The Association between Child Emotional Abuse and Emotional Neglect with Disordered Eating Behaviours

by

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Abstract

Background

Disordered eating behaviours (DEBs) are problematic eating behaviours such as the use of diuretics, self-induced vomiting, and restrictive dieting; however, these symptoms are not present or severe enough to meet a clinical diagnosis. DEBs are associated with adverse health outcomes and may progress to clinical eating disorders. Previous literature shows associations between emotional abuse and emotional neglect with DEBs; however, few studies have examined these associations in Canadian adolescents.

Objectives

The objectives of this study were to: 1) determine the relationship between child emotional abuse (EA) and emotional neglect (EN) with DEBs among a Canadian community sample of adolescents and 2) identify protective factors that decrease the odds of developing DEBs among those with and without a history of any emotional maltreatment (EM).

Methods

Adolescent data were derived from the Wellbeing and Experiences (WE) study. Logistic regression models were run to assess associations between EA and EN with DEBs. Models were adjusted for sociodemographic variables (AOR 1) (i.e., age, household income, sexual identity) and for all child maltreatment types (AOR 2) (i.e., physical abuse, sexual abuse, physical neglect, and exposure to intimate partner violence (EIPV). Analyses were stratified by sex. Possible protective factors that were statistically and potentially clinically significant were also identified in adjusted models (AOR 1) (i.e., age, sex, household income), stratified by histories of EM.

Results

Overall, 24.5% of adolescents reported any form of EM, 21.7% reported EA, and 13.3% reported EN. Females reported more DEBs than males (67.5% vs 32.6%). EA, EN, and any EM were significantly associated with DEBs in the unadjusted models (OR range 4.47-10.04) and adjusted models among both the males and females (AOR 1 range 3.44-7.31). After adjusting for all child maltreatment types, only EM remained statistically significant for both sexes. Several statistically significant and clinically significant protective factors were associated with increased odds of no DEBs, though many models may have been underpowered.

Conclusions

These findings emphasize the need to better understand DEBs in adolescents, particularly their associations with EA and EN, and to identify protective processes that can guide prevention and early intervention efforts.

Introduction

There has been a 40% increase in hospitalizations for children and adolescents with eating disorders since the early 2000s in Canada and the United States (US).[1] In 2012-2013, the estimated lifetime prevalence in the United States (US) for any eating disorder was 1.7%.[2] In Ontario, Canada, it was stated that 17,373 people from 1990-2014 had visited an emergency department or been hospitalized due to an eating disorder.[3] The Canadian Health Survey on Children and Youth indicated that 0.32% adolescents aged 5 to 17 years had an eating disorder in 2019.[4] While data indicates that eating disorders are present among adolescents, very little prevalence data are available in Canada.

Eating disorders are mental disorders caused by abnormal eating behaviours and weight control measures such as dietary restriction, a refusal to eat, binging and purging, or just the act of binging.[5] Disordered eating behaviours (DEBs) have a similar presentation to eating disorders, however, these behaviours are not severe enough to meet a clinical diagnosis according to Diagnostic and Statistical Manual of Mental Disorders.[5,6] DEBs are more common than clinically diagnosed eating disorders and if left untreated can lead to clinical eating disorders.[6–8] Estimates of DEBs in Canadian community samples from 1993-2002 range from 8.5%-10.5%.[9,10] However, these numbers are outdated. Research focused on DEBs is important because such eating behaviours can lead to physical comorbidities such as diabetes, hypertension, back and neck pain, as well as chronic headaches.[11] DEBs can also develop into eating disorders, which are associated with poor health outcomes [12,13] and are known to have high mortality rates.[14,15]

One known risk factor for developing DEBs is child maltreatment.[16–18] Child maltreatment includes physical abuse, physical neglect, sexual abuse, emotional abuse, emotional neglect, and exposure to intimate partner violence (EIPV).[19] All types of child maltreatment are associated with eating disorders with notable sex differences.[2] A large literature on DEBs have focused on physical abuse and sexual abuse as common risk factors for DEBs.[20–25] There are fewer studies on emotional abuse (EA), emotional neglect (EN) and any emotional maltreatment (EM) as risk factors.[21] EA is defined by the verbal assaults on a child's sense of worth and well-being.[20] It can also be any humiliating, demeaning, or threatening behaviour directed towards a child by an older person.[20] EN is the failure to provide basic

emotional and psychological needs.[20] Any EM is the experience of EA and/or EN.[26] It has been found that EA has a greater association with DEBs when compared to physical and sexual abuse.[18–21] Only one Canadian study, using an undergraduate sample, has been conducted that examined DEBs among those with a history of EA.[27] More research among Canadian adolescents on the relationship between EA and/or EN is needed since DEBs often start in adolescence [28] and sometimes worsen during the period of young adulthood.[29] Examining the relationship between EA and EN with DEBs in Canadian adolescents is important for guiding early prevention efforts and informing treatment of DEBs.[29]

In addition, research gaps exist in our understanding of what protective factors may be related to a decreased likelihood of DEBs. A protective factor can be a trait that helps build resilience or positively modifies an individual's response to adversity.[30] There are individual-level (e.g., personal characteristics), family-level (e.g., family resources or supportive relationships), school-level (e.g., peer relationships, social support from schools, teachers), community-level (e.g., social supports in community and involvement in community), and societal-level (e.g., social and economic policies) protective factors.[30,31] Several studies have found that individual- and family-level protective factors significantly decreased the odds of DEBs.[32–34] Some individual-level factors that decrease the odds of developing DEBs are body appreciation and self-compassion,[34] and some significant family-level protective factors are high family connectedness and feelings of love and support from your family.[32,33] However, to date, there are no studies that look at protective factors for DEBs among those with a history of EA and EN. In addition, there is a lack of Canadian studies that examine protective factors for DEBs, more generally, with the exception of one Canadian study that looked at protective factors for DEBs among transgender youth where the authors reported that high family connectedness and high social supports were protective against the development of DEBs.[35] Examining protective factors for DEBs among Canadian adolescents with a history of EA and/or EN can aid in informing prevention and treatment efforts. Once identified these protective factors can be included in intervention efforts that are tested to determine efficacy in protecting against DEBs in the general population, but also sub-groups of the population who may be at greater risk for DEBs or clinical eating disorders. If effective, these interventions may help decrease the odds of DEBs in Canadian communities.

The current study aimed to fill some important knowledge gaps that remain in our understanding of EA, EN, protective factors, and DEBs within the Canadian context. Therefore, the objectives of the current study were to: 1) examine the relationships between EA and/or EN with DEBs among a community sample of Manitoban adolescents (ages 14 to 17 years) and 2) identify what protective factors are associated with decreased likelihood of DEBs among adolescents with and without an EA and/or EN history.

Review of the Literature

Eating Disorders and Disordered Eating Behaviours

Eating disorders are mental disorders caused by abnormal eating behaviours and weight control measures.[5] Some common clinical eating disorders are anorexia nervosa, bulimia nervosa, binge-eating disorder, other specified feeding or eating disorders, and avoidant/restricted food intake disorder.[36] Anorexia nervosa is characterized by pervasive, pathological weight and shape concerns leading to restrictive eating and being underweight.[37] The estimated lifetime prevalence of anorexia nervosa in the US is 0.8% (0.2% among men and 1.4% among women).[2] Bulimia nervosa is characterized by binge eating, unhealthy compensatory behaviour, and body image concerns in a person around a healthy weight.[38] For bulimia nervosa, the estimated lifetime prevalence is 0.2% (0.07% among men and 0.4% among women).[2] Binge-eating disorder is characterized by discrete rapid consumption of large amounts of food due to feelings of stress and loss of control.[38] The prevalence for binge-eating disorder is 0.8% (0.5% among men and 1.0% among women).[2] Other specified feeding or eating disorders are defined as DEBs that are clinically significant but not meeting full criteria for a specific eating disorder, [39] whereas avoidant/restrictive food intake disorder is the refusal or limitation of food and drinks that is typically due to anxiety related to pain, emesis, texture, and choking.[40] Recent Canadian statistics for the lifetime prevalence of anorexia nervosa, bulimia nervosa, binge-eating disorder, other specified feeding or eating disorders, and avoidant/restrictive food intake disorder are not available.

There is a belief that eating disorders only occur in those from a higher socioeconomic background, however, it has been found that eating disorders can affect a wide range of socioeconomic backgrounds.[41] Anorexia nervosa, bulimia nervosa, and binge-eating disorder were found in those with higher incomes and lower incomes.[41] Those with higher incomes tend

to seek treatment for their eating disorders more than those with lower incomes.[41] Also, it has been found that sexual identity can affect the development of eating disorders.[42] In a meta-analysis, it was found that homosexual and bisexual males compared to homosexual and bisexual females were more prone to binge eating, purging, dieting, and using diet pills.[42] Homosexual and bisexual males and females compared to heterosexual males and females were more likely to exhibit eating disorder-related eating behaviours.[42]

DEBs are problematic eating, body, and weight control behaviours such as the use of diuretics, self-induced vomiting, and restrictive dieting, but these behaviours are not present or severe enough to meet a clinical diagnosis.[5,6] Uncontrolled eating, emotional eating, and thought restraint are three features of DEBs.[43] Uncontrolled eating is associated with the over consumption of food because of a lack of control when exposed to external food cues.[44,45] Emotional eating involves overeating in response to emotional states, and thought restraint is the psychological regulation of eating behaviours to control weight.[46,47] A meta-analysis that included Canada, found 22.36% of children and adolescents from 16 countries exhibited DEBs.[48] DEBs are more common than clinically diagnosed eating disorders and if left untreated can lead to clinical eating disorders.[6–8] DEBs can also increase the likelihood of developing mood and anxiety disorders, substance use, lower self-esteem, and a decreased quality of life.[29,49] For example, a longitudinal study using a sample of Finnish twins (2835 females, 2423 males) used wave 4 data to conduct analyses on health outcomes when the twins were between the ages of 22-27 years old. They found that DEBs were strongly associated with poor self-rated health, higher body mass index (BMI), and more psychological distress and results were sustained 10 years later in the same sample.[50] Similarly, DEBs can become more severe and turn into eating disorders, which are associated with other poor health outcomes such as poor mental health, altered menstrual function, infertility, dental erosion, an increased risk for developing certain cancers, and an increased likelihood of fatalities due to starvation and suicide.[12,51–53] Recent Canadian statistics for DEBs are not available and more research should be done to assess the prevalence of DEBs within the Canadian context. Due to the severity of eating disorders, prevention remains a priority to reduce the proportion of the population who experience these DEBs and to lower the number of people who develop eating disorders with their associated morbidity and mortality risks.

Child Maltreatment

Child maltreatment is a major public-health issue worldwide.[2] Child maltreatment includes physical abuse, physical neglect, sexual abuse, emotional abuse, emotional neglect, and EIPV.[19] In 2012, 32.1% of the adult population in Canada reported experiencing any form of child abuse (including physical, sexual, and/or EIPV).[54] It was found 10 years later in 2022, 34.4% of adults had experienced any form of child abuse.[55] In 2012 and 2022, physical abuse in childhood was the most common, however, 2022 physical abuse prevalence estimates were significantly higher than 2012 (27.8% vs 26.1%, respectively).[54,55] Measures of emotional abuse and neglect were not included in 2012 and 2022 data collection, so the prevalence for all child maltreatment types at the national Canadian level are currently unknown. [54]

It has been found that children who grow up in a low-income household are at an increased risk of experiencing child maltreatment.[56] Also, if a child identifies as anything other than heterosexual, they are at an increased of experiencing child maltreatment.[57] Adults with a history of child maltreatment experience negative physical health conditions such as back problems, cancer, chronic fatigue, chronic pain, and obesity.[54,58–60] Adolescents with histories of child maltreatment experience poor education due to lack of attendance, low academic motivation, and dropping out.[61] Maltreated adolescents are also more likelihood to experience mental disorders and poor mental health such as depression, anxiety, post-traumatic stress disorder, and substance abuse problems.[61–65] Also, adolescents with a child maltreatment history are at an increased risk of criminal behaviour, sexual exploitation, and self-injurious behaviours.[62]

It has been found that all child maltreatment types are associated with mental disorders.[54,66,67] In the literature, it is common for the focus to be on the effects of physical abuse and sexual abuse on individuals' mental health. Less is known on the impact of EA and EN on mental health across the life course. EA and EN may be a core component of all forms of childhood maltreatment and can have equal to, or greater, consequences than physical and sexual abuse.[68,69] In a nationally representative US sample examining EA and EN together (i.e., EM) it was found that 14% of the US population had experienced EA and EN before the age of 18 years.[26] EN was the most prevalent form of emotional maltreatment followed by EA.[26] EA and EN were found to be associated with mental health and substance use disorders, as well as personality disorders.[26]

Emotional Abuse, Emotional Neglect, Eating Disorders, and Disordered Eating Behaviours

There is limited literature on the relationship between EA and EN with eating disorders.[2] In one study that used a nationally representative US data to examine the relationship between child maltreatment and mental disorders, it was found that all types of child maltreatment were associated with eating disorders with notable sex differences.[2] Among women, sexual abuse and EA had the most robust relationships with anorexia nervosa, bulimia nervosa, and binge-eating disorder.[2] For men, sexual abuse and physical neglect had the most robust relationships with anorexia nervosa, bulimia nervosa, and binge-eating disorder. It was also found that EN was strongly associated with bulimia nervosa and binge-eating disorder.[2] A systematic review looking at EA, EN, and EIPV found a high prevalence between EA and EN with bulimia nervosa, binge-eating disorder, and binge-eating symptoms (21.1%-66.0%).[70]

A United Kingdom (UK) study examined if emotion regulation mediated the relationship between child maltreatment and DEBs among adolescents [71]; 10.8% of the participants had experienced EA and 20.3% of participants experienced EN.[71] About 7.7% of these participants were at risk of developing an eating disorder.[71] Findings indicated that emotionally abusive and neglectful environments can lead to emotional dysregulation.[71] Also, EA and EN were both significantly positively correlated with disordered eating and dysfunctional emotional regulation.[71] Other studies have indicated that EA has strong associations with DEBs (drive for thinness, body dissatisfaction, and binging and purging behaviours).[21,72] There is also evidence of indirect paths from EA and EN to DEBs via emotion dysregulation.[21]

There is only one Canadian study using a university sample that has examined DEBs among those with a history of EA. The goal of the study was to investigate two explanatory models proposed by Kent and Waller [72] which looked at the relationship between EA and DEBs. The first model viewed EA as an independent variable, along with physical abuse, sexual abuse, and neglect. Self-esteem, anxiety, and depression were included as potential mediators.[72] The second model proposed EA as a moderator in the relationship between neglect, physical and sexual abuse, and the mediators.[72] Findings indicated that EA had direct and unmediated effects on DEBs.[72] Also, EA did not significantly moderate the effects of the independent variables on the mediators.[72] While these findings are important, the study is dated (1999) and is limited because it only included female university students. More research is needed in this area using an community adolescent sample since this is a developmental period when DEBs are common[50,73]

and can continue or sometimes worsen in young adulthood.[29] The emergence of DEBs during adolescence may be due to the developmental period that involves significant body changes and causes adolescents to become more aware and self-conscious of their appearance.[73] A study from Jamaica found that 1 in 5 adolescents had DEBs, with female compared to male adolescents having higher levels of DEBs.[73] Importantly, however, 1 in 10 male adolescents also reported DEBs.[73]

Protective Factors for DEBs

A protective factor can be a trait that helps build resilience or positively modifies an individual's response to adversity.[30] There are individual-level (e.g., personal characteristics), family-level (e.g., family resources or supportive relationships), school-level (e.g., peer relationships, social support from schools, teachers), community-level (e.g., social supports in community and involvement in community), and societal-level (e.g., social and economic policies) factors that can protect against negative health and mental health outcomes, including DEBs and eating disorders.[30,31] Protective factors have also been associated with improved mental health among adolescents who have experienced child maltreatment.[30] From a theoretical perspective, protective factors may reduce the likelihood of DEBs among maltreated children and youth in various ways.[74] Protective factors can decrease the poor outcomes directly by preventing the occurrence of a risk factor related to DEBs or can interact with risk factors to prevent or lessen the negative effects.[74] It is important to develop protective factors within the individual-level, family-level, school-level, community-level, and societal-level. Several studies have specifically examined protective factors for DEBs.[32,34,75] Many studies are focused on body image flexibility, level of self-esteem, receptibility to hunger cues, and emotion regulation as individual-protective factors.[32,34,74,76–79] More protective factors should be examined to see if they are protective against DEBs. Some potential individual-level protective factors to be studied are cultural and ethnic connectedness, feelings and thoughts on their future, level of physical activity, participation in extracurriculars, and the ability to speak about their problems to others.[30]

With respect to family-level protective factors, a small number of studies have examined these in relation to DEBs. [32,80] Some studies examined protective factors at the family-level and found that being satisfied with family life during early adolescence, high family connectedness,

high social supports during adolescence, and having family meals in a positive environment are protective against DEB development.[32,80] School-level and community-level protective factors need to be studied more. Friendships have been only examined as a risk factor for DEBs.[81,82] More research is needed to see if participation in school, having high quality friendships, connectedness with students and adults in the school, participation, and connection with the community are potential protective factors for DEBs.[30] Very little is known about protective factors for DEBs among adolescents in Canada. The one study in this area found that among the transgender youths, high family connectedness and high social supports were protective against DEBs.[35] Also, there is not a study that examines protective factors for those who have experienced EA and/or EN but did not develop DEBs in the Canadian context. Research on the outlined protective factors for the current study needs to be done to examine if they are effective in protecting adolescents against DEBs, both among emotionally maltreated and non-maltreated adolescents. Expanding the research within the Canadian context is needed to inform prevention and treatment efforts for DEBs in Canadian communities.

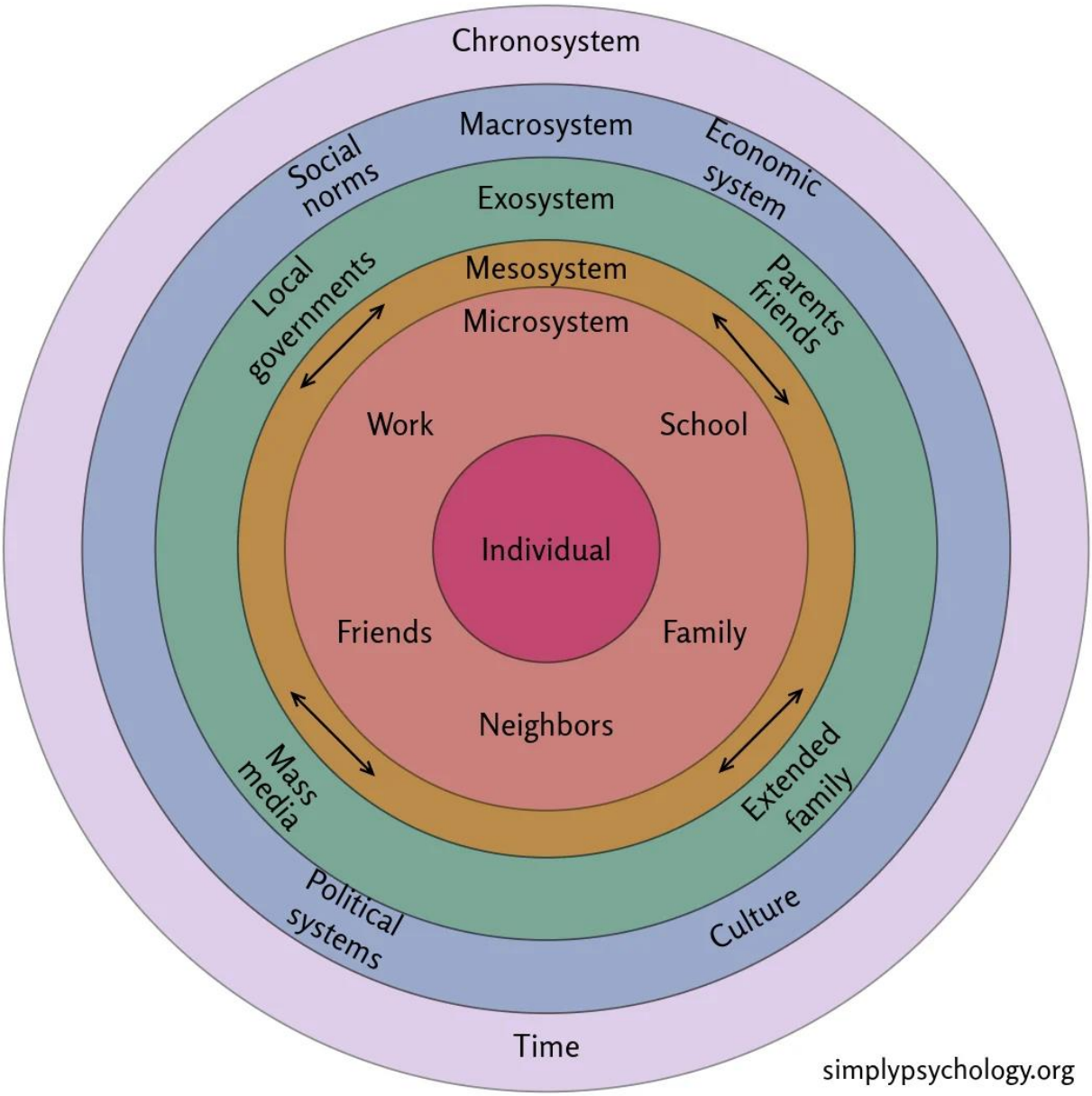
Theoretical perspective

For the current research, the ecological model was adapted to better understand how protective factors could decrease the likelihood of DEBs in those with and without a history of EA and EN. The ecological model was used to as a guide to help select protective factor variables that fall into each system level. In the current study, the ecological model helped identify which protective factors were at the individual level and which were at the microsystem level. These levels were chosen because they are the most immediate environments influencing adolescents' day-to-day experiences. The general ecological model states that human development takes place through progressively complex interactions between humans, objects, and symbols in the person's immediate environment.[83] The interaction must occur regularly over multiple periods of time which are known as proximal processes.[83] Proximal processes are one of the defining properties for the ecological model.[83] Some examples of proximal processes are found in parent-child and child-child activities, group, or solitary play, reading, learning new skills, and performing complex tasks.[83] The second defining property is the form, power, content, and direction of the proximal processes and how it interacts with environment.[83] The interaction between the environment and the proximal processes affects an individual's

development.[83] One finding of the ecological model is that development in less advantaged environments has a large effect on people, especially during childhood.[83] The development of mental abilities, academic achievement, social skills and so on through proximal processes have a greater impact if done in a more advantaged and stable environment throughout the life course.[83]

Another distinctive feature of the ecological model is its nested structure, moving from the innermost level to the outer most level.[83] There are 5 levels: microsystems, mesosystems, exosystems, macrosystems, and chronosystems. First, individual characteristics are examined which include neurological, genetic, personality, temperament, and intelligence.[84] The first level of the ecological system is the microsystem. This consists of activities, social roles, and interpersonal relations experienced by the individual, which interact with the physical, social, and symbolic features of the environment.[83] This can happen within the family, school, peer group, and workplace. In the microsystem, proximal processes produce and sustain development, but this is dependent on the content and structure of the microsystem.[83] The mesosystem consists of the linkages and processes that take place between two or more settings that the individual interacts in (e.g., relations between home and school).[83] The exosystem consists of the linkages and processes taking place between two or more settings, at least one of settings does not have the individual, but the events in this setting(s) does affect the individual's life (e.g., for a child, the relationship between the home and the parent's workplace).[83] The macrosystem is the cultures or subcultures that influence an individual.[83] This level consists of the belief systems, bodies of knowledge, material resources, customs, lifestyles, and life-course options.[83] It is important to look at the specific social and psychological features at the macrosystem level that affect the conditions and processes within the microsystem.[83] Finally, the chronosystem encompasses change or consistency over time both in the individual and in the environment that the individual lives in (e.g., changes in life structure, socioeconomic status, employment etc.).[83]

Figure 1. Bronfenbrenner's ecological model. Guy-Evans O. Bronfenbrenner's ecological systems theory. https://www.simplypsychology.org/bronfenbrenner.html



There is some literature that examines protective factors for those who have experienced child maltreatment, through an ecological lens. For example, childhood aggression was studied in children who had experienced child maltreatment.[85] The ecological model was used to see which protective factors at the individual-, family-, and community-levels influenced the decreased presentation of childhood aggression.[85] They found higher child prosocial skills, parental well-being, and fewer problems in the neighbourhood were associated with lower levels of aggressive behaviours among children.[86] Another study examined resilience in children who

were exposed to violence in their families and communities.[86] The authors studied individual-, family-, school and peer-, and community-level protective factors through the ecological model.[86] They found self-regulation, positive self-perceptions, coping skills, family support, school supports, peer supports, and engagement in extracurricular activities decreased the presentation of childhood aggression.[86]

The literature looking at protective factors for DEBs through an ecological lens is small. The limited literature has focused on prevention efforts, specifically which protective factors can be used at each level to create prevention programs.[84] The focus of the current study was to examine which protective factors already exist within the individual, their environments, and their social relationships that have (or have not) protected the participants from developing DEBs. Also, the protective factors that were examined for preventative programs are different from the protective factors that were examined in the current study. The prevention programs looked at self-compassion, self-esteem, general family factors, family meals, mindfulness, yoga, recognition of internal cues, feminism, body appreciation, emotional self-regulation, sport participation, perceived acceptance by God, and perceived body acceptance by others.[84] While the current study examined different protective factors such as being excited for the future, being active in their communities and schools, sleep, relationships with parents and siblings, and having friendships. It is important to examine other potential protective factors because they may be helpful in to inform strategies for prevention and intervention.

For the current study, the ecological model was adapted to look at the individual and microlevels that effect the individual. Refer to Table 1 for specific items. Looking at the individual and microlevels, and the protective factors within them, could create a better understanding of why individuals do not develop poor outcomes such as DEB following EA or EN.

Table 1. Individual level and Microlevel Protective Factors		
System Level	**Description**	**Protective Factors**
Individual Level	Refers to personal characteristics and traits that influence resilience and well-being	I know my cultural or ethnic language or languages I am excited about my future I can picture what my life will be like in 5 years from now In a typical week, in the fall or winter, how many days are you physically active for 30 minutes or more? In a typical week, in the spring or summer, how many days are you physically active for 30 minutes or more? Do you have anyone you can talk to about yourself or your problems? In past 30 days, how long do you usually spend sleeping each night? During the school year, how often do you participate in before-school, lunchtime, or after-school sports or physical activities organized by your school? During the school year, how often do you participate in before-school, lunchtime, or after-school activities other than sports or physical activities organized by your school?

Microlevel	Involves immediate social environments including family, school, and community support systems	<u>Family level</u> In my family (immediate or extended), there is an adult who I trust How often does a parent or a person raising you hug you? How often does a parent or person raising you tell you "I love you"? In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with? How much does your mother/mother figure understand your problems and worries? How much can you confide in your mother/mother figure about things that are bothering you? How much does your father/father figure understand your problems and worries? How much can you confide in your father/father figure about things that are bothering you? How often can you rely on at least one sibling for help if you have a serious problem? <u>School Level</u> Do you have at least one close friend?

Microlevel		How much can you rely on your friend or friends for help if you have a serious problem? I feel close to other students at school At my school, there is an adult I trust I feel I am part of my school I feel safe at my school <u>Community level</u> In my community, there is an adult I trust In the past 12 months, how often did you take part in volunteer activities? I feel involved in my community I feel motivated to help and improve my community

Study objectives

The aims of the current study were to: 1) examine the relationships between EA and/or EN with DEBs among a community sample of Manitoban adolescents (ages 14 to 17 years) and 2) identify what protective factors are associated with a decreased likelihood of DEBs among adolescents with and without an EA and/or EN history.

Research Questions and Hypotheses

1) What is the prevalence of DEBs among male and female adolescents, with and without histories of EA and/or EN in a community sample from Manitoba?
   Hypothesis: Those with a history of EA and/or EN will present with DEBs more than those without a history of EA and/or EN. Females will present with DEBs more than males.
2) What is the association between EA and EN, individually, with DEBs among adolescents in unadjusted models and after adjusting for sociodemographic covariates (i.e., household income, sex, sexual identity, and age) and 4 child maltreatment types (physical abuse, sexual abuse, physical neglect, and EIPV).
   Hypothesis: It is hypothesized that EA and EN will increase the likelihood of DEBs in unadjusted models and after adjusting for sociodemographic covariates.
3) Are individual-level, family-level, school-level, and community-level protective factors associated with a decreased odds of DEBs among those with and without a history of emotional maltreatment (EA and/or EN)? In unadjusted models and after adjusting for sociodemographic covariates (i.e., household income, sex, sexual identity, and age).
   Hypothesis: Individual-level, family-level, school-level, and community-level protective factors will decrease the likelihood of DEBs among adolescents with a history of EA and/or EN.

Methods

Data Source

Data were drawn from the Well-Being and Experiences (WE) study.[87] The WE study is a longitudinal and intergenerational study that was conducted in Manitoba. Parents (n=1000) and

adolescents ages 14-17 years (*n*=1000) completed separate baseline questionnaires for Wave 1.[87] The sample was identified by using random digit dialing (21%) and convenience sampling (79%) such as referrals and community advertisements.[87] For the random digit dialing portion, 83% were interested in participating, of those eligible, 63% consented and completed the survey.[87] The Forward Sortation Area was used to ensure that the postal codes were from areas that closely represented the Winnipeg, Manitoba area and surrounding rural areas.[87] Data collection was monitored to ensure that the community sample was representative by following the Statistic Canada (2017) census profile.[87] The person most knowledgeable of the adolescent was asked to complete the survey, the adult sample was mostly mothers therefore the parent sample was not representative of the general population.[87] Wave 1 (2017-2018) was collected in a research facility and Waves 2-5 were completed online. Adolescents were re-contacted to answer questionnaires for the additional waves.[87] The current study used the adolescent's data from Waves 3-5 (*n*=556) and the parent's baseline data only for the household income variable. DEBs were measured using Wave 3 (2020; N=663), Wave 4 (2021; N=587), and Wave 5 (2022; N=507) combined, turning longitudinal data into a cross-sectional data set. The total sample for the current study was determined by combing all valid DEBs data (yes and no responses) from Waves 3-5. EA and EN were measured using Waves 3-5 (2020-2022) and protective factors were measured using Waves 1 and 2 (2019; N=756). Only 3 questions were repeated from Wave 1 to Wave 2. These 3 questions were used from the Wave 2 data because of its proximity to Wave 3. The other 25 questions were taken from the Wave 1 data.

Measures

Emotional Abuse and Emotional Neglect: EA and EN were assessed using the Childhood Trauma Questionnaire (CTQ).[20] The questions asked if a parent or other adult living in the home gave emotionally abusive or emotionally neglectful messages to the adolescent. EA was included in the WE study by using five questions from the CTQ, the items were people in my family called me things like "stupid", "lazy", or "ugly"; I thought that my parents wished I had never been born; people in my family said hurtful or insulting things to me; I felt that someone in my family hated me; I believe that I was emotionally abused. At least one response of *sometimes true* to *very often true* were coded as having experienced EA.

EN was included in the WE study by asking all five questions for EN from the CTQ. The items were there was someone in my family who helped me feel that I was important or special; I felt loved; people in my family looked out for each other; people in my family felt close to each other; my family was a source of strength and support. These items were reversed scored, at least one response of *sometimes true* to *never true* were coded as having experienced EN.

An any EM dichotomous variable was created, using the previously created EA and EN variables. Missing data where the individuals said yes or no to at least one EA and/or EN variable were included in the binary responses (yes/no). Participants who did not respond at all to the questions were considered as missing's and labelled as 100. The missing data were coded out to create the final emotional maltreatment variable used for analyses.

Disordered Eating Behaviours: DEBs were assessed using the SCOFF questionnaire.[88] The SCOFF consists of five questions that address core features of anorexia nervosa and bulimia nervosa. The questions are dichotomous, asking yes or no. Terms in the SCOFF questionnaire were adjusted in the WE Study to match Canadian verbiage. For the SCOFF, those who score "3" or above are considered to have DEBs. However, for the purpose of the current study, "1" was the cut-off score. All the data from Waves 3 to 5 were combined because of low power. DEBs were examined at any timepoint from Waves 3 to 5. If a participant said "yes" to at least one DEB, at any timepoint, 1 data point from the participant was scored.

DEB variables from Waves 3, 4, and 5 were individually coded as dichotomous variables. Participants who responded "yes" to one DEB variable, but did not respond to the rest of the variables/did not complete the survey, they were coded in with the other "yes" responses. Other missing data where the participant did not respond to DEB variables at all, they were coded as 100. Three DEB variables (Waves 3,4,5) were created where the missing's were not coded out of the data. The DEB variables that included missing data were then combined from all three waves to create a summed DEB variable. This was to ensure that all participants who said no or yes to a DEB variable in the three waves but did not complete the rest of the DEB questions, were still included. After this, the missing's that had no data for the DEB variables were coded out and a final binary variable was made (Yes DEBs, No DEBs). This final variable was used for analyses. Individuals who only participated in one wave (3, 4, or 5), but provided a valid yes or no response, were included in the analyses since only one datapoint was needed from the participant.

Protective Factors: Twenty-eight potential protective factors at the individual-level, family-level, school-level, and community-level were examined in the WE study.[30] Nine individual-level questions were asked examining cultural and ethnic connectedness, feelings and thoughts on their future, level of physical activity, participation in extracurriculars, sleep, and the ability to speak about their problems to others. Nine family-level questions were asked examining if the respondent has an adult in the family that they trust, how often they are hugged by a parent or person in the family, if they are told that they are loved, how often they eat dinner with an adult, if they can confide in their mother and father, and if they can rely on their sibling. Six school-level questions were asked, examining their friendship quality, closeness to others at school, if there is an adult that they trust, if they feel a part of the school, and if they feel safe. Four community-level questions were asked if they had an adult they can trust in the community, if they volunteer, feel a part of the community, and if they want to improve their community. Refer to Table 1 for exact items that were asked. The protective factors from Waves 1 and 2 were coded as dichotomous variables to increase power. The protective factor cutoffs were created to reflect whether the adolescent had the protective factor or not. For each variable, response options were grouped into "yes" when they represented having the protection, and no when the response did not suggest reliable protection. For example, sleep was coded based on the number of hours the participant slept each night. If an individual had lower sleep durations (less than 8 hours), then they were coded as "no". If they had healthy amounts of sleep (more than 8), then they were coded as "yes".

Sociodemographic Covariates: The sociodemographic covariates that were adjusted for are total annual household income, sex, sexual identity, and age. For sex, at Wave 1, respondents were asked if they are a boy or girl. Also at Wave 1, the respondent was asked their age (14 and 17 years). For sexual identity, at Waves 4 and 5, respondents were asked if they are heterosexual, homosexual, bisexual, or identified as a different identity. The sexual identity variable was coded as a dichotomous variable, where homosexual, bisexual, and different identity were combined and labelled "Diverse" to decrease empty cells. For household income, at Wave 1, parents were asked if they make $49,999 or less, $50,000 to $99,999, $100,000 to $149,999, and $150,000 or more.

Child Maltreatment Covariates: Physical abuse, physical neglect, sexual abuse, and EIPV were assessed using items adapted from the CTQ.[20] These items were from Waves 3-5. Physical

abuse was assessed using items capturing severe physical aggression (e.g. being hit hard enough to require medical attention, being bruised, being punished with hard objects, or being kicked, punched, or physically attacked). Physical neglect included items related to unmet basic needs (e.g. not having enough food, wearing dirty clothes, lack of supervision or protection, and inconsistent access to medical care). Sexual abuse was measured using items describing unwanted sexual touching, coercion, threats, and molestation. Finally, EIPV was measured using a single item asking how often the adolescent witnessed adults in the home hitting each other. Each maltreatment variable was recorded as binary variables (0= no maltreatment; 1= any maltreatment).

Statistical analysis

Descriptive statistics were computed to assess the sociodemographic characteristics of those with and without DEBs. Child maltreatment prevalence (EA, EN, any EM) was also assessed among those with and without DEBs. Finally, prevalence of DEBs by EA, EN, any EM history (and no history) was assessed by stratifying by sex. Chronicity of DEBs symptoms over time was assessed using a count variable. The summed DEB variable that was created, combined DEB variables from Waves 3,4, and 5 (range: 0-3). A score of 1 indicated presence of DEBs in one wave, scores of 2 or 3 indicated repeated presence of DEBs across the waves. Logistic regression models were used to examine the association between EA and/or EN with DEBs. These models were run unadjusted, then adjusted for sociodemographic covariates. Further adjusted models were computed, adjusting for other types of child maltreatment (i.e., physical abuse, sexual abuse, physical neglect, and EIPV). Sex trends for DEBs were assessed using stratified models since the sample did not have adequate power to examine potential moderation effects. Multiple logistic regression models were computed to understand the associations between individual-, family-, school-, and community-level protective factors and DEBs. The models were run unadjusted, then adjusted for sociodemographic covariates (i.e., age, sex, household income). Protective factor trends for DEBs were assessed by stratifying by history (or no history) of any EM. Post-hoc analyses were conducted as a sensitivity analysis to further examine potential Type II errors. The post-hoc analyses assessed if models would reach statistical significance ($p < 0.05$. 95% CI) with increased power, which was accomplished by not stratifying by any EM history. Post-hoc analyses also considered potential clinically significant

protective factors, defined as those with an adjusted odds ratio (AOR 1) of 1.50 or higher, even when confidence intervals were wide. This cutoff was chosen pragmatically to flag potentially meaningful effects. While Chen et al., (2010) provide benchmarks for interpreting odds ratios relative to Cohen's *d,* the use of 1.50 in the current study is for exploratory purposes rather than a formally established standard.[89]

Missing data

Missing data were examined for all variables. Most of the variables had low missing data (<5%). A small number of variables had missing data between 5-16%. Participants who responded "yes" to some items within a measure but did not respond to the remaining items were coded as "yes" for the binary variables. The rest of the missing's where no data could be extracted were coded out of the final variables. However, for the severity count, missing data were not included in the count because of the inability to properly categorize the missing's into a specific count (2, 3, or 4). Refer to Table 2 for the list of missing data.

Table 2. Missing Data Table

Variable	% Missing
Sexual Identity	8.6%
Sex	0.30%
Household income	4.8%
Disordered eating	15.9%
Emotional Abuse	1.9%
Emotional Neglect	2.9%
Any Emotional Maltreatment	2.7%
Physical Abuse	4.0%
Physical Neglect	2.7%
Sexual Abuse	3.4%
Exposure to Intimate Partner Violence	4.2%
Excited for Future	4.2%
Picture Life	4.0%
Anyone to talk to	9.3%
Eat dinner with adults	2.0%
Volunteering	3.2%
Close to other students	1.1%
Feel part of school	1.3%
Feel safe at school	0.8%
Involved in community	2.2%

Motivated to help community	1.9%
Know cultural/ethnic language	10.7%
Adult you trust at school	10.8%
Adult you trust in community	13.3%
Adult I trust in family	4.4%
Fall workout	5.8%
Spring workout	5.2 %
Hours sleeping	1.9%
School sports	2.4%
School activity	2.7%
Hugs from parents	3.1%
I love you from parents	3.8%
Mom understands	2.1%
Confide in mom	2.1%
Dad understands	4.4%
Confide in Dad	3.7%
Reliable sibling	3.0%
Have close friends	3.0%
Reliable friends	1.9%

Assumptions

The logistic regression equation is a statistical test that has fewer restrictions compared to other parametric tests and allows one to compute the probability of a binary outcome occurring. (90) The dependent variable must be dichotomous to predict the presence/absence of an event.(90) Logistic regression also allows for multiple independent variables.(90) In the current study, the independent variables were EA, EN, and protective factors. The dependent variable was DEBs.

The assumptions of the logistic regression analysis include lack of multicollinearity, linearity of the logit, absence of outliers in the solution, ratio of cases to variables, adequacy of expected frequencies and power, and independence of error.(90) These assumptions were tested to ensure that logistic regression was the appropriate model to use.

Multicollinearity. Two variables should not have a correlation coefficient larger than 0.8.(90) This is because the presence of multicollinear predictors results in unstable parameter estimates and weakens the ability to determine which independent variable is influencing the dependent variable.(90) Multicollinearity was assessed using variance inflation factors (VIFs) after running the regression models. A VIF greater than 10 was considered large collinearity,

values above 2.5-5 may also be a concern. In the adjusted logistic regression models that include sociodemographic covariates, all VIFs were below these thresholds, suggesting multicollinearity was not an issue. Since protective factors were examined in separate models, multicollinearity did not apply.

Linearity of the logit. Logistic regression requires a linear relationship between continuous independent variables and the logit transformation of the dependent variable.[90] Age was a continuous variable used as a covariate. This was tested by examining a scatterplot to assess if the logit of Y had a linear relationship with age. The relationship was linear.

Absence of outliers in the solution. In logistic regressions, poorly predicted cases can indicate poor model fit if many cases fall into the wrong category with high probability.[90] Outliers can be identified by examining standardized residuals, with values above ±3.3 are considered extreme. Deviance residuals were examined after running the models, two outliers were identified (-3.35). Sensitivity analyses showed that removing these cases did not change the results, so they were retained in the final analyses.

Ratio of cases to variables and adequacy of expected frequencies and power. Having enough cases in a sample allows you to reliably estimate the effect on the dependent variable.[90] Including too many variables and not having a large enough sample may result in large parameters, having a large odds ratio and a wide confidence interval which could lead to a Type II error.[90] This was assessed by examining cross tabs between all categorical variables to see if all frequencies are greater than one, and no more than 20% less than 5.[90] There were no zero cells, however some protective factor analyses were limited due to reduced statistical power.

Independence of errors. Logistic regression assumes that responses of different cases are independent of each other.[90] Independence is when no data point is linked to any other data point in the analysis.[90] This assumption can be violated if repeated measures are used (e.g., before and after a treatment or a matched case-control study and can lead to a Type I error because of overdispersion).[90] DEBs were examined at any timepoint from Waves 3 to 5. If a participant said “yes” to at least one DEB, at any timepoint, 1 data point from the participant was scored. Therefore, independence of errors was not violated because data were not drawn multiple times from the participants.

Ethical considerations

Ethics approval was obtained from the Health Research Ethics Board of the University of Manitoba. This was a secondary data analysis, the dataset was already de-identified, and there was no direct contact with participants. As a result, the risk of harm to individuals was considered minimal. To maintain confidentiality and protect participant privacy, all data were analyzed in aggregate form. Also, cell counts under five were not reported in the tables to maintain confidentiality. Although this was a secondary data analysis, the sensitive nature of child maltreatment and DEBs emphasizes the importance of carefully handling the data and cautious interpretations of the results. Findings are reported at the group level only and stigmatizing language is avoided to not contribute to harm.

Results

Descriptive Analysis

Table 3. shows the sociodemographic characteristics of the total sample. Overall, 41.5% of adolescents identified as male and 58.5% identified as female. Most adolescents identified as heterosexual (72.6%) and 27.4% identified as sexually diverse. Participants ranged between 14-17 years old. The largest proportion being 14 years old (30.9%), followed by 15-year-olds (25.7%), 16-year-olds (25.2%), and 17-year-olds (18.2%). Household income varied, with 39.8% of adolescents coming from a household income of $50,000-$99,999, 22.7% between $100,000 and $149,999, 22.5% at $150,000 or more, and 15.0% reporting an income below $49,999.

Table 3. Sociodemographic characteristics among those with/ without an emotional maltreatment history (n=556).

Sociodemographic Characteristics	**Total Sample % (n)**
Sex[a]	
Male	41.5 (230)
Female	58.5 (324)
Sexual Identity[b]	
Heterosexual	72.6 (369)
Diverse (Homosexual, Bisexual, Other Sexual Identity)	27.4 (139)
Age[a]	
14 years old	30.9 (172)
15 years old	25.7 (143)

16 years old	25.2 (140)
17 years old	18.2 (101)
Household Income[a]	
$49,999 or less	15.0 (80)
$50,000 to $99,999	39.8 (212)
$100,000 to $149,999	22.7 (121)
$150,000 or more	22.5 (120)

[a] Data from baseline

[b] Data from Waves 4 and 5

A total of 69.4% of the sample reported DEBs, and 30.6% reported no DEBs. A description of how DEBs were distributed across sociodemographic groups is presented in Table 4. Among males, 54.4% reported DEBs and 45.7% did not. Among females, 79.9% reported DEBs and 20.1% did not report DEBs. For sexual identity, 61.3% of heterosexual adolescents reported DEBs and 83.5% of sexually diverse adolescents reported DEBs. The remaining 38.8% and 16.6%, respectively, did not report DEBs. Across age groups, DEBs were present at all ages with 72.7% of 14-year-olds, 70.6% of 15-year-olds, 60.0% of 16-year-olds, and 75.3% of 17-year-olds reporting DEBs. A similar pattern emerged across household income levels. Adolescents from lower income households (<$49,999) reported DEBs the most (82.5%), followed by those from household incomes of $50,000-$99,999 (74.5%), $100,000-$149,999 (62.8%), and >$150,000 (60.8%). The rest of the adolescents in each income group did not report DEBs.

Table 4. Sociodemographic characteristics among those with disordered eating behaviours (n=556)	**Disordered Eating Behaviours % (n)**	
Sociodemographic Characteristics	**DEB (Yes)**	**No DEB**
Sex		
Male	54.4 (125)	45.7 (105)
Female	79.9 (259)	20.1 (65)
Sexual Identity		
Heterosexual	61.3 (226)	38.8 (143)
Diverse (Homosexual, Bisexual, Other Sexual Identity)	83.5 (116)	16.6 (23)
Age		
14 years old	72.7 (125)	27.3 (47)
15 years old	70.6 (101)	29.4 (42)
16 years old	60.0 (84)	40.0 (56)
17 years old	75.3 (76)	24.8 (25)

Household Income		
$49,999 or less	82.5 (66)	17.5 (14)
$50,000 to $99,999	74.5 (158)	25.5 (54)
$100,000 to $149,999	62.8 (76)	37.2 (45)
$150,000 or more	60.8 (73)	39.2 (47)

Note: DEB variables from Waves 3-5 were combined to create the sample.

Table 5. presents the prevalence of EA, EN, and any EM in the total sample among those with and without DEBs. Overall, 24.5% of adolescents reported any EM, 21.7% reported EA, and 13.3% reported EN. Each of these forms of maltreatment appeared more frequently among adolescents with DEBs than among those without.

Table 5. Prevalence of child maltreatment in the total sample and the prevalence of disordered eating behaviours among the maltreated sample (n=526).

	Disordered Eating Behaviours		
	Total Sample	**DEB (Yes)**	**No DEB**
Child Maltreatment[a]	**% (n)**		
Emotional Abuse	21.7 (115)	29.6 (107)	4.7 (8)
Emotional Neglect	13.3 (70)	17.9 (64)	3.6 (6)
Emotional Maltreatment	24.5 (129)	32.6 (117)	7.2 (12)

[a] Data from Waves 3, 4, and 5

The chronicity of DEBs is described in Table 6. Over one-third of adolescents reported no DEBs (36.8%), 31.0% reported DEBs over three waves. Smaller but notable proportions reported DEBs over one wave (16.5%) or DEBs over two waves (15.8%).

Table 6. Chronicity of disordered eating behaviours (n=462)

Number of waves DEBs were recorded	**(n)**	**Percent (%)**
0	170	36.8
1	76	16.5
2	73	15.8
3	143	31.0

Abbrev. *DEB,* Disordered Eating Behaviours.

Note: The n's for this table will not be similar to the other tables due to missing data not being included in the count for Table 6.

The item-level responses for the SCOFF are described in Table 7. "Worried you lost control" was answered the most across all waves (48.2-50.2%), "Think you are fat when untrue" was answered the second most across waves (38.8-39.9%), followed by "Food controls my life" (25.3-29.7%). The least answered items were "Lost weight in a short period of time" (16.7-23.9%) and "Vomiting for weight loss" (7.5-8.3%).

Table 7. Item-level responses to SCOFF questionnaire across Waves 3-5

SCOFF Items	**Wave 3 Yes % (n)**	**Wave 3 No % (n)**	**Wave 4 Yes % (n)**	**Wave 4 No % (n)**	**Wave 5 Yes % (n)**	**Wave 5 No % (n)**	**ANY Yes Waves 3-5 % (n)**
Vomiting for weight loss	7.5 (28)	92.6 (348)	7.1 (25)	92.9 (327)	5.0 (15)	95.1 (288)	8.3% (46)
Worried you Lost Control	48.2 (183)	51.8 (197)	49.9 (175)	50.1 (176)	49.8 (152)	50.2 (153)	48.2 (268)
Lost weight in a short period of time	16.7 (61)	83.3 (304)	16.8 (58)	83.2 (287)	19.1 (58)	80.9 (245)	23.9 (133)
Think you are fat when untrue	38.8 (142)	61.2 (224)	36.9 (125)	63.1 (214)	38.6 (115)	61.4 (183)	39.9 (222)
Food controls life	25.3 (94)	74.7 (278)	29.1 (99)	70.9 (241)	28.3 (85)	71.7 (215)	29.7 (165)

Note: SCOFF items were coded 1 ("Yes") and 0 ("No"); responses that were missing were excluded. "ANY Yes" indicates whether an adolescent said yes to the SCOFF item at least once across Waves 3,4, or 5.

Table 8. presents the prevalence of DEBs among adolescents with and without histories of EA, EN, and any EM, stratified by sex. Among males, DEBs were reported by 82.8% (n=24) of those who experienced EA, 86.4% (n=19) of those with EN, and 80.0% (n=28) of those with any EM. In contrast, 47-49% of males without maltreatment histories reported DEBs. Among females, DEBs were reported by 96.4% (n=81) with histories of EA, 93.6% (n=44) with EN, and 94.6% (n=87) with any EM. Compared to 72-76% of females without histories of maltreatment.

Across both sexes, adolescents with EA, EN, or any EM reported greater prevalence of DEBs than those without maltreatment histories.

Table 8. Prevalence of disordered eating behaviours among those with and without a history of emotional abuse, emotional neglect, and any emotional maltreatment, stratified by sex.

	Disordered Eating Behaviours	
	Present % (n)	**Absent % (n)**
Child Maltreatment		
Male		
Emotional abuse		
No	47.6 (91)	52.4 (100)
Yes	82.8 (24)	17.2 (5)
Emotional neglect		
No	48.7 (95)	51.3 (100)
Yes	86.4 (19)	NR
Emotional maltreatment		
No	47.3 (86)	52.8 (96)
Yes	80.0 (28)	20.0 (7)
Female		
Emotional abuse		
No	72.9 (164)	27.1 (61)
Yes	96.4 (81)	NR
Emotional neglect		
No	76.1 (197)	23.9 (62)
Yes	93.6 (44)	NR
Emotional maltreatment		
No	72.6 (156)	27.4 (59)
Yes	94.6 (87)	5.4 (5)

Note. Emotional maltreatment refers to emotional abuse and/or emotional neglect. NR- n's less than 5.

Logistic regression models

Table 9. presents the associations between EA, EN, and any EM with DEBs, stratified by sex. **Males:** In unadjusted models, EA (OR = 5.27, 95% CI 1.93-14.4, $p < .001$), EN (OR = 6.67, 95% CI 1.91-23.3, $p < .01$), and EM (OR = 4.47, 95% CI 1.86-10.7, $p < .001$) were associated with greater odds of DEBs. These associations remained significant after adjusting for sociodemographic variables (AOR1), but only any EM remained significant after further adjusting for all child maltreatment types (AOR2= 2.79, 95% CI 1.02-7.66, $p < .05$).

Females: In unadjusted models, EA (OR= 10.04, 95% CI 3.06-33.0, p < .001), EN (OR = 4.62, 95% CI 1.38-15.4, p < .05), and any EM (OR = 6.58, 95% CI 2.55-17.0, p < .001) were associated with greater odds of DEBs. After adjusting for sociodemographic variables (AOR1), all three remained significant. After further adjusting for all child maltreatment types (AOR 2), EA (AOR 2 =. 7.52, 95% CI 1.43-39.7, p < .05) and any EM (AOR 2 = 3.84, 95% CI 1.24-11.9, p < .05) remained significant, while EN was no longer significant.

Table 9. Associations between emotional abuse, emotional neglect, and any emotional maltreatment with disordered eating behaviours, stratified by sex.

	Disordered Eating Behaviours			
	OR (95% CI)	**AOR 1 (95% CI)**	**AOR 2 (95% CI)**	**Note**
Male				
Emotional Abuse	5.27 (1.93-14.4) ***	3.60 (1.22-10.61) *	2.40 (0.73-7.82)	‡
Emotional Neglect	6.67 (1.91-23.26) **	4.58 (1.20-17.51) *	2.27 (0.53-9.76)	‡
Emotional Maltreatment	4.47 (1.86-10.74) ***	3.44 (1.32-8.92) *	2.79 (1.02-7.66) *	
Female				
Emotional Abuse	10.04 (3.06-32.99) ***	7.31 (2.17-24.64) **	7.52 (1.43-39.70) *	
Emotional Neglect	4.62 (1.38-15.38) *	3.54 (1.03-12.11) *	0.92 (0.22-3.90)	
Emotional Maltreatment	6.58 (2.55-17.01) ***	4.61 (1.69-12.53) **	3.84 (1.24-11.93) *	

Abbrev. *OR* unadjusted odds ratio, *CI* Confidence Interval, *AOR-1* odds ratio adjusted for sexual identity, household income, and age, *AOR-2* odds ratio adjusted for all types of child maltreatment (physical abuse, sexual abuse, physical neglect, EIPV).
* p ≤ .05; **p ≤ .01; ***p ≤ .001
‡ Possible Type II error: 95% CI crosses the null (1.0) and the clinical threshold (1.50). This could indicate imprecision and a risk of type II error (false negative).

Table 10. presents the associations between individual-, family-, school-, and community-level protective factors and the absence of DEBs among adolescents *without* a history of any EM. Models were adjusted for sex, household income, and age.

Five protective factors were significantly associated with greater odds of not having DEBs. At the individual level, adolescents who reported being excited about their future had increased odds of not having DEBs (AOR= 2.21, 95% CI 1.11- 4.41, p < .05). At the family level, being able to confide in their mother increased their odds of not having DEBs (AOR =

2.51, 95% CI 1.29-4.89, $p < .01$). At the school level, feeling close to other students (AOR = 2.11, 95% CI 1.13-3.94, $p < .05$), feeling part of the school (AOR =3.34, 95% CI 1.73-6.48, $p < .001$), and feeling safe at school (AOR =2.12, 95% CI 1.07-4.14, $p < 0.05$) were associated with increased odds of not having DEBs.

The protective factors that could have clinical importance were determined if the results did not reach statistical significance ($p \geq 0.05$), but the AOR met 1.50 or above with a wide confidence interval. These models may have clinical importance but may not have reached statistical significance due to potentially underpowered models. These protective factors include "In a typical week, in the spring or summer, how many days are you physically active for 30 minutes or more" (AOR=3.88, 95% CI 0.40-37.98), "Do you have anyone you can talk to about yourself or your problems?" (AOR= 1.49, 95% CI 0.34-6.47), "In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with?" (AOR= 1.65, 95% CI 0.79-3.41), "How much can you confide in your father/father figure about things that are bothering you" (AOR= 1.56, 95% CI 0.94-2.61), "In my community, there is an adult I trust" (AOR=1.94, 95% CI 0.92-4.12), "I feel involved in my community" (AOR= 1.50, 95% CI 0.96-2.35). Refer to Table 13 for a summary of the statistically significant and clinically significant protective factors.

Table 10. Individual-, family-, school-, and community-level protective factors associated with NO disordered eating behaviours among adolescents *without* a history of any emotional maltreatment

	No Disordered Eating Behaviours		
Protective Factor	**No DEB % (n)**	**AOR (95% CI)**	**Note**
Individual level			
I know my cultural or ethnic language or languages			
Strongly disagree/Disagree/ Neither agree nor disagree/I don't identify with my ethnic/cultural language	36.7 (51)	1.00	
Strongly Agree/Agree	63.3 (88)	1.02 (0.63-1.66)	
I am excited about my future			
Strongly Disagree/Disagree/Neither agree nor disagree	11.6 (18)	1.00	
Strongly agree/agree	88.4 (137)	2.21 (1.11-4.41) *	
I can picture what my life will be like in 5 years from now			
Strongly Disagree/Disagree/Neither agree nor disagree	54.3 (83)	1.00	
Strongly agree/agree	45.8 (70)	1.16 (0.74-1.81)	
In a typical week, in the fall or winter, how many days are you physically active for 30 minutes or more?			
0-1 Days	4.6 (7)	1.00	
2+ Days	95.4 (145)	1.48 (0.46-4.74)	
In a typical week, in the spring or summer, how many days are you physically active for 30 minutes or more?			
0-1 Days	NR	1.00	
2+ Days	98.7 (151)	3.88 (0.40-37.98)	† ‡
Do you have anyone you can talk to about yourself or your problems?			
No	NR	1.00	
Yes	97.3 (142)	1.49 (0.34-6.47)	† ‡
In past 30 days, how long do you usually spend sleeping each night?			
Less than 8 hours	NR	1.00	
8+ hours	100 (154)	--	
During the school year, how often do you participate in before-school, lunchtime, or after-school sports or physical activities organized by your school?			
Never- Less than once a week	44.2 (68)	1.00	
Once a week or more	55.8 (86)	0.92 (0.59-1.44)	
During the school year, how often do you participate in before-school, lunchtime, or after-school activities other than sports or physical activities organized by your school?			
Never- Less than once a week	55.6 (84)	1.00	
Once a week or more	44.4 (67)	1.29 (0.82-2.03)	
Family Level			

In my family (immediate or extended), there is an adult who I trust			
No	NR	1.00	
Yes	98.7 (152)	0.31 (0.03-3.56)	
How often does a parent or a person raising you hug you?			
Never	6.6 (10)	1.00	
Once a week or more	93.4 (142)	1.28 (0.50-3.25)	
How often does a parent or a person raising you say "I love you"			
Never	4.6 (7)	1.00	
Once a week or more	95.4 (145)	1.16 (0.36-3.81)	
In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with?			
0-2 days	9.2 (14)	1.00	
3+ Days	90.9 (139)	1.65 (0.79-3.41)	† ‡
How much does your mother/mother figure understand your problems and worries?			
Barely- Not at all	11.8 (18)	1.00	
Some- A lot	88.2 (135)	1.32 (0.68-2.56)	
How much can you confide in your mother/mother figure about things that are bothering you?			
Barely- Not at all	9.9 (15)	1.00	
Some- A lot	90.1 (137)	2.51 (1.29-4.89) **	
How much does your father/father figure understand your problems and worries?			
Barely- Not at all	17.7 (26)	1.00	
Some- A lot	82.3 (121)	1.49 (0.85-2.61)	
How much can you confide in your father/father figure about things that are bothering you?			
Barely- Not at all	25.3 (37)	1.00	
Some- A lot	74.7 (109)	1.56 (0.94-2.61)	† ‡
How often can you rely on at least one sibling for help if you have a serious problem?			
Barely- Not at all	32.4 (46)	1.00	
Some- A lot	67.6 (96)	1.27 (0.77-2.10)	
School Level			
Do you have at least one close friend?			
No	NR	1.00	
Yes	98.1 (151)	0.55 (0.09-3.53)	
How much can you rely on your friends for help if you have a serious problem?			
Barely- Not at all	6.5 (10)	1.00	
Some- A lot	93.6 (145)	1.18 (0.52-2.71)	
I feel close to other students at school			
Strongly Disagree/Disagree/Neither Agree nor Disagree	13.0 (20)	1.00	
Strongly agree/Agree	87.0 (134)	2.11 (1.13-3.94) *	
At my school, there is an adult I trust			
No	10.3 (15)	1.00	
Yes	89.7 (131)	1.38 (0.68-2.77)	
I feel I am part of my school			

Strongly Disagree/Disagree/Neither Agree nor Disagree	9.8 (15)	1.00	
Strongly agree/Agree	90.2 (138)	3.34 (1.73-6.48)***	
I feel safe at my school			
No	10.3 (16)	1.00	
Yes	89.7 (139)	2.12 (1.07-4.14) *	
Community Level			
In my community, there is an adult I trust			
No	9.8 (14)	1.00	
Yes	90.2 (129)	1.94 (0.92-4.12)	† ‡
In the past 12 months, how often did you take part in volunteer activities			
No Volunteering	19.9 (30)	1.00	
Volunteers	80.1 (121)	0.78 (0.43-1.43)	
I feel involved in my community			
Strongly disagree/Disagree/ Neither agree nor disagree	39.0 (60)	1.00	
Strongly agree/Agree	61.0 (94)	1.50 (0.96-2.35)	† ‡
I feel motivated to help and improve my community			
Strongly disagree/Disagree/ Neither agree nor disagree	45.2 (70)	1.00	
Strongly agree/Agree	54.8 (85)	1.42 (0.91-2.21)	

Abbrev. *DEB* Disordered Eating Behaviours*; Emotional Maltreatment* emotional abuse and/or emotional neglect; *CI* Confidence Interval; *AOR* Adjusted Odds Ratio; AORs adjust for household income, age, and sex. The outcome was coded such that 1 = no DEBs and 0 = DEBs present; ORs and AORs >1 indicate a greater likelihood of ***not*** having DEBs (potential protective factor), while values <1 indicate a lower likelihood of not having DEBs.

Note: Combined variables into binary variables to increase power. NR- Indicates small cell sizes. – Indicates omitted values

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

† Possible clinical importance: Result did not reach statistical significance ($p \geq 0.05$), but the AOR meets the threshold for clinical significance (1.50).

‡ Possible Type II error: 95% CI crosses the null (1.0) and the clinical threshold (1.50). This could indicate imprecision and a risk of type II error (false negative).

Table 11. presents the associations between individual-, family-, school-, and community- level protective factors and the absence of DEBs among adolescents *with* a history of any EM. Models were adjusted for sex, household income, and age.

One protective factor was associated with increased odds of not having DEBs "During the school year, how often do you participate in before-school, lunchtime, or after-school sports or physical activities organized by your school?" (AOR=4.68, 95% CI 1.07-20.51, $p < 0.05$).

The protective factors that could have clinical importance were determined if the results did not reach statistical significance ($p \geq 0.05$), but the AOR met 1.50 or above with a wide confidence interval. These models may have clinical importance but may not have reached statistical significance due to potentially underpower models. These included individual level (knowing one's cultural or ethnic language, being excited about future), family-level (parental affection, confiding in mother/father, having a reliable sibling), school-level (feeling safe at school), and community level factors (volunteering, community involvement, motivation to help community). Refer to Table 13. for a summary of the statistically significant and clinically significant protective factors.

Table 11. Individual-, family-, school-, and community-level protective factors associated with NO disordered eating behaviours among adolescents *with* a history of any emotional maltreatment

	No Disordered Eating Behaviours		
Protective Factor	**No DEB % (n)**	**AOR (95% CI)**	**Note**
Individual level			
I know my cultural or ethnic language or languages			
Strongly disagree/Disagree/ Neither agree nor disagree/I don't identify with my ethnic/cultural language	NR	1.00	
Strongly Agree/Agree	83.3 (10)	2.76 (0.54-14.16)	† ‡
I am excited about my future			
Strongly Disagree/Disagree/Neither agree nor disagree	NR	1.00	
Strongly agree/agree	80.0 (8)	3.53 (0.59-21.29)	† ‡
I can picture what my life will be like in 5 years from now			
Strongly Disagree/Disagree/Neither agree nor disagree	45.5 (5)	1.00	
Strongly agree/agree	54.6 (6)	1.29 (0.35-4.79)	
In a typical week, in the fall or winter, how many days are you physically active for 30 minutes or more?			
0-1 Days	NR	1.00	
2+ Days	90.9 (10)	1.29 (0.13-12.82)	
In a typical week, in the spring or summer, how many days are you physically active for 30 minutes or more?			
0-1 Days	NR	1.00	
2+ Days	83.3 (10)	0.53 (0.08-3.49)	
Do you have anyone you can talk to about yourself or your problems?			
No	NR	1.00	
Yes	81.8 (9)	1.32 (0.21-8.44)	
In past 30 days, how long do you usually spend sleeping each night?			
Less than 8 hours	NR	--	
8+ hours	115 (100)	--	
During the school year, how often do you participate in before-school, lunchtime, or after-school sports or physical activities organized by your school?			
Never- Less than once a week	NR	1.00	
Once a week or more	75.0 (9)	4.68 (1.07-20.51) *	
During the school year, how often do you participate in before-school, lunchtime, or after-school activities other than sports or physical activities organized by your school?			
Never- Less than once a week	58.3 (7)	1.00	
Once a week or more	41.7 (5)	0.86 (0.23-3.25)	
Family Level			

In my family (immediate or extended), there is an adult who I trust			
No	NR	1.00	
Yes	12 (100)	--	
How often does a parent or a person raising you hug you?			
Never	NR	1.00	
Once a week or more	91.7 (11)	2.15 (0.23-19.79)	† ‡
How often does a parent or a person raising you say "I love you"			
Never	NR	1.00	
Once a week or more	100 (12)	--	
In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with?			
0-2 days	NR	1.00	
3+ Days	75.0 (9)	0.71 (0.16-3.26)	
How much does your mother/mother figure understand your problems and worries?			
Barely- Not at all	NR	1.00	
Some- A lot	91.7 (11)	2.57 (0.50-13.23)	† ‡
How much can you confide in your mother/mother figure about things that are bothering you?			
Barely- Not at all	NR	1.00	
Some- A lot	75.0 (9)	2.63 (0.61-11.42)	† ‡
How much does your father/father figure understand your problems and worries?			
Barely- Not at all	NR	1.00	
Some- A lot	72.7 (8)	3.53 (0.78- 16.07)	† ‡
How much can you confide in your father/father figure about things that are bothering you?			
Barely- Not at all	NR	1.00	
Some- A lot	72.7 (8)	3.64 (0.82-16.04)	† ‡
How often can you rely on at least one sibling for help if you have a serious problem?			
Barely- Not at all	NR	1.00	
Some- A lot	60.0 (6)	2.25 (0.54-9.32)	† ‡
School Level			
Do you have at least one close friend?			
No	NR	1.00	
Yes	91.7 (11)	0.88 (0.08-9.05)	
How much can you rely on your friends for help if you have a serious problem?			
Barely- Not at all	--	1.00	
Some- A lot	83.3 (10)	0.92 (0.17-4.96)	
I feel close to other students at school			
Strongly Disagree/Disagree/Neither Agree nor Disagree	--	(1.00)	
Strongly agree/Agree	75.0 (9)	1.37 (0.32-5.99)	
At my school, there is an adult I trust			
No	--	1.00	
Yes	83.3 (10)	0.72 (0.12-4.19)	
I feel I am part of my school			

Strongly Disagree/Disagree/Neither Agree nor Disagree	--	1.00	
Strongly agree/Agree	66.7 (8)	0.97 (0.24-3.84)	
I feel safe at my school			
No	--	1.00	
Yes	83.3 (10)	1.94 (0.36-10.39)	† ‡
Community Level			
In my community, there is an adult I trust			
No	--	1.00	
Yes	81.8 (9)	0.58 (0.09-3.92)	
In the past 12 months, how often did you take part in volunteer activities			
No Volunteering	--	1.00	
Volunteers	83.3 (10)	2.21 (0.39-12.62)	† ‡
I feel involved in my community			
Strongly disagree/Disagree/ Neither agree nor disagree	41.7 (5)	1.00	
Strongly agree/Agree	58.3 (7)	1.72 (0.42-6.99)	† ‡
I feel motivated to help and improve my community			
Strongly disagree/Disagree/ Neither agree nor disagree	NR	1.00	
Strongly agree/Agree	66.7 (8)	2.69 (0.69-10.48)	† ‡

Abbrev. *DEB* Disordered Eating Behaviours*; Emotional Maltreatment* emotional abuse and/or emotional neglect; *CI* Confidence Interval; *AOR* Adjusted Odds Ratio. AORs adjust for household income, age, and sex. The outcome was coded such that 1 = no DEBs and 0 = DEBs present; ORs and AORs >1 indicate a greater likelihood of ***not*** having DEBs (potential protective factor), while values <1 indicate a lower likelihood of not having DEBs.

Note: Combined variables into binary variables to increase power. NR Indicates small cell sizes. – Indicates omitted values.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

† Possible clinical importance: Result did not reach statistical significance ($p \geq 0.05$), but the AOR meets the threshold for clinical significance (1.50).

‡ Possible Type II error: 95% CI crosses the null (1.0) and the clinical threshold (1.50). This could indicate imprecision and a risk of type II error (false negative).

Table 12. presents post-hoc analyses of the associations between individual-, family-, school-, and community level protective factors and increased odds of not having DEBs, regardless of maltreatment history. These analyses were conducted without stratifying by maltreatment to increase statistical power and to examine whether additional protective factors would emerge. Models were adjusted for sex, household income, and age.

Twelve protective factors were significantly associated with increased odds of not developing DEBs. At the individual level, being excited about the future increased odds of not having DEBs (AOR=3.00, 95% CI 1.65-5.46, $p < 0.001$). At the family level, maternal understanding, maternal confiding, paternal understanding, paternal confiding, and having a reliable sibling increased odds of not having DEBs (AORs ranged from 1.68-3.22). At the school level, feeling close to other students (AOR=2.03, 95% CI 1.20-3.46, $p < 0.01$), belonging at school (AOR=3.26, 95% CI 1.84-5.77, $p < 0.001$), and feeling safe at school (AOR=2.11, 95% CI 1.17-3.80, $p < 0.05$) increased the odds of not having DEBs. At the community level, having an adult to trust (AOR=2.07, 95% CI 1.09-3.95, $p < 0.05$), feeling involved (AOR=1.76, 95% CI 1.18-2.64, $p < 0.01$), and feeling motivated to help the community (AOR=1.64, 95% CI 1.10-2.45, $p < 0.05$) increased the odds of not having DEBs. Several clinically significant protective factors were found, including physical activity, parental affection, and having family meals. A full summary of both statistically significant and clinically significant protective factors are listed in Table 14.

Table 12. Individual-, family-, school-, and community-level protective factors associated with NO disordered eating behaviours among adolescents regardless of maltreatment history

	No Disordered Eating Behaviours		
Protective Factor	**No DEB % (n)**	**AOR (95% CI)**	**Note**
Individual level			
I know my cultural or ethnic language or languages			
Strongly disagree/Disagree/ Neither agree nor disagree/I don't identify with my ethnic/cultural language	35.1 (54)	1.00	
Strongly Agree/Agree	64.9 (100)	1.15 (0.74-1.78)	
I am excited about my future			
Strongly Disagree/Disagree/Neither agree nor disagree	12.5 (21)	1.00	
Strongly agree/agree	87.5 (147)	3.00 (1.65-5.46)***	
I can picture what my life will be like in 5 years from now			
Strongly Disagree/Disagree/Neither agree nor disagree	53.9 (90)	1.00	
Strongly agree/agree	46.1 (77)	1.18 (0.79-1.76)	
In a typical week, in the fall or winter, how many days are you physically active for 30 minutes or more?			
0-1 Days	5.4 (9)	1.00	
2+ Days	94.6 (157)	1.93 (0.77-4.81)	† ‡
In a typical week, in the spring or summer, how many days are you physically active for 30 minutes or more?			
0-1 Days	NR	1.00	
2+ Days	97.6 (164)	2.47 (0.67-9.11)	† ‡
Do you have anyone you can talk to about yourself or your problems?			
No	3.8 (6)	1.00	
Yes	96.3 (154)	1.40 (0.52-3.79)	
In past 30 days, how long do you usually spend sleeping each night?			
Less than 8 hours	NR	1.00	
8+ hours	100 (169)	--	
During the school year, how often do you participate in before-school, lunchtime, or after-school sports or physical activities organized by your school?			
Never- Less than once a week	43.2 (73)	1.00	
Once a week or more	56.8 (96)	1.20 (0.80-1.79)	
During the school year, how often do you participate in before-school, lunchtime, or after-school activities other than sports or physical activities organized by your school?			
Never- Less than once a week	55.4 (92)	1.00	
Once a week or more	44.6 (74)	1.33 (0.89-2.00)	
Family Level			
In my family (immediate or extended), there is an adult who I trust			
No	NR	1.00	
Yes	98.2 (166)	1.58 (0.41-6.11)	† ‡
How often does a parent or a person raising you hug you?			
Never	6.6 (11)	1.00	
Once a week or more	93.4 (156)	2.17 (0.99-4.74)	† ‡

How often does a parent or a person raising you say "I love you"			
Never	4.2 (7)	1.00	
Once a week or more	95.8 (160)	1.98 (0.70-5.58)	† ‡
In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with?			
0-2 days	10.1 (17)	1.00	
3+ Days	89.9 (151)	1.79 (0.96-3.33)	† ‡
How much does your mother/mother figure understand your problems and worries?			
Barely- Not at all	12.5 (21)	1.00	
Some- A lot	87.5 (147)	1.86 (1.06-3.27) *	
How much can you confide in your mother/mother figure about things that are bothering you?			
Barely- Not at all	10.8 (18)	1.00	
Some- A lot	89.2 (149)	3.22 (1.81-5.71)***	
How much does your father/father figure understand your problems and worries?			
Barely- Not at all	19.9 (32)	1.00	
Some- A lot	80.1 (129)	1.97 (1.22-3.18)**	
How much can you confide in your father/father figure about things that are bothering you?			
Barely- Not at all	26.9 (43)	1.00	
Some- A lot	73.1 (117)	1.90 (1.21-2.98)**	
How often can you rely on at least one sibling for help if you have a serious problem?			
Barely- Not at all	32.3 (50)	1.00	
Some- A lot	67.7 (105)	1.68 (1.08-2.61)*	
School Level			
Do you have at least one close friend?			
No	3.0 (5)	1.00	
Yes	97.0 (163)	0.69 (0.21-2.23)	
How much can you rely on your friends for help if you have a serious problem?			
Barely- Not at all	8.2 (14)	1.00	
Some- A lot	91.8 (156)	1.11 (0.57-2.16)	
I feel close to other students at school			
Strongly Disagree/Disagree/Neither Agree nor Disagree	14.8 (25)	1.00	
Strongly agree/Agree	85.2 (144)	2.03 (1.20-3.46)**	
At my school, there is an adult I trust			
No	11.2 (18)	1.00	
Yes	88.8 (143)	1.43 (0.79-2.61)	
I feel I am part of my school			
Strongly Disagree/Disagree/Neither Agree nor Disagree	11.3 (19)	1.00	
Strongly agree/Agree	88.7 (149)	3.26 (1.84-5.77)***	
I feel safe at my school			
No	11.2 (19)	1.00	
Yes	88.8 (151)	2.11 (1.17-3.80)*	
Community Level			
In my community, there is an adult I trust			
No	10.8 (17)	1.00	
Yes	89.2 (140)	2.07 (1.09-3.95)*	
In the past 12 months, how often did you take part in volunteer activities			

No Volunteering	19.3 (32)	1.00	
Volunteers	80.7 (134)	1.16 (0.69-1.96)	
I feel involved in my community			
Strongly disagree/Disagree/ Neither agree nor disagree	38.5 (65)	1.00	
Strongly agree/Agree	61.5 (104)	1.76 (1.18-2.64)**	
I feel motivated to help and improve my community			
Strongly disagree/Disagree/ Neither agree nor disagree	43.5 (74)	1.00	
Strongly agree/Agree	56.5 (96)	1.64 (1.10-2.45)*	

Abbrev. *DEB* Disordered Eating Behaviours*; Emotional Maltreatment* emotional abuse and/or emotional neglect; *CI* Confidence Interval; *AOR* Adjusted Odds Ratio. AORs adjust for household income, age, and sex. The outcome was coded such that 1 = no DEBs and 0 = DEBs present; ORs and AORs >1 indicate a greater likelihood of ***not*** having DEBs (potential protective factor), while values <1 indicate a lower likelihood of not having DEBs.

Note: Combined variables into binary variables to increase power. NR Indicates small cell sizes. – Indicates omitted values.

* p ≤ .05; **p ≤ .01; ***p ≤ .001

† Possible clinical importance: Result did not reach statistical significance (p≥0.05), but the AOR meets the threshold for clinical significance (1.50).

‡ Possible Type II error: 95% CI crosses the null (1.0) and the clinical threshold (1.50). This could indicate imprecision and a risk of type II error (false negative).

Table 13. Statistically and clinically significant protective factors associated with increased odd of no DEBs among adolescents with and without histories of emotional maltreatment

Ecological level	Protective Factor	No History of Emotional Maltreatment	History of Emotional Maltreatment	Present in both statistically and clinically significant tables
Individual	I am excited about my future	Statistically Significant	Clinically Significant	Yes
Individual	During the school year, how often do you participate in before-school, lunchtime, or after-school sports or physical activities organized by your school?	__	Statistically Significant	No

Individual	In a typical week, in the spring or summer, how many days are you physically active for 30 minutes or more?	Clinically significant	__	No
Individual	Do you have anyone you can talk to about yourself or your problems?	Clinically significant	__	No
Individual	In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with?	Clinically significant	__	No
Family (Micro)	How much can you confide in your mother/mother figure about things that are bothering you?	Statistically Significant	Clinically Significant	Yes
Family (Micro)	How much does your mother/mother figure understand your problems and worries?	__	Clinically Significant	No
Family (Micro)	How much can you confide in your father/father figure about things that are bothering you?	Clinically significant	Clinically significant	No
Family (Micro)	How much does your father/father figure understand your problems and worries?	__	Clinically Significant	No
Family (Micro)	How often does a parent or a person raising you hug you?	__	Clinically Significant	No

Family (Micro)	In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with?	Clinically Significant	__	No
Family (Micro)	How often can you rely on at least one sibling for help if you have a serious problem?	__	Clinically significant	No
School (Micro)	I feel close to other students at school	Statistically Significant	__	No
School (Micro)	I feel I am part of my school	Statistically Significant	__	No
School (Micro)	I feel safe at my school	Statistically Significant	Clinically significant	Yes
Community (Micro)	In my community, there is an adult I trust	Clinically significant	__	No
Community (Micro)	In the past 12 months, how often did you take part in volunteer activities	__	Clinically Significant	No
Community (Micro)	I feel motivated to help and improve my community	Clinically Significant	Clinically Significant	No
Community (Micro)	I feel involved in my community	__	Clinically Significant	No

Emotional Maltreatment- emotional abuse and/or emotional neglect

Note: adjusted odds ratios above 1.50 with wide confidence intervals. Likely underpowered models but protective factors could be clinically significant. Protective factors that appeared in both statistically and clinically significant tables are indicated in the last column. Grey cells indicate protective factors that were present in both history types (No EM history/ EM history).

Table 14. Statistically and clinically significant protective factors associated with increased odds of no DEBs among adolescents regardless of emotional maltreatment history		
Ecological Level	Statistically Significant Protective Factors	Possible Clinically Significant Protective Factors (AOR ≥ 1.50)
Individual	I am excited about my future	In a typical week, in the fall or winter, how many days are you physically active for 30 minutes or more? In a typical week, in the spring or summer, how many days are you physically active for 30 minutes or more?
Family	How much does your mother/mother figure understand your problems and worries? How much can you confide in your mother/mother figure about things that are bothering you? How much does your father/father figure understand your problems and worries? How much can you confide in your father/father figure about things that are bothering you? How often can you rely on at least one sibling for help if you have a serious problem?	How often does a parent or a person raising you hug you? How often does a parent or a person raising you say "I love you" In a typical week, how often do you eat dinner (the evening meal) with at least one adult that you live with? In my family (immediate or extended), there is an adult who I trust
School	I feel close to other students at school I feel I am part of my school	

	I feel safe at my school	
Community	In my community, there is an adult I trust I feel involved in my community I feel motivated to help and improve my community	

Emotional Maltreatment- emotional abuse and/or emotional neglect
Note: adjusted odds ratios above 1.50 with wide confidence intervals. Likely underpowered models but protective factors could be clinically significant

Discussion

The aim of the current study was to study the relationship between EA and/or EN with DEBs among Canadian adolescents. This is one of the first studies in Canada to look at DEBs in a community sample of adolescents. The main findings from the current study are as follows: 1) those with a history of EA, EN, and any EM had higher prevalence of DEBs than those without a history of EA, EN, and any EM. 2) Among males and females, a history of EA, EN, and any EM increases the odds of developing DEBs after adjusting for sociodemographic covariates (i.e., age, sexual identity, and household income). These models further adjusted for all child maltreatment types; these associations differed by sex. Among males, only any EM increased the odds of developing DEBs after adjusting for all child maltreatment types. However, the AORs for EA and EN were large, and they had wide confidence intervals indicating possible Type II error. Among females, both EA and any EM increased the odds of developing DEBs after adjusting for all child maltreatment types. These results suggest possible sex-specific trends, however, since interaction terms were not tested due to small sample size, we cannot infer sex differences. 3) For those without a history of any EM, 5 out of the 28 protective factors were associated with increased odds of not having DEBs. Among those with a history of any EM, only 1 protective factor was associated with increased odds of not having DEBs. Potential clinically significant protective factors were found for those with and without histories of EM. Five out of 28 protective factors could have clinical significance for those without histories of any EM. Twelve

out of 28 protective factors could have clinical significance for those with histories of any EM. These protective factors were distributed across the individual-, family-, school-, and community-levels, showing influences from multiple environments of an adolescent's life.

Descriptive results

The current study used a lower SCOFF threshold which contributed to a higher DEB prevalence (69.4%) compared with the estimates reported in the literature review (22.36%). This lower threshold was intentional, reflecting a prevention focused approach aimed at detecting any early indicators of DEBs rather than limiting identification to those who meet the standard clinical cut off of three positive SCOFF items. In the current study, a greater proportion of females reported DEBs than males, this finding is consistent with previous research.[91] DEBs were prevalent across all ages in this sample. Although 16-year-olds showed a somewhat lower prevalence (60%), the overall pattern indicates that DEBs are widespread throughout adolescence, rather than concentrated at a single age. This supports existing literature showing that DEBs typically emerge during early to mid-adolescence and remain elevated into late adolescence.[29] In this sample, adolescents from lower-income households reported higher levels of DEBs. This is consistent with other studies that have found those who experience food insecurity, due to financial difficulties, have greater odds of developing DEBs such as unhealthy weight-control behaviours among adolescents.[92] For sexual identity, the sexually diverse adolescents reported DEBs more than heterosexual adolescents. This aligns with research which has found that lesbian, gay, bisexual, and other sexual minority youth experience DEBs due to minority stress, body image pressures, and elevated exposure to weight related teasing.[57]

The first hypothesis that those with a history of EA and/or EN would report more DEBs than those without a history, was supported. For EA, EN, and any EM, both males and females with EA and/or EN histories reported DEBs more often than those without EA and/or EN histories. Any EM was most reported in the total sample, and adolescents with a history of any EM reported the highest prevalence of DEBs. These findings are consistent with the current literature which state that EM is both highly prevalent and strongly associated with DEBs.[18,93] Although the prevalences collected in the current study are not nationally or provincially representative, these are the most recent DEB prevalence data collected in a Canadian community sample.

The chronicity of DEBs is presented in Table 6, showing that 31% of the sample experienced a DEB over the 3 waves. This information is important due to the severity of DEBs increasing overtime and leading to the development of clinical eating disorders.[6–8] It has been found that those who engaged in DEBs during adolescence were at an increased risk of these behaviours 10 years later.[29] In a study looking at treatment for bulimia nervosa, it was found that there were significant reductions in binge eating and purge symptoms earlier in treatment, showing better outcomes for adolescents with bulimia nervosa at the end of treatment.[94] Since 31% of the adolescents in the current study reported DEBs, early prevention and treatment programs should be developed to reduce the risk of these behaviours persisting, and/or worsening, later in life.[29]

The SCOFF item responses across Waves 3-5 showed that "Worried you lost control" had the highest responses at each wave, followed by "Thinking you are fat when untrue" and "Food controls my life". The lowest answers were "Lost weight in a short period of time" and "Vomiting for weight loss". A similar pattern of item responses was reported in another study using the SCOFF. In a Swedish study using adolescents, "Worried you have lost control" had the highest responses and "Vomiting to lose weight" had the lowest responses.[95]

Logistic regression results

Associations between EA and/or EN with DEBs, stratified by sex.

The second research question examined the association between EA and/or EN with DEBs, stratified by sex. In the unadjusted models and the AOR 1 models (adjusting for sociodemographic models), histories of EA, EN, and any EM were associated with increased odds of DEBs for both males and females. The hypothesis, that a history of EA and/or EN will increase the likelihood of DEBs in unadjusted and sociodemographic adjusted models was supported.

After adjusting for all child maltreatment types (AOR 2), different patterns were observed in the stratified models: only any EM remained significant among males, while EA and any EM remained significant among females. In the male AOR 2 models, EA and EN had large AORs with wide confidence intervals, which may indicate the presence of Type II errors. Type II error is when a statistical test is unable to detect a real difference or association between variables even though there is an association.[96] If a study is underpowered due to sample size,

this increases the chance of making a Type II error.[96] For females, EN did not remain significant in the AOR 2 models. Previous research has found that EA is significantly associated with eating disorders among females.[2] This may provide context for why EA remained significant in the female models.

These results can also be interpreted through the ecological model, which was used in the current study to provide a framework for examining how risk and protective factors operate across multiple levels of influence.[83] The ecological model emphasizes that development is shaped by interactions between each level of an environment with an individual. Applying the ecological model helps explain the current findings by situating EA, EN, and any EM within the microlevel of the family environment. EA, EN, any EM are harmful family interactions that can interfere with attachment, self-concept, and emotion regulation.[18,71] Research that has examined EM specifically has shown that emotionally invalidating or abusive environments can create chronic feelings of worthlessness, self-blame, and difficulty regulating emotions.[18,71] Studies have found that EA is associated with DEBs through low self-esteem, heightened shame, and difficulties identifying or managing emotions.[18,71] In these contexts, DEBs can serve as a coping strategy to manage distress and regain self-control. In the current study, EA and any EM remained significant in AOR 1 models and some AOR 2 models. Within the ecological model, these findings highlight how negative family-level experiences at the microlevel can be influential for adolescent development, which can help explain why any EM remained associated to DEBs in all models.

Protective factors associated with decreased odds of DEBs among those with and without histories of any EM

The third hypothesis, that individual-, family-, school-, and community-level protective factors would be associated with increased odds of not developing DEBs among adolescents with histories of any EM, was partially supported. For adolescents with any EM histories, only one protective factor reached statistical significance, while several other had large AORs but wide confidence intervals, suggesting the models may have been underpowered. Among the adolescents without any EM histories, multiple protective factors were found to be statistically significant. Post-hoc analyses, examining protective factors regardless of any EM histories, identified additional statistically significant protective factors, highlighting the need for

replication in larger samples. Across all models, most significant and clinically important protective factors were identified at the individual and family levels, fewer were identified at the school and community levels. This pattern could be due to the number of items assessed at each level, the dataset had fewer school and community level questions compared to individual- and family-level questions.

Previous research on DEBs have focused on individual- and family-level protective factors, such as body image, flexibility, self-esteem, receptivity to hunger cues, emotion regulation, family connectedness, and positive family meal environments.[32,34,74,76–79] The current study adds to the literature by identifying potential school and community level protective factors. Since several protective factors had large AORs but wide confidence intervals, it is possible that some models were underpowered and represented a potential Type II error.[96] To address this, clinically important protective factors were listed. A cut-off of AOR 1.50 was chosen to flag protective factors that might have meaningful implications, even if statistical significance was not reached. This threshold was chosen pragmatically for exploratory purposes.

The ecological model is useful for interpreting these findings because it emphasizes that adolescent development is shaped by multiple, interacting systems.[97] Protective factors reflect strength and supports within and individual, their family, their school, and their community settings. By using the ecological model to ground the findings, it is possible to see how different levels of influence may increase the odds of not developing DEBs among those with histories of any EM. In the current study, protective factors were examined at the individual level, and the microlevel (family, school, and community). All statistically and clinically significant protective factors are grouped by their ecological level. The microsystem level (family, school, and community) is presented in their own subsections to reflect the specific contexts in which adolescents develop.

Individual Level Protective Factors (Entire Sample)

Protective factors associated with lower odds of DEBs included optimism about the future and participating in physical extracurricular school activities. Participating in physical extracurriculars have been found to provide opportunities for healthy activity and interactions with peers, which has been shown to support resilience and well-being.[98] In the current study, adolescents who reported optimism about their future were less likely to report DEBs. Optimism

represents a positive outlook towards the future and has been linked with lower levels of depressive and anxiety symptoms among adolescents.[99,100] Previous work has also shown that optimism is related to adaptive coping and psychological adjustment.[101] These results suggest that optimism may promote healthy cognitive and emotional development.

Clinically important protective factors included physical activities outside of school and knowledge of cultural or ethnic language(s). Physical activity has consistently been associated with improved mental health outcomes and lower levels of internalizing symptoms among adolescents.[102,103] Physical activity may promote emotional regulation and provide opportunities for positive peer interactions. Research has found that knowledge of cultural or ethnic languages, and connectedness to one's culture are linked to positive self-concept and resilience among youth.[104,105] A recent study also found that maintaining cultural identity contributes to adolescent well-being and can be a protective factor against mental distress.[106] While the current study did not explore these relationships in detail, the findings align with ecological perspectives emphasizing that individual characteristics, such as optimism and cultural identity, are embedded within adolescents' immediate social environments.

Within the context of the ecological model, the statistically and clinically significant protective factors reflect the individual level of the model, where adolescent routines, attitudes, and identities interacting with surrounding environments to influence development.[97] These findings represent the interactions occurring at the individual level that are continuously influenced by the microsystem. Protective factors such as optimism, engagement in school or physical activities, and cultural identity can be seen as individual characteristics that are shaped by continuous interactions within the family, peer, and school environments. For example, if an adolescent is encouraged by their teachers or parents to join a school sport team, then they will likely join and build connections with their peers and increase their optimism.

Family Level Protective Factors (Entire Sample)

At the family-level, protective factors associated with increased odds of no DEBs included supportive and trusting relationships with parents/guardians. Adolescents who reported being able to confide in parents, feeling understood by them, and experiencing affectionate interactions were less likely to report DEBs in the current study. Previous studies have found that secure parent-child attachment and positive family interactions are associated with healthier

emotion regulation and decreased use of maladaptive coping behaviours, such as DEBs.[107,108] A longitudinal study also found that parental warmth is linked with an adolescent's ability to better handle stress.[109] These findings align with the current study's results, suggesting that warmth and mutual understanding in the parent-child relationship could be linked to healthier outcomes in adolescence.

Clinically important factors at this level were eating dinner with an adult and having sibling support. Regularly sharing meals with an adult has been associated with several positive adolescent outcomes, including better communication, strong family connectedness, and lower engagement in risk behaviours.[110–112] In the context of DEBs, previous studies have shown that more frequent family meals are associated with lower risk of DEBs among adolescents.[113,114] Clinical research also highlights the importance of shared meals: in Family-Based Treatment (FBT),[115,116] the leading evidence-based intervention for adolescent eating disorders; the family meal is considered a central therapeutic component used to support parents in re-establishing structured eating patterns.[116] These findings suggest that shared meals may reflect valuable opportunities for emotional connection, supervision, and routine, factors that may help buffer against the development of DEBs.[110–112]

Within the context of the ecological model, the statistically and clinically significant protective factors are a part of the family level of the microsystem, where adolescents experience direct and recurring interactions that shape their development.[97] The ecological model states that families are a central part of the microlevel, where day-to-day interactions help shape how adolescents experience and regulation emotions.[97] Supportive family relationships may reinforce individual-level protective factors such as optimism and participating in school activities, and a positive home environment can provide adolescents with the space to healthily express themselves. Eating meals together can reinforce feelings of belonging and stability. All together, these results show how a positive family dynamic may support resilience and reduce the likelihood of DEBs through consistent emotional connection and feelings of security.

School Level Protective Factors (Entire Sample)

School level protective factors that were associated with decreased likelihood of DEBs were feeling safe at school, feeling close to peers and feeling a sense of belonging. Previous studies have reported that adolescents who perceive greater school connectedness and belonging in school report better mental health outcomes and lower engagement in risky behaviours.[117–119] These results suggest that the school environment play an important role in fostering emotional security and promoting well-being among adolescents. Feeling close to peers and feeling a sense of belonging may reflect opportunities for emotional validation and mutual support within the school environment. A study has found that positive school environments, characterized by safety, inclusivity, and supportive peer relationships, are associated with better emotional outcomes in adolescents.[120] In the current study, adolescents who felt safer and more connected at school were less likely to report DEBs, highlighting the importance of positive school environments on development.

Within the context of the ecological model, the statistically significant protective factors reflect the school level of the microsystem, where adolescent interactions with peers, teachers, and institutional structures contribute to their development.[97] Findings from the current study show how school environments that are trusting and build connections may reinforce individual factors such as optimism and social skills. These results highlight the ecological nested structure, showing how interactions in each level affect development.

Community level Protective Factors (Entire Sample)

At the community level, protective factors associated with decreased odds of DEBs included trusting an adult in the community, feeling motivated to contribute to the community, and feeling involved. Clinically important protective factors included volunteer activity and having community supports. Previous research has found that adolescents' connections with adults they trust in their community, are associated with better emotional adjustment and lower stress.[121] It has also been found that community involvement and mentorship opportunities are linked to improved psychological well-being and resilience.[122,123] Consistent community involvement contributes to adolescent well-being and fosters a sense of agency.[122] These results suggest that adolescents' engagement with community activities may strengthen their social connections and provide opportunities for participation and recognition.

Within the context of the ecological model, the statistically and clinically significant protective factors reflect the community level of the microsystem, where adolescents interact with broader social structures and supportive adults.[97] Trusting relationships and opportunities for contribution within the community may reinforce adolescent's individual characteristics, such as optimism and identity, by providing consistent feedback, belonging, and validation. The interactions in the community-level also interact with the family and school level, which helps support adolescent resilience and development.

Looking at all the protective factors together, from the individual-, family-, school-, and community-level, it is shown that protective factors to reduce the likelihood of DEBs can be found at all levels, not only individual-level and family-level. Thinking through the lens of the ecological model, the family-, school-, and community-level protective factors directly interact with adolescents in their daily lives. Having protective factors at all levels suggests that supportive interactions in all environments can decrease the odds of developing DEBs in adolescents with any EM histories. Although several findings may indicate Type II errors due to sample size, both significant and clinically important factors provide useful directions for future research and prevention efforts.

Strengths and limitations

The current study has many strengths. It adds to the DEBs literature by looking at the relationship with EA and EN in the Canadian context. A strength of the current study is the use of adolescent data rather than adult retrospective data. The existing literature in Canada involves adults recalling their childhood maltreatment experiences, this can introduce recall bias. The current study, however, uses data that is directly from adolescents at the time of the survey. Although the items still require the participants to reflect on their experiences, it is a shorter recall window. Another strength is the protective factors that were studied. The protective factors from the current study are not commonly examined when looking at the decreased odds of DEBs among those who have been maltreated or not maltreated. School-level and community-level protective factors were studied and listed. These types of protective factors are not typically studied, only individual and family-level. Also, using the ecological framework in this context is a strength because the ecological framework has been typically used for prevention methods for

eating disorders, not to see which protective factors are already embedded within the individual and their environment.

The current study has some limitations. The WE study is not representative of the whole Canadian and Manitoban population because it is a community sample, and most of the information was from Winnipeg residents and rural communities surrounding Winnipeg. Therefore, prevalence data may not be generalizable to all Manitoban or Canadian adolescents e.g., Northern, and remote, who were not included in data collection. Another limitation is the sample size. Some models in the current study were underpowered therefore many results came back as insignificant and/or having wide confidence intervals. Examining multiplicative moderation effects (i.e., interaction term) between protective factors and EM to see if protective factors moderate (i.e., lessen) the likelihood of DEBs would have been ideal. However, the WE study is not adequately powered to conduct these analyses, which would then increase the likelihood of Type II errors. For the protective factor variables, we were unable to look at each level of measurement on its own due to power. Collapsing the variables down to binary variables was needed to increase power. The DEB variables also have some important limitations. They were only collected in Waves 3-5, rather than across all five waves of the study. The same issue applied to the EA and EN variables. Since both the DEB items and the EA/EN items were not available in earlier waves, it was not possible to determine whether EA or EN occurred before the experience of DEBs. The SCOFF questionnaire where the DEB variables were derived from, has been criticized for not properly assessing for bulimia nervosa (only looking at vomiting as compensatory mechanism), binge eating disorder, and avoidant/restricted food intake disorder, which is an increasingly recognized diagnosis that affects 0.3-15% of community samples and is common among younger adolescents.[124] This could have led to missing participants who have symptoms of these eating disorders but questions were not included in the questionnaire. Although, it should be noted, that the use of the SCOFF at a low threshold (one or more yes responses) allowed for atypical anorexia to be captured in the sample. Atypical anorexia includes individuals who exhibit all the core features of anorexia nervosa, such as restricting, over-exercising, bingeing/purging, and an intense fear of gaining weight, but they are not considered significantly underweight.[125] Many adolescents with atypical anorexia being at higher weights, lose a substantial amount of weight through restrictive behaviours, and then become medically compromised despite remaining in a normal or overweight range.[125] Since the SCOFF includes

items assessing rapid weight loss, fear of gaining weight, preoccupation with food, and a compensatory behaviour, it aligns with the cognitive and behavioural features that define both anorexia nervosa and atypical anorexia.[125]

Another limitation is that some data collected were retrospective from self-report questionnaires. Retrospective measures can be affected by recall bias, individuals may not accurately remember or report past events.[126] Self-report surveys are also vulnerable to social desirability bias, where respondents may underreport sensitive or stigmatized experiences such as child maltreatment and DEBs.[127]

There were some missing data for the sexual identity variable (8.6%). Only participants with valid responses were included in analyses involving this variable. If adolescents who chose not to report their sexual identity differ in their experiences of EA, EN, any EM, or DEBs (for example, if sexually diverse adolescents who felt less comfortable disclosing their identity are more likely to have DEBs), this could bias the results. Estimates comparing heterosexual and sexually diverse adolescents may under or overestimate true differences and should be interpreted with caution. Imputations could not be performed for the sexual identity variable since this is a personal question; the individual might have skipped over the question because it is a sensitive topic. Therefore, data could not be predicted for the sexual identity variable from the patterns of other data.

Several contextual factors also need to be considered. Data collection for Waves 3-5 occurred place during the Covid-19 pandemic (2020-2022), a period of time that caused a lot of stress, social isolation, financial insecurity, and shifts in daily routines.[128–131] Previous studies have shown that the pandemic influenced eating behaviours, exposure to maltreatment, and access to food.[128–131] These conditions may have shaped the prevalence of DEBs in the current study.

Food insecurity was not assessed in the current study, which is a limitation because there is literature that states food insecurity is associated with DEBs.[29,92] Statistics Canada reported that 1 in 10 Canadians experienced food insecurity due to financial restraints in 2020 (9.6%) and 2021 (9.1%), with prevalence rising to 15.6% in 2022 due to inflation.[132] Previous research has found that severe food insecurity is associated with DEBs, particularly extreme weight control behaviours (self-induced vomiting, diet pill use) and binge eating.[29] Longitudinal evidence shows that severe food insecurity predicts binge eating over time.[29] Another study found that

young children who experienced food insecurity reported significantly higher levels of DEBs than their food secure peers.[92] It is possible that food insecurity during the survey period contributed to the number of adolescents reporting DEBs. However, the SCOFF has been tested for validity in food secure, and insecure, groups. A recent study using differential item functioning found that the SCOFF functions effectively across both secure and insecure groups.[133] This reduces, but does not eliminate, the concern that food insecurity may have inflated DEB prevalence in this sample.

Adolescents during the Covid-19 pandemic were also exposed to anti-obesity discourse in the Canadian media and on social media platforms. Previous research has shown that stay-at-home mandates disrupted physical activity levels and access to healthy eating.[131] Media framed obesity as the "first pandemic" that increased Covid-19 transmission, and it was the individual's responsibility to lose weight to reduce their risk of contracting Covid.[129] The media also pushed the discourse that the home was a space for inactivity and overeating, and social media circulated images making fun of weight gain during the pandemic.[129] A study found that 53% of adolescents were exposed to weight-stigmatizing content on social media during the pandemic, among those, two-thirds reported increased body dissatisfaction.[129] Although the current study did not directly measure media exposure, these contextual factors may have influenced the prevalence of DEBs in this sample.

Implications

Potential implications from this work include identifying protective factors that are associated with the decreased likelihood of DEBs among adolescents. Identifying statistically significant and clinically significant protective factors for DEBs is valuable because it can point to areas where early prevention and intervention efforts may be most effective. For example, family-level protective factors such as supportive parent-child communication, and school-level factors such as sense of belonging and safety at school, could inform targeted prevention strategies that focus on strengthening everyday environments for adolescents. However, all interventions must be developed and tested for efficacy before implementing.

For clinical applications, the findings from the current study can help inform intervention approaches that would need to be tested for efficacy. Healthcare providers working with adolescents could consider the potential influence of experiences such as EA, EN, and any EM

when supporting adolescents with DEBs. Screening all adolescents for experiences of EA, EN, or any EM is not currently advised. Instead, a trauma and violence informed approach is recommended, where clinicians emphasize safety, trust, and choice when working with individuals who may have experienced adversity.[134] The VEGA (Violence, Evidence, Guidance, Action) project provides guidance for implementing trauma and violence informed care and highlights the importance of selective, clinically informed inquiry rather than universal screening.[134] Clinicians can also incorporate protective factors into their treatment planning. For example, clinicians could encourage family interventions such as positive communication or finding ways to build trusting relationships with adults and individuals outside of the family, such as at their school or in the community.

From a policy perspective, the results highlight the importance of school and community settings in supporting adolescent mental health. Programs that promote safe and inclusive school environments, providing access to extracurricular activities, and creating opportunities for community engagement may be protective against DEBs. Policies that support families through resources that promote positive parenting and family connectedness could also be beneficial. Although this is not a national prevalence study, this information could help inform the need to collect current prevalence data in Canada for DEBs and eating disorders. Having new prevalence data can help inform the need for prevention and intervention programs in Canada.

Knowledge Translation

The results from the current study will be presented at conferences in the form of a poster presentation. The results will be published in an open access journal to remove barriers for people outside of academia. An infographic will also be created to make the information easily digestible for the general population, especially adolescents and young adults. These infographics will be posted online and handed out when presenting at conferences with clinicians and other researchers.

Future Directions

Suggestions for future studies include conducting a nationally representative prevalence study by using a nationally representative Canadian sample (both adolescent and adults). This would be important work since the last national prevalence data for DEBs are from 2002. Also,

assessing the relationship with EA and/or EN with DEBs in a nationally representative sample would be important since this study has not been done before and information at a national level is needed to inform program creation for prevention and treatment. Future research should also test the protective factors identified in this study, both those that reached statistical significance and those identified as clinically important. Larger samples would be needed to determine whether these factors are protective against DEBs, especially among adolescents with histories of any EM. Future studies should conduct a power analysis before data collection and consider a multi-site or longitudinal recruitment to ensure a large enough sample size. Also, it would be important to ask the same questions across all Waves to get the full, longitudinal picture. The SCOFF measure is a good tool because of its high sensitivity, however, using a more comprehensive tool alongside the SCOFF, such as the Eating Disorder Examination Questionnaire (EDE-Q) would provide efficient screening and more accurate prevalences.

Future research should examine how media exposure, such as appearance focused content, photoshopping, weight-loss messaging, and pro-eating disorder material, may contribute to the development of DEBs. Including questions about adolescents' social media use, the types of accounts they follow, and how often they encounter weight or shape related content would help build a clearer picture of the risk factors adolescents face today. It may also be valuable to assess how parents and caregivers engage with media, since the messages that adults consume, and model could shape the attitudes, beliefs, and behaviours of the adolescents in the household. This information could then be used to direct policies that ban pro-anorexia and pro-bulimia content on social media.

Future studies should examine sex and gender differences in the relationship between EA/EN with DEBs, and whether certain protective factors operate differently across these groups. EA/EN with DEBs and protective factors should also be examined across sexually diverse and gender diverse individuals. There is also a need for intervention-based research to translate these findings into practice, such as testing school-, family-, or community-level programs that strengthen identified protective factors. Finally, the relationship between EA and/or EN with DEBs, and the protective factors for DEBs, should be assessed in a larger Manitoban sample, including individuals from rural communities further away from Winnipeg, and northern/remote communities to get a better picture of Manitoban experiences.

Conclusion

The current study contributes to the limited Canadian literature on DEBs by examining their associations with EA and EN, and by identifying potential protective factors in adolescents. Using adolescent self-report data reduced some concerns about retrospective recall and provided a more immediate picture of these experiences during a critical development period. Guided by the ecological model, the current study emphasizes the influence of protective factors at both the individual level and the microlevel (family, school, and community) related to DEBs. Looking at school and community factors adds to the literature, which has focused on individual and family factors. The current study indicates that updated, nationally representative prevalence data on DEBs in Canada are needed. National prevalence data would help create prevention and intervention strategies within the Canadian context. Further research is needed to examine the protective factors identified in the current study with larger and more diverse samples to extend this work to intervention studies. Doing so could inform programs and policies that strengthen these protective factors to reduce DEBs and support healthy youth development. Further research would allow for the creation of programs and policies that could reduce the burden of DEBs and support healthier development in youths.

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