS Human Research Ethics Committee
C/- Research & Innovation Office
University of Technology, Sydney
E: Research.Ethics@uts.edu.au

REF: E38

From: Research.Ethics@uts.edu.au
Subject: UTS HREC Approval - ETH19-3781
Date: 4 July 2019 at 3:19 pm
To: Shauna.Byrne@student.uts.edu.au, ChrisB@bastenpsychology.com.au, Christopher.Basten@uts.edu.au, John.McAloon@uts.edu.au, Research.Ethics@uts.edu.au

Dear Applicant

UTS HREC REF NO. ETH19-3781

The HREC Expedited Review Committee reviewed your amendment application for your project titled, "Factors that influence the longitudinal development of eating disorders in adolescents", and agreed that the amendments meet the requirements of the NHMRC National Statement on Ethical Conduct In Human Research (2007). I am pleased to inform you that the Committee has approved your request to amend the protocol as follows:

"In the original application we proposed that data collection would occur on two occasions - the first between April and June 2019 and the second between September and November 2020. We are now wishing to add additional data collection points in 2024 and 2029, 5 and 10 years after the initial data collection. As these proposed additional data collection points will not involve schools, we are seeking approval to add an additional question to our survey that asks participants
"We are very interested in finding out more about how people who participate in our research do over time. Are you happy for us to contact you in 5 years time, and in another 5 years after that? If so, can you please provide us with an email address that will be valid for the next 5 years so we can ask you to complete this survey again?". Participants will be provided with a tick box option to record their response."

This amendment is subject to the standard conditions outlined in your original letter of approval.
You are reminded that this letter constitutes ethics approval only. This research project must also be undertaken in accordance with all UTS policies and guidelines including the Research Management Policy (http://www.gsu.uts.edu.au/policies/research-management-policy.html).

You should consider this your official letter of approval. If you require a hardcopy please contact the Research Ethics Officer (Research.Ethics@uts.edu.au).

To access this application, please follow the URLs below:
* if accessing within the UTS network: https://rm.uts.edu.au
* if accessing outside of UTS network: https://vpn.uts.edu.au , and click on " RM6 – Production " after logging in.

If you wish to make any further changes to your research, please contact the Research Ethics Secretariat in the Research and Innovation Office on 02 9514 2478.

In the meantime I take this opportunity to wish you well with the remainder of your research.

Yours sincerely,

A/Prof Beata Bajorek
Chairperson
UTS Human Research Ethics Committee
C/- Research & Innovation Office
University of Technology Sydney
T: (02) 9514 9772
F: (02) 9514 1244
E: Research.Ethics@uts.edu.au
I: http://www.research.uts.edu.au/policies/restricted/ethics.html
P: PO Box 123, BROADWAY NSW 2007
[Level 14, Building 1, Broadway Campus]
CB01.14.08.04

E13-3

UTS CRICOS Provider Code: 00099F DISCLAIMER: This email message and any accompanying attachments may contain confidential information. If you are not the intended recipient, do not read, use, disseminate, distribute or copy this message or attachments. If you have received this message in error, please notify the sender immediately and delete this message. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the University of Technology Sydney. Before opening any attachments, please check them for viruses and defects. Think. Green. Do. Please consider the environment before printing this email.

From: Research.Ethics@uts.edu.au
Subject: HREC Approval Granted - ETH20-5035
Date: 15 October 2020 at 1:26 pm
To: Research.Ethics@uts.edu.au, John.McAloon@uts.edu.au, ShaunaElizabeth.Byrne@uts.edu.au, Shauna.Byrne@student.uts.edu.au

Dear Applicant

Re: ETH20-5035 - "Factors that influence the longitudinal development of disordered eating in adolescents"

The UTS Human Research Ethics Expedited Review Committee reviewed your amendment application for your project and agreed that the amendments meet the requirements of the NHMRC National Statement on Ethical Conduct In Human Research (2007). I am pleased to inform you that the Committee has approved your request to amend the protocol as follows:

We would like to make an amendment to the location the research/data collection will take place, due to the restrictions placed on data collection at the moment in NSW high schools as a result of COVID19. We would like to be able to distribute the survey online on social media platforms such as Facebook and in relevant social media groups/forums. The consent form and information form has been incorporated into an online format for participants to read through so by moving the study onto social media platforms rather than just in schools we may be able to continue data collection that is currently prohibited in schools due to the COVID19 lockdowns and additional work teachers/students have to accommodate. This has been a major point of resistance for schools in committing to the research and withdrawing from the research despite having already committed to it. We would also like to change the title of the project to: "Factors that influence the longitudinal development of disordered eating in adolescents".

This amendment is subject to the standard conditions outlined in your original letter of approval.

You are reminded that this letter constitutes ethics approval only. This research project must also be undertaken in accordance with all UTS policies and guidelines including the Research Management Policy.

You should consider this your official letter of approval. If you require a hardcopy please contact the Ethics Secretariat.

To access this application, please click here, a copy of your application has also been attached to this email.

If you wish to make any further changes to your research, please contact the Research Ethics Secretariat on 02 9514 2478.

In the meantime I take this opportunity to wish you well with the remainder of your research.

Yours sincerely,

Prof Beata Bajorek
Chairperson
UTS Human Research Ethics Committee
C/- Research Office
University of Technology Sydney
Research.Ethics@uts.edu.au | Website
PO Box 123 Broadway NSW 2007

From: **Research.Ethics@uts.edu.au** research.ethics@uts.edu.au
Subject: HREC Approval Granted - ETH21-6521
Date: 29 October 2021 at 11:37 am
To: Research.Ethics@uts.edu.au, 149323@uts.edu.au, John.McAloon@uts.edu.au, Shauna.Byrne@student.uts.edu.au

Dear Applicant

Re: ETH21-6521 - "Factors that influence the longitudinal development of eating disorders in adolescents"

The UTS Human Research Ethics Executive Review Committee reviewed your amendment application for your project and agreed that the amendments meet the requirements of the NHMRC National Statement on Ethical Conduct In Human Research (2007). I am pleased to inform you that the Committee has approved your request to amend the protocol as follows:

"We would like to make an amendment to the compensation participants may receive for completing the survey at Time 2, due to the restrictions placed on data collection at the moment in NSW high schools as a result of COVID19. We would like to be able to contact participantss who have consented to complete the survey Time 2 and provided their email address to do so, and offer a prize of winning one of five $200 Mastercard virtual gift cards. The winners will be chosen at random and the virtual gift card can be emailed to them via the email address they provided when asked if they would consent to completing the Time 2 time point. The research was originally planned to be completed in school time however school shut-downs as a result of COVID-19 has meant that schools that have already committed to the research are unable to continue with it, and schools that were considering signing up to the research are no longer able to do so. With this amendment we hope to encourage adolescent participants to complete the research within their home schooling and believe the opportunity to enter a draw represents an appropriate form of compensation to do so. We would also like to change the title of the project to: "Factors that influence the longitudinal development of disordered eating in male adolescents" as the current data we have for Time 1 is an all-male participant pool."

This amendment is subject to the standard conditions outlined in your original letter of approval.

You are reminded that this letter constitutes ethics approval only. This research project must also be undertaken in accordance with all UTS policies and guidelines including the Research Management Policy.

You should consider this your official letter of approval. If you require a hardcopy please contact the Ethics Secretariat.

To access this application, please click here, a copy of your application has also been attached to this email.

If you wish to make any further changes to your research, please contact the Research Ethics Secretariat on 02 9514 2478.

In the meantime I take this opportunity to wish you well with the remainder of your research.

Yours sincerely,

The Research Ethics Secretariat

on behalf of the Human Research Ethics Executive Review Committees
C/- Research Office
University of Technology Sydney
Research.Ethics@uts.edu.au | Website
PO Box 123 Broadway NSW 2007

Appendix B: Stakeholder Approval letters (Studies 2 and 3)

NSW GOVERNMENT Education Public Schools

Miss Shauna Byrne

DOC19/225003
SERAP 2018950

Dear Miss Byrne

I refer to your application to conduct a research project in NSW government schools entitled *Factors that influence the longitudinal development of eating disorders in adolescents*. I am pleased to inform you that your application has been approved.

You may contact principals of the nominated schools to seek their participation. **You should include a copy of this letter with the documents you send to principals.**

This approval will remain valid until 26 March 2020.

The following researchers or research assistants have fulfilled the Working with Children screening requirements to interact with or observe children for the purposes of this research for the period indicated:

Researcher name	WWCC	WWCC expires
Shauna Byrne	WWC1069698E	16-Dec-2023

I draw your attention to the following requirements for all researchers in NSW government schools:

- The privacy of participants is to be protected as per the NSW Privacy and Personal Information Protection Act 1998.
- School principals have the right to withdraw the school from the study at any time. The approval of the principal for the specific method of gathering information must also be sought.
- The privacy of the school and the students is to be protected.
- The participation of teachers and students must be voluntary and must be at the school's convenience.
- Any proposal to publish the outcomes of the study should be discussed with the research approvals officer before publication proceeds.
- All conditions attached to the approval must be complied with.

When your study is completed please email your report to: serap@det.nsw.edu.au.
You may also be asked to present on the findings of your research.

I wish you every success with your research.

Yours sincerely

Production Note:
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to publication.

Robert Stevens
Manager Research
School Policy and Information Management
26 March 2019

School Policy and Information Management
NSW Department of Education
Level 1, 1 Oxford Street, Darlinghurst NSW 2010 – Locked Bag 53, Darlinghurst NSW 1300
Telephone: 02 9244 5060 – Email: serap@det.nsw.edu.au

CATHOLIC EDUCATION
DIOCESE OF BATHURST

28 March 2019

Shauna Byrne
University of Technology Sydney

Via email: shauna.byrne@student.uts.edu.au

Dear Shauna,

Thank you for your application to conduct research within the Diocese of Bathurst. I understand you would like to contact schools within the Diocese of Bathurst in order to conduct the study titled "*Factors that influence the development of eating disorders in adolescents*". Approval is hereby given for you to conduct this study.

The schools nominated for the study would be the central and secondary schools within the Diocese of Bathurst.

As we have already received your completed forms, we will now notify the school and advise the Principals of our preliminary approval. You now have permission to approach the Principals of the schools. As you no doubt appreciate, it is the prerogative of any Principal whom you might approach to decline your invitation to be involved in this study or to withdraw from involvement at any time.

The privacy of the school and that of any school personnel or students involved in your study must, of course, be preserved at all times and comply with requirements under the Commonwealth Privacy Amendment (Private Sector) Act 2000.

It is a condition of approval that when your research has been completed you will forward a summary report of the findings and/or recommendations to this office as soon as practicable after results are to hand.

Please do not hesitate to contact me at this office if there is any further information you require. I wish you well in this undertaking and look forward to learning about your findings.

Yours sincerely,

Production Note:
Signature removed prior
to publication.

Mrs Jenny Allen
Executive Director of Schools

Gilmour Street Kelso NSW 2795 | PO Box 308 Bathurst NSW 2795 | T: 02 6338 3000 | F: 02 6338 3001
138 Sheraton Road Dubbo NSW 2830 | PO Box 4208 Dubbo NSW 2830 | T: 02 6882 7355 | F: 6882 9337
Email: ceo@bth.catholic.edu.au | ABN: 73 470 086 952 | www.bth.catholic.edu.au

Catholic Schools Office
DIOCESE OF MAITLAND-NEWCASTLE

Director's Office
Brid Corrigan
STRATEGIC PROGRAM ADVISOR
P 4979 1207 **F** 4979 1208
E brid.corrigan@mn.catholic.edu.au

29 May 2019

Ms Shauna Byrne
Clinical Psychology Registrar
Graduate School of Health
UTS

Dear Shauna,

Thank you for your application to conduct research in the Diocese of Maitland-Newcastle. Approval is given for the research project 'Factors that influence the development of eating disorders in adolescents' within the diocese. Please note the following points in relation to research requests:

- It is the school principal, who gives final permission for research to be carried out in their school.
- The privacy of participants is to be observed in reporting and must comply with the requirements of the Commonwealth Privacy Amendment (Private Sector) Act 2000.
- There should be some feedback to schools and a copy of the findings of the research forwarded to this office.
- This letter of approval should accompany any approach to schools.

We note that no researchers will have direct contact with students.

I look forward to the results of this study and wish you the best over the coming months. If you require any further assistance or wish to discuss any aspect of this research in our diocese, please do not hesitate to contact me.

Yours sincerely,

Production Note:
Signature removed prior
to publication.

Brid Corrigan
STRATEGIC PROGRAMS ADVISOR

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09 May 2019

Shauna Byrne
[redacted]
shauna.byrne@student.utd.edu.au

Dear Shauna,

Re: Application to undertake the research project entitled:
"Factors that influence the longitudinal development of eating disorders in adolescents".

Acknowledgement is made of your application to conduct the above mentioned research within the Diocese of Wollongong.

Approval has been granted for you to proceed at a general level in the Diocese of Wollongong for 2019, and to approach the principal of the schools in the Diocese of Wollongong, nominated in your application.

In accordance with the agreement permitting you to conduct your research within the Wollongong Diocese, I would ask that provide a summary report of the project at your earliest convenience and within 6 months of the completion. Alternatively, inform me if the research project is discontinued, as this information will enable us to keep our records and files updated.

Please do not hesitate to contact me on 4253 0935 if you have any further enquiries.

I wish you well with this undertaking and look forward to receiving your final report.

Yours sincerely,

Production Note:
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to publication.

Mark Raue
Professional Assistant to the Director of Schools
Strategic Planning and Policy - Office of the Director
Catholic Education Office, Diocese of Wollongong
Locked Mail Bag 8802
WOLLONGONG NSW 2500

Appendix C: Participant Information sheet (Studies 2 and 3)

PARTICIPANT INFORMATION SHEET
Eating difficulties in Adolescents
UTS HREC REF NO. 18-2254

WHO IS DOING THE RESEARCH?

My name is Miss Shauna Byrne and I am a student at UTS. My supervisors are Dr John McAloon and Dr. Chrisptoher Basten at the UTS Graduate School of Health.

WHAT IS THIS RESEARCH ABOUT?

Adolescents aged between 11-18 years old develop eating difficulties more than any other age. The Australian Child and Adolescent Survey of Mental Health and Wellbeing estimated that 2.4% of young people aged 11–17 reported problem eating behaviours in 2012–13. Evidence suggest that young females have 2.5 times as many eating disorders as young men.

During adolescence, people undergo significant changes in social, emotional and behavioural ways. This research aims to find out more about eating difficulties; things that can contribute to vulnerability to developing eating difficulties in adolescence and things that can protect against it.

Our research looks at a range of individual, family and social factors at two time points one year apart. Importantly, research like this does not attempt to identify *causes*, rather we hope to identify things that change over time that contribute to vulnerability to eating difficulties in adolescence and things that protect against them. We are interested in exploring these things within Australia because we want to know more about how eating difficulties appear in our young people. It is important to know that we are not diagnosing eating disorders in this research and if you have any concerns about your own or your child's eating, we suggest you contact your family GP to discuss them.

WHY HAVE I BEEN ASKED?

We are interested in hearing from you because you are an adolescent attending a NSW High School. Please note that if you are in one of the following groups we won't be able to ask you to join in on the research:

- If you are not aged between 11-19
- If you have been diagnosed with an eating disorder
- If you have been diagnosed with a Neurodevelopmental disorder like Autism
- if you have experience of child protection, out of home care or have been in detention.

IF I SAY YES, WHAT WILL IT INVOLVE?

If you decide to take part, we will invite you to complete a four-part online survey. The first part will happen between April and June 2019, the second between September and November 2020 and the third and fourth parts will happen in 2024 and 2029. Each survey will take approximately 40 minutes to complete, and you would do this during a time elected by your school.

The online survey will ask you some questions about your eating and exercise habits, your family and peer eating habits, peer support, family relationships, substance use, social media use, how you feel about the way you look and your emotional and psychological wellbeing.

The results of this research will be used in Miss Shauna Byrne's Doctor of Philosophy research (Clinical Psychology). The research may also be used for publication in an academic journal or be presented at conferences but you won't be identified in any way.

ARE THERE ANY RISKS/INCONVENIENCE?

We hope you won't feel any distress from answering the survey questions, but there is always a small chance you will. If you do become distressed because of the survey, we will ask you to tell your parents or to get in touch with us when we are at your school of by email so we can check in with you and work out what to do. If you do want to talk to us, the best person to contact is Dr John McAloon, email: john.mcaloon@uts.edu.au

UTS UNIVERSITY OF TECHNOL SYDNEY

DO I HAVE TO SAY YES?

No, you don't have to do this if you don't want to. It is completely up to you whether or not you decide to take part.

WHAT WILL HAPPEN IF I SAY NO?

If you decide you don't want to participate, it will not affect your relationship with your school or UTS. If you wish to withdraw from the study once it has started, just let us know. Please contact Miss Shauna Byrne by email: shauna.byrne@student.uts.edu.au

CONFIDENTIALITY

We will ask you and your parents to sign a consent form. This means you and your parents are consenting to us using the information you provide in the survey for the research project. All your information will be treated confidentially. You will be asked to help generate a confidential code and we will use this instead of your name so no one will be able to identify your information. Your information will only be used for the purpose of this research project. Only the nominated researchers will have access to the material provided by participants in this study. This will ensure that data will be kept confidential, both during the collection phase and in the publication of results.

It is important for you to know that if we are concerned about you we will want to get in touch with your parents to work out how we can best help you.

We plan to publish and use the results in a doctoral thesis, journal article and potentially at a conference. In any publication, information will be provided in such a way that you cannot be identified.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?

If you have concerns about the research that you think I or my supervisor can help you with, please feel free to contact us on the details below:

Primary Investigator: Shauna Byrne
Email: shauna.byrne@student.uts.edu.au

UTS Primary Supervisor: Dr. John McAloon
Phone: +61 2 9514 7240, Email: john.mcaloon@uts.edu.au

If you feel distressed when completing the survey, you are able to withdraw at any time.

If you wishe to talk to someone about how they feel during or after completing the survey please contact:

- Parentline – 1300 1300 52
- Kids Helpline – 1800 55 1800 (24 hours)
- Lifeline – 11 13 14 (24 hours)
- UTS Psychology Cinic – 9514 7339
- Your local GP or wellbeing team at your child's local school

Please screenshot this page for a personal copy of this information sheet.

NOTE:
This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au], and quote the UTS HREC reference number. Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Appendix D: Participant Consent form (Studies 2 and 3)

CONSENT FORM
FACTORS THAT INFLUENCE THE DEVELOPMENT OF EATING DISORDERS IN ADOLESCENTS
UTS HREC REF NO. ETH18-2254

I _____ (Parents name, PLEASE PRINT) agree for my child participate in the research project *Factors That Influence the Development of Eating Disorders in Adolescents [UTS HREC REF NO. ETH18-2254]* being conducted by Miss Shauna Byrne under the supervision of Dr John McAloon and Dr Josephine Paparo at the Graduate School of Health, UTS.

I have read the Participant Information Sheet or someone has read it to me in a language that I understand.

I understand the purposes, procedures and risks of the research as described in the Participant Information Sheet.

I have had an opportunity to ask questions and I am satisfied with the answers I have received.

I freely agree for my child to participate in this research project as described and understand that they are free to withdraw at any time without affecting my relationships with the researchers and the University of Technology Sydney or my child's school.

I understand that I can screenshot this page for a personal copy of the consent form.

I agree that the research data gathered from this project may be published in a form that:
☐ Does not identify my child in any way
☐ May be used for future research purposes

I am aware that I can contact Dr John McAloon at john.mcaloon@uts.edu.au if I have any concerns about the research.

By saying yes, I agree to give my informed consent for my child to participate in this research.

NOTE:
This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au, and quote the UTS HREC reference number. Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Parents Signature: _____

Date: _____

Childs Signature: _____

Date: _____

Appendix E: Research questionnaire set (Studies 2 and 3)

To create a Unique ID for your information please write the first letters of your first and last name and the two digits of the day and month you were born (e.g. John Smith born on 26th of May = JS2605)

Unique ID: _____

We are very interested in finding out more about how people who participate in our research do over time. Are you happy for us to contact you in 5 years' time, and in another 5 years after that?

- ☐ Yes
- ☐ No

If so, can you please provide us with an email address that will be valid for the next 5 years so we can ask you to complete this survey again?

Email: _____

What is your age in years?

- ☐ 11 years
- ☐ 12 years
- ☐ 13 years
- ☐ 14 years
- ☐ 15 years
- ☐ 16 years
- ☐ 17 years
- ☐ 18 years
- ☐ 19 years

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Non-binary/ gender fluid
- ☐ Different Identity: _____

What is your ethnicity?

- ☐ Australian
- ☐ White (English/ Welsh/ Scottish/ Irish)
- ☐ Indigenous Australia or Torres Strait Islander
- ☐ New Zealander
- ☐ Asian
- ☐ Indian
- ☐ Middle Eastern
- ☐ European
- ☐ North American
- ☐ South American
- ☐ African
- ☐ Other (Please Specify): _____

What is your parental structure?

- ☐ Mother and Father
- ☐ Father and Father
- ☐ Mother and Mother
- ☐ Single Female parent or Guardian
- ☐ Single Male Parent or Guardian
- ☐ 2 Male Guardians
- ☐ 2 Female Guardians
- ☐ Male guardian and Female Guardian

Do you have siblings?

- ☐ Yes
- ☐ No

Eating Disorder Inventory – 3 (Garner, 2004)

These items ask you about your attitudes, feelings about behaviors, some of the items relate to food or eating; other items ask about your feelings about yourself.

For each item, decide if the item is true about you ALWAYS, USUALLY, OFTEN, SOMETIMES, RARELY or NEVER. Mark the box that corresponds to your rating. For example, if your rating for an item is OFTEN, you would tick the "OFTEN" box for that item.

	Always	Usually	Often	Sometimes	Rarely	Never
1. I eat sweets and carbohydrates without feeling nervous						
2. I think about dieting						
3. I feel extremely guilty after overeating						
4. I am terrified of gaining weight						
5. I exaggerate or magnify the importance of weight						
6. I am preoccupied with the desire to be thinner						
7. If I gain a pound, I worry that I will keep gaining						
8. I think my stomach is too big						
9. I think that my thighs are too large						
10. I think that my stomach is just the right size						
11. I feel satisfied with the shape of my body						
12. I like the shape of my buttocks						
13. I think my hips are too big						
14. I feel bloated after I eat a normal meal						
15. I think that my thighs are just the right size						

16. I think my buttocks are too large.						
17. I think that my hips are just the right size.						
18. Other people would say that I am emotionally unstable						
19. I say things impulsively that I regret having said						
20. I have to be careful to my tendency to abuse drugs						
21. I am prone to outbursts of anger or rage						
22. I have to be careful of my tendency to abuse alcohol						
23. Others would say that I get irritated easily						
24. I experience marked mood shifts						
25. I feel ineffective as a person						
26. I feel inadequate						
27. I feel secure about myself						
28. I have a low opinion of myself						
29. I feel that I can achieve my standards						
30. I feel that I am a worthwhile person						
31. I trust others						
32. I have close relationships						
33. I need to keep people at a certain distance (feel uncomfortable if someone tries to get too close)						
34. People I really like end up disappointing me						

35. I feel trapped in relationship						
36. People understand my real problems						
37. I know that people love me						
38. Only outstanding performance is good enough for my family						
39. As a child, I tried very hard to avoid disappointing my parents and teachers						
40. I hate being less than best at things						
41. My parents have expected excellence of me						
42. I feel that I must do things perfectly or not do them at all						
43. I have extremely high goals						
44. I get frightened when my feelings are too strong						
45. I get confused about what emotion I am feeling						
46. I can clearly identify what emotion I am feeling						
47. I don't know what's going on inside me						
48. I get confused as to whether or not I am hungry						
49. I worry that my feelings will get out of control						
50. When I am upset, I don't know if I am sad, frightened or angry						
51. I have feelings I can't quite identify						
52. I can't get strange thoughts out of my head						

Strengths and Difficulties Questionnaire (Goodman, 2001)

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items the best you can even if you are not absolutely certain. Please give your answers on the basis of how things have been for you over the **last six months.**

	Not True	Somewhat True	Certainly True
1. I try to be nice to other people. I care about their feelings			
2. I am restless I cannot stay still for long			
3. I get a lot of headaches, stomach-aches or sickness			
4. I usually share with others, for example CD's, games, food			
5. I get very angry and often lose my temper			
6. I would rather be alone than with people of my age			
7. I usually do as I am told			
8. I worry a lot			
9. I am helpful if someone is hurt, upset or feeling ill			
10. I am constantly fidgeting or squirming			
11. I have one good friend or more			
12. I fight a lot. I can make other people do what I want			
13. I am often unhappy, depressed or tearful			
14. Other people my age generally like me			
15. I am easily distracted, I find it difficult to concentrate			
16. I am nervous in new situations, I easily lose confidence			
17. I am kind to younger children			
18. I am often accused of lying or cheating			
19. Other children or young people pick on me or bully me			
20. I often offer to help others (parents, teachers, children)			
21. I think before I do things			
22. I take things that are not mine from home, school or elsewhere			
23. I get along better with adults than people my own age			
24. I have many fears, I am easily scared			
25. I finish the work I'm doing, My attention is good			

Do you have any other comments or concerns?			
Overall do you think that you have difficulties in any of the following areas: *Emotions, concentration, behavior or being able to get on with other people?*			
No	Yes- Minor difficulties	Yes – Definite difficulties	Yes- Severe difficulties
If you have answered "Yes", please answer the following questions about these difficulties:			
How long have these difficulties been present?			
Less than a month	1-5 months	6-12 months	Over a year
Do the difficulties upset or distress you?			
Not at all	Only a little	Quite a lot	A great deal

Do the difficulties interfere with your everyday life in the following areas?

	Not at all	Only a little	Quite a lot	A great deal
Home life				
Friendships				
Classroom Learning				
Leisure Activities				

Do the difficulties make it harder for those around you (family, friends, teachers etc)?			
Not at all	Only a little	Quite a lot	A great deal

Parental Bonding Instrument – Brief Current form

(Klimidis, Minas & Ata, 1992)

This questionnaire lists various attitudes and behaviors of parents.

Please **place a tick** in the most appropriate box next to each question

	Never	**Sometimes**	**Always**
1. My **Mother** does not help me as much as I need			
2. My **Mother** lets me do things I like doing			
3. My **Mother** seems emotionally cold to me			
4. My **Mother** appears to understand my problems and worries			
5. My **Mother** likes me to make my own decisions			
6. My **Mother** tries to control everything I do			
7. My **Mother** tends to baby me			
8. My **Mother** can make me feel better when I am upset			
1. My **Father** does not help me as much as I need			

2. My **Father** lets me do things I like doing			
3. My **Father** seems emotionally cold to me			
4. My **Father** appears to understand my problems and worries			
5. My **Father** likes me to make my own decisions			
6. My **Father** tries to control everything I do			
7. My **Father** tends to baby me			
8. My **Father** can make me feel better when I am upset			

The Sociocultural Internalization of Appearance Questionnaire – Adolescents (Keery et al., 2004)

Please **circle the number** that is true for you for each of the sentences below.

For example, if looking at social media 'definitely' makes you want to lose or gain weight, you would circle the number '5' for that sentence.

1. I would like my body to look like the bodies of people on social media.

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree nor Disagree	Mostly Agree	Definitely Agree

2. Looking at social media makes me want to change the way I look.

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree nor Disagree	Mostly Agree	Definitely Agree

3. Looking at social media makes me want to lose or gain weight.

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree nor Disagree	Mostly Agree	Definitely Agree

4. Looking at social media makes me want to change my appearance.

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree nor Disagree	Mostly Agree	Definitely Agree

5. I would like my appearance to be like the appearance of people on social media.

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree nor Disagree	Mostly Agree	Definitely Agree

Appendix F: UTS HREC Ethics Approval Letters (Study 4)

From: Research.Ethics@uts.edu.au <Research.Ethics@uts.edu.au>
Sent: Tuesday, 14 June 2022 1:27 PM
To: Research Ethics <research.ethics@uts.edu.au>; John McAloon <John.McAloon@uts.edu.au>; Shauna Elizabeth Byrne <149323@uts.edu.au>
Subject: HREC Approval Granted - ETH21-5909

Dear Applicant

Re: ETH21-5909 - "How does a lack of clarity around disordered eating definition, impact clients seeking clinical treatment?"

Thank you for your response to the Committee's comments for your project. The Committee agreed that this application now meets the requirements of the National Statement on Ethical Conduct in Human Research (2007) and has been approved on that basis. You are therefore authorised to commence activities as outlined in your application.
You are reminded that this letter constitutes ethics approval only. This research project must also be undertaken in accordance with all UTS policies and guidelines including the Research Management Policy.

Your approval number is UTS HREC REF NO. ETH21-5909.

Approval will be for a period of five (5) years from the date of this correspondence subject to the submission of annual progress reports.

The following standard conditions apply to your approval:

- Your approval number must be included in all participant material and advertisements. Any advertisements on Staff Connect without an approval number will be removed.
- The Principal Investigator will immediately report anything that might warrant review of ethical approval of the project to the Ethics Secretariat.
- The Principal Investigator will notify the Committee of any event that requires a modification to the protocol or other project documents, and submit any required amendments prior to implementation. Instructions on how to submit an amendment application can be found here.
- The Principal Investigator will promptly report adverse events to the Ethics Secretariat. An adverse event is any event (anticipated or otherwise) that has a negative impact on participants, researchers or the reputation of the University. Adverse events can also include privacy breaches, loss of data and damage to property.
- The Principal Investigator will report to the UTS HREC or UTS MREC annually and notify the Committee when the project is completed at all sites. The Principal Investigator will notify the Committee of any plan to extend the duration of the project past the approval period listed above.
- The Principal Investigator will obtain any additional approvals or authorisations as required (e.g. from other ethics committees, collaborating institutions, supporting organisations).
- The Principal Investigator will notify the Committee of his or her inability to continue as Principal Investigator including the name of and contact information for a replacement.

This research must be undertaken in compliance with the Australian Code for the Responsible Conduct of Research and National Statement on Ethical Conduct in Human Research.

You should consider this your official letter of approval. If you require a hardcopy please contact the Ethics Secretariat.

If you have any queries about your ethics approval, or require any amendments to your research in the future, please don't hesitate to contact the Ethics Secretariat and quote the ethics application number (e.g. ETH20-xxxx) in all correspondence.

Yours sincerely,
The Research Ethics Secretariat

On behalf of the UTS Human Research Ethics Committees
C/- Research Office
University of Technology Sydney
E: Research.Ethics@uts.edu.au

Appendix G: Participant and Parent Information sheets (Study 4)

PARTICIPANT INFORMATION SHEET
Disordered Eating and Clinical Treatment
UTS HREC REF NO. 18-2254

WHO IS DOING THE RESEARCH?

My name is Miss Shauna Byrne and I am a PhD student at UTS. My supervisors are Dr John McAloon and Dr Christopher Basten at the UTS Graduate School of Health.

WHAT IS THIS RESEARCH ABOUT?

- Adolescents from 11-18 years of age are at greatest risk of developing an eating disorder.
- Evidence suggests that the earlier eating disorders occur in adolescents, the greater the potential for significant and long-term physical and psychological difficulties.
- A range of factors have been thought to contribute to the development of eating disorders in adults such as substance use, social media influences, family eating habits, exercise habits, dieting habits, body image concerns.
- However, there is limited research on the impact of these factors and others on the development of disordered eating during the adolescent years.

WHY HAVE I BEEN ASKED?

We are interested in hearing from you because you are being treated for difficulties with eating. Please note that if you are in one of the following groups we won't be able to ask you to join in on the research:
- If you are not aged between 11-19
- If you have been diagnosed with a Neurodevelopmental disorder like Autism Spectrum Disorder
- If you have experience of child protection, out of home care or have been in detention.

IF I SAY YES, WHAT WILL IT INVOLVE?

- We would like you to answer some questions for us at two time points: once soon and once in a few months.
- The questions take about 25-30 minutes to complete and you can do them in the waiting room at your psychologist appointment or at home online.
- We will remind you when the second questions are available for you to complete.
- The questions ask about your eating and the impact that has on your day-to-day life, your experience with receiving any diagnoses for an eating disorder or eating difficulties, and any difficulties you have faced when trying to receive treatment and/or diagnosis.
- Following the survey, you can help us even further by participating in a one-on-one discussion with the researcher to talk more about your experience with seeking treatment for disordered eating or an eating disorder. If you decide to provide your contact information, the researcher will contact you to arrange a phone or Zoom meeting which should take approximately 15 minutes.

ARE THERE ANY RISKS/INCONVENIENCE?

We hope you won't feel any distress from answering the survey questions, but there is always a small chance you will. If you do become distressed because of the survey, we will ask you to tell someone close to you or your psychologist at your appointment. If you want to talk to the researchers, the best person to contact is Dr John McAloon, email: john.mcaloon@uts.edu.au. You can also contact one of the helplines below.

DO I HAVE TO SAY YES?

No, you don't have to do this if you don't want to. It is completely up to you whether or not you decide to take part.

WHAT WILL HAPPEN IF I SAY NO?

If you decide you don't want to participate, that's fine. It will not affect your relationship with your psychologist or anyone else and if you wish to withdraw from the study once it has started, just let the reception team know.

CONFIDENTIALITY

All your information will be treated confidentially. You will be asked to help generate a confidential code and we will use this instead of your name so no one will be able to identify your information.

Only the nominated researchers will have access to the material provided by participants in this study and your treating team may be provided with a report of your survey responses to provide any additional and relevant information we can to assist in formulation and treatment planning.

It is important for you to know that if we are concerned about you, we will want to get in touch with you to work out how we can best help you.

We plan to publish and use the results in a doctoral thesis, journal article and potentially at a conference. In any publication, information will be provided in such a way that you cannot be identified.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?

If you have concerns about the research that you think I or my supervisor can help you with, please feel free to contact us on the details below:

Primary Investigator: Shauna Byrne
Email: shauna.byrne@student.uts.edu.au

UTS Primary Supervisor: Dr. John McAloon
Phone: +61 2 9514 7240, Email: john.mcaloon@uts.edu.au

If you feel distressed when completing the survey, you are able to withdraw at any time.

If you wish to talk to someone about how you feel during or after completing the survey please contact:

- **Kids Helpline – 1800 55 1800 (24 hours)**
- **Lifeline – 11 13 14 (24 hours)**
- **Your local GP or wellbeing team at your school**

Please copy this page for a personal copy of this information sheet.

NOTE:
This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au], and quote the UTS HREC reference number. Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

UTS UNIVERSITY OF TECHNOL SYDNEY

INFORMATION SHEET FOR A PARENT OF A PARTICIPANT
Disordered Eating and Clinical Treatment
UTS HREC REF NO. 18-2254

WHO IS DOING THE RESEARCH?

My name is Miss Shauna Byrne and I am a PhD student at UTS. My supervisors are Dr John McAloon and Dr Christopher Basten at the UTS Graduate School of Health.

WHAT IS THIS RESEARCH ABOUT?

- Adolescents from 11-18 years of age are at greatest risk of developing an eating disorder.
- Evidence suggests that the earlier eating disorders occur in adolescents, the greater the potential for significant and long-term physical and psychological difficulties.
- A range of factors have been thought to contribute to the development of eating disorders in adults such as substance use, social media influences, family eating habits, exercise habits, dieting habits, body image concerns.
- However, there is limited research on the impact of these factors and others on the development of disordered eating during the adolescent years.

WHY HAVE I BEEN ASKED?

We are interested in hearing from your child because they are being treated for difficulties with eating. Please note that if they are in one of the following groups we won't be able to ask them to join in on the research:

- If your child is not aged between 11-19
- If your child has been diagnosed with a Neurodevelopmental disorder like Autism Spectrum Disorder
- If your child has experience of child protection, out of home care or has been in detention.

IF I SAY YES, WHAT WILL IT INVOLVE?

- We would like your child to answer some questions for us at two time points: once soon and once in a few months.
- The questions take about 25-30 minutes to complete and your child can do them in the waiting room at their psychologist appointment or at home online.
- We will remind you/your child when the second questions are available for them to complete.
- The questions ask about your child's eating and the impact that has on their day-to-day life, their experience with receiving any diagnoses for an eating disorder or eating difficulties, and any difficulties they have faced when trying to receive treatment and/or diagnosis.
- Following the survey, your child can help us even further by participating in a one-on-one discussion with the researcher to talk more about your experience with seeking treatment for disordered eating or an eating disorder. If they decide to provide your contact information, the researcher will contact you/ your child to arrange a phone or Zoom meeting which should take approximately 15 minutes.

ARE THERE ANY RISKS/INCONVENIENCE?

We hope your child won't feel any distress from answering the survey questions, but there is always a small chance they will. If your child does become distressed because of the survey, we will ask them to tell you or their psychologist at their appointment. If you/ your child want to talk to the researchers, the best person to contact is Dr John McAloon, email: john.mcaloon@uts.edu.au. Your child can also contact one of the helplines below.

DO I HAVE TO SAY YES?

No, you don't have to do this if you don't want to. It is completely up to you whether or not you decide if you'd like your child to take part.

UTS UNIVERSITY OF TECHNOLOGY SYDNEY

WHAT WILL HAPPEN IF I SAY NO?

If you decide you don't want your child to participate, that's fine. It will not affect their relationship with their psychologist or anyone else and if your child wishes to withdraw from the study once it has started, they can just let the reception team know.

CONFIDENTIALITY

All your child's information will be treated confidentially. They will be asked to help generate a confidential code and we will use this instead of their name so no one will be able to identify their information.

Only the nominated researchers will have access to the material provided by participants in this study and your child's treating team may be provided with a report of their survey responses to provide any additional and relevant information we can to assist in formulation and treatment planning.

It is important for you to know that if we are concerned about your child, we will want to get in touch with you to work out how we can best help your child.

We plan to publish and use the results in a doctoral thesis, journal article and potentially at a conference. In any publication, information will be provided in such a way that your child cannot be identified.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?

If you have concerns about the research that you think I or my supervisor can help you with, please feel free to contact us on the details below:

Primary Investigator: Shauna Byrne
Email: shauna.byrne@student.uts.edu.au

UTS Primary Supervisor: Dr. John McAloon
Phone: +61 2 9514 7240, Email: john.mcaloon@uts.edu.au

If your child feels distressed when completing the survey, they are able to withdraw at any time.

If you or your child wish to talk to someone about how they feel during or after completing the survey please contact:

- **Kids Helpline – 1800 55 1800 (24 hours)**
- **Parentline – 1300 1300 52**
- **Lifeline – 11 13 14 (24 hours)**
- **Your local GP or wellbeing team at your school**

Please copy this page for a personal copy of this information sheet.

NOTE:
This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au], and quote the UTS HREC reference number. Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Appendix H: Participant Consent form (Study 4)

CONSENT FORM
Disordered Eating and Clinical Treatment
UTS HREC REF NO. 18-2254

I _____ (Participant/Parents name, PLEASE PRINT) agree for **myself / my child** (Please circle relevant participant) to participate in the research project **Client Experience of an Eating Diagnosis** being conducted by Miss Shauna Byrne under the supervision of Dr John McAloon and Dr Christopher Basten at the Graduate School of Health, UTS.

- I have read the Participant Information Sheet or someone has read it to me in a language that I understand.
- I understand the purposes, procedures and risks of the research as described in the Participant Information Sheet.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I freely agree for **myself/ my child** to participate in this research project as described and understand that I/ they are free to withdraw at any time without affecting my relationships with the researchers and the University of Technology Sydney and the clinical practice.
- I understand the researchers may want to use the data in subsequent analyses related to the study area and that in this event, all data will be deidentified and no individual will be identified in any publication that may result.
- I (yes/no) (PLEASE SELECT) agree that the researchers may share an aggregated report of my/my child's survey responses with the treating team in an effort to provide any additional and relevant information we can to assist in formulation and treatment planning.
- I understand that if I or my child decide to provide my email within the survey, the researchers may contact me/my child following the survey for a one-on-one discussion about my/my child's experience within clinical settings and treatment for disordered eating.
- I understand that I can screenshot this page for a personal copy of the consent form.

<u>I agree that the research data gathered from this project may be published in a form that:</u>

- ☐ Does not identify **me/ my child** in any way
- ☐ May be used for future research purposes

I am aware that I can contact Dr John McAloon at john.mcaloon@uts.edu.au if I have any concerns about the research.

By signing below, I agree I give my informed consent for me/my child to participate in this research.

Appendix I: Demographics and Eating Disorder Treatment and Diagnosis

Information Measure

Please enter the first letters of your first and last name and the two digits of the day and month you were born (e.g. John Smith born on 26th of May = JS2605)
We would like to hear more about your individual experience with the treatment you received for your eating difficulties by having a one-on-one conversation with you. If you would be willing to talk to the researcher Miss Shauna Byrne, please leave your email and phone number below and she will be in contact with you to arrange a meeting time.
The conversation will last about 15-20 mins and can be done via phone or Zoom.

- Phone number: ___
- Email: ___
- I do not want to participate

1. What is your age in years?
   - 11
   - 12
   - 13
   - 14
   - 15
   - 16
   - 17
   - 18
   - 19

2. What is your gender?
   - Male
   - Female
   - Non-binary
   - Different Identity: ___

3. What is your Nationality?
   - Australian
   - White (English/ Welsh/ Scottish/ Irish)
   - Indigenous Australian or Torres Strait Islander
   - New Zealander
   - Asian
   - Indian
   - Middle Eastern
   - European
   - North American
   - South American
   - African
   - Other, Please specify ____

4. At what age did you first notice your eating difficulties?
   - 5-8 years
   - 9-12 years
   - 13-16 years

- 17-20 years
- Other, please specify: _____

5. At what age did you start to seek help from a professional for your mental health?
    - 5-8 years
    - 9-12 years
    - 13-16 years
    - 17-20 years
    - Other, please specify: _____

6. What kind of health professional did you first see?
    - GP
    - Dietician
    - Nurse
    - Counsellor (No referral needed, Deal with less severe mental health concerns)
    - Psychologist (Need a GP referral, Deal with specific and more severe mental health conditions and diagnoses)
    - Clinical Psychologist (Need a GP referral, Have a Master's Degree in Clinical Psychology, Deal with specific and more severe mental health conditions and diagnoses)
    - Psychiatrist (Medical Doctor, Can prescribe medication)
    - Eating disorder specialized psychologist
    - Eating disorder specialized Clinical psychologist
    - Eating disorder specialized psychiatrist
    - Eating disorder specialized Dietician
    - Eating disorder specialized GP
    - Other, please specify: _____

7. Have you seen any other health professionals?
    - GP
    - Dietician
    - Counsellor
    - Psychologist
    - Clinical Psychologist
    - Nurse
    - Psychiatrist
    - Eating disorder specialized psychologist
    - Eating disorder specialized Clinical psychologist
    - Eating disorder specialized psychiatrist
    - Eating disorder specialized Dietician
    - Eating disorder specialized GP
    - Other, please specify: _____

8. Have you been provided with any of the following?
    - Eating Disorder Care Plan
    - NDIS Funding
    - Disability Support pension
    - Chronic Disease Management plan

- Mental Health Care Plan
- Other, please specify: _____

9. How many sessions have you had with a Psychologist/Clinical Psychologist?
    - 0 sessions
    - 1 session
    - 2 sessions
    - 3 sessions
    - 4 sessions
    - 5 sessions
    - 6 sessions
    - More than 6 sessions
    - More than 10 sessions

10. Were you given a mental health issue diagnosis?
    - Depression
    - Anxiety
    - Bipolar
    - Personality Disorder: ____
    - Sensory Disorder: ____
    - Autism
    - ADHD
    - Other, please specify: _____

11. Were you given an eating disorder diagnosis?
    - Yes
    - No

12. What eating disorder were you diagnosed with? (If your diagnosis has changed, please tick the first eating disorder diagnosis you received)
    - Anorexia Nervosa
    - Bulimia Nervosa
    - Binge Eating Disorder
    - Avoidant Restrictive Food Intake Disorder
    - Pica
    - Rumination Disorder
    - Other Specified Feeding and Eating Disorder
        - Atypical Anorexia Nervosa
        - Bulimia nervosa of low frequency and/or limited duration
        - Binge eating disorder of low frequency and/or limited duration
        - Purging Disorder
        - Night Eating Syndrome
    - Unspecified Feeding and Eating Disorder

13. Since starting psychological treatment for your eating difficulties how long did it take for you to get diagnosed with an eating disorder?
    - 1 session
    - 2 sessions
    - 3 sessions
    - 4 sessions

- 5 sessions
- 6 sessions
- More than 6 sessions
- More than 10 sessions

14. Have you had to regain weight?
    - Yes
    - No

15. Have you been hospitalized for issues related to eating difficulties?
    - Yes
    - No

16. If you know already, is there a clear treatment plan for your eating difficulties?
    - Yes – FBT - Family Based treatment e.g. Maudsley Method
    - Yes – CBT-E – Individual treatment ages 18+
    - Yes – Inpatient hospital treatment- hospital re-feeding
    - Yes – Inpatient hospital treatment – longer term stay
    - Yes - Outpatient hospital treatment – e.g. day program
    - No
    - Unsure yet
    - Other, Please specify_____

17. What life areas have your eating difficulties impacted?
    - My friendships
    - My relationship with my parents
    - My relationship with my siblings
    - My schooling
    - My job
    - My physical health
    - My mental health
    - My hobbies/interest

Appendix J: Interview Schedule (Study 4)

[*The following script was used as the basis of the semi-structured interview*]

Thank you for agreeing to participate in the current study. My name is Shauna Byrne. I am a psychologist and a PhD candidate at the University of Technology Sydney.

We are conducting research to explore the experiences of male adolescents undergoing treatment for an eating disorder. Our findings will be published in an academic journal, but you will not be referred to by name, and any information that could indicate your identity will be removed or changed.

I will be recording our interview so that I have a record of our conversation – is that OK?

[*Start interview recording*]

The interview will take between 15-20 minutes to complete. Everything you say will be confidential and you can stop and end the interview at any time. If you have any other thoughts or comments that come to mind, please feel free to jump whenever you like.

1. Which particular eating-related concerns made you want to seek support and treatment from a psychologist?
2. Do you have any other concerns that you will seek support from your psychologist for?
3. Do you feel like your psychologists listens to you and understands your experience?
4. Did you have any difficulties receiving a diagnosis of an eating disorder, and if so, what were they?
5. Do you know the name of the psychological treatment you received?

6. Do you know the sorts of treatment components this included?

7. What have you found worked well in treatment for you?

8. Were there any things that you found difficult or did not work so well for you in treatment?

9. What suggestions would you make for treating eating disorders in the future from your experience of it?

10. What psychological or treatment support do you require moving forward?

11. Is there anything we haven't spoken about that you would like to add?

Thank you for participating in our research.