

Cybervictimization and Disordered Eating Among Adolescent Girls: A Structural Equation Model of Appearance Comparison, Body Dissatisfaction, and Self-Esteem

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ABSTRACT

Objective: This study aimed to test the direct and indirect relationships between cybervictimization and disordered eating among adolescent girls, with appearance comparison, body dissatisfaction, and self-esteem examined as parallel and sequential mediators.

Methods and Materials: A cross-sectional correlational study was conducted with 648 adolescent girls aged 13–18 years who were recruited from 12 public secondary schools in Ontario, British Columbia, and Alberta, Canada. Participants completed standardized measures of cybervictimization, appearance comparison, body dissatisfaction, self-esteem, and disordered eating. Data were analyzed using descriptive statistics, Pearson correlations, confirmatory factor analysis, and structural equation modeling. Model fit was evaluated using the comparative fit index, Tucker–Lewis index, root mean square error of approximation, and standardized root mean square residual. Indirect effects were tested using 10,000 bias-corrected bootstrap samples.

Findings: The proposed partially mediated structural model demonstrated good fit to the data, $\chi^2(1090) = 1754.91$, CFI = .950, TLI = .946, RMSEA = .031, and SRMR = .043. Cybervictimization significantly predicted appearance comparison, body dissatisfaction, lower self-esteem, and disordered eating. Appearance comparison significantly predicted body dissatisfaction, lower self-esteem, and disordered eating, while body dissatisfaction significantly predicted lower self-esteem and greater disordered eating. Self-esteem was negatively associated with disordered eating. All hypothesized specific indirect effects were significant. The total indirect effect of cybervictimization on disordered eating was .272, whereas the total effect was .372. The model explained 17% of the variance in appearance comparison, 52% in body dissatisfaction, 49% in self-esteem, and 61% in disordered eating.

Conclusion: Cybervictimization was associated with disordered eating both directly and through interconnected appearance-related and self-evaluative mechanisms, highlighting appearance comparison, body dissatisfaction, and self-esteem as important targets for prevention and intervention.

Keywords: cybervictimization; disordered eating; appearance comparison; body dissatisfaction; self-esteem; adolescent girls; structural equation modeling

1. Introduction

Adolescence is a developmental period characterized by rapid physical maturation, heightened sensitivity to peer evaluation, increasing reliance on social approval, and intensified concern about physical appearance. These developmental changes occur alongside expanding engagement with digital technologies, social networking platforms, image-sharing applications, and online communication environments. For adolescent girls, the convergence of pubertal changes and constant exposure to digitally mediated appearance standards may create a particularly vulnerable context for body-related distress and maladaptive eating attitudes. Contemporary social media environments encourage users to view, evaluate, compare, edit, and publicly display their bodies, often within highly selective and appearance-focused contexts. Although online platforms can support communication, identity exploration, and social connection, they can also amplify unrealistic beauty ideals, facilitate appearance-based judgment, and expose adolescents to public criticism, exclusion, harassment, and humiliation (Álvarez-Mon et al., 2024; Marano et al., 2025). These risks have increased concern that digital experiences may contribute to the development or maintenance of body dissatisfaction, low self-esteem, and disordered eating among adolescent girls.

Cybervictimization refers to repeated or harmful experiences of aggression, harassment, humiliation, exclusion, impersonation, intimidation, or unwanted exposure through digital technologies. Unlike traditional forms of victimization, online aggression can occur continuously, reach large audiences, remain permanently accessible, and enter spaces that would otherwise be considered private or safe. Digital content can be reproduced and redistributed rapidly, making it difficult for victims to control the duration or scope of the harmful experience. Cybervictimization has been associated with adverse psychosomatic, emotional, interpersonal, and behavioral outcomes, including anxiety, depressive symptoms, social withdrawal, sleep disturbance, somatic complaints, and impaired psychological well-being (Makarova & Makarova, 2023). The visibility and persistence of online attacks may be especially harmful when the content concerns weight, body shape, facial features, attractiveness, clothing, or other appearance-related characteristics. Such attacks communicate not only interpersonal rejection but also the message that the victim's body is unacceptable, publicly evaluable, or deserving of ridicule.

Appearance-related cybervictimization is particularly relevant to adolescent girls because appearance often becomes an important component of self-definition and social status during this developmental stage. Online attacks may include negative comments about weight, posting or distributing unflattering photographs, mocking specific body features, comparing a girl unfavorably with peers, or pressuring her to alter her physical appearance. Evidence suggests that appearance-related cyberbullying is associated with a stronger desire among adolescent girls to modify their bodies, indicating that online victimization can influence both appearance evaluation and intentions to pursue physical change (Prince et al., 2024). Weight-based cybervictimization has similarly been identified as a significant pediatric public health concern because it may intensify shame, internalized weight stigma, social isolation, and engagement in harmful weight-control practices (Zumaglini et al., 2025). The increasing recognition of online body shaming as a systematic form of psychological harm further demonstrates that digital environments can transform the body into a target of social regulation and humiliation (Kudlová et al., 2024).

Body shaming has broader implications for mental health, gender equity, and public health because appearance-based criticism is disproportionately directed toward girls and women and frequently reflects restrictive cultural expectations about femininity, thinness, attractiveness, and bodily conformity. Such experiences may produce enduring shame, self-surveillance, and feelings of bodily inadequacy (Omari et al., 2026). Qualitative evidence involving vulnerable adolescents indicates that experiences of violence, body shaming, and emotional distress can become interconnected with self-harm and severe psychological suffering, suggesting that body-related humiliation may influence both self-perception and broader patterns of maladaptive coping (Rizk-Hildbrand et al., 2025). Cybervictimization may therefore have consequences that extend beyond immediate emotional distress, particularly when adolescents internalize the negative evaluations expressed by online aggressors.

Disordered eating includes a spectrum of maladaptive attitudes and behaviors related to food, body weight, and shape, including restrictive dieting, fasting, binge eating, compensatory behaviors, emotional eating, preoccupation with calories, fear of weight gain, and excessive concern about body appearance. These behaviors may occur below the threshold of a clinically diagnosed eating disorder but still produce meaningful psychological and physical harm.

Adolescence is a critical period for the emergence of disordered eating because pubertal body changes may conflict with socially promoted ideals of thinness, fitness, or narrowly defined attractiveness. Systematic evidence has identified multiple risk factors for adolescent eating disorders, including body dissatisfaction, low self-esteem, weight-related teasing, peer pressure, perfectionism, negative affect, family influences, and sociocultural appearance ideals (Varela et al., 2023). Digital environments may intensify several of these risks simultaneously by increasing exposure to idealized bodies, facilitating social comparison, and allowing appearance-related criticism to occur publicly and persistently.

Social media has been repeatedly implicated in the development of problematic eating attitudes because many platforms privilege visual content and reward appearance-based self-presentation. Images are frequently edited, filtered, posed, or selectively shared, creating unrealistic standards against which users may evaluate themselves. Studies have linked social media exposure with heightened body surveillance, dissatisfaction with body shape, pressure to lose weight, restrictive eating, and eating-disorder symptoms (Gao, 2023; Liu, 2023). Reviews of the relationship between social media, body perception, and eating disorders have similarly concluded that repeated exposure to idealized appearance content may normalize unrealistic body expectations and increase vulnerability to harmful eating practices (Wang & Ding, 2023). These effects may be especially pronounced among adolescent girls, who frequently encounter content emphasizing thinness, facial perfection, sexual attractiveness, and carefully managed lifestyles.

Problematic or addictive social media use may further increase psychological vulnerability because excessive engagement can strengthen dependence on online validation, reduce opportunities for restorative offline activity, and increase exposure to comparison-based and appearance-focused content. Observational evidence has shown that social media consumption and risk of social media addiction are associated with disordered eating behavior among adolescents (Pérez-Jiménez et al., 2025). Problematic social media use has also been associated with psychological distress, with eating-disorder symptoms functioning as an important explanatory mechanism in this relationship (Soh, 2025). Although evidence from university populations cannot be generalized directly to adolescent girls, it supports the broader proposition that maladaptive digital engagement, emotional distress, and eating-related pathology may form

an interconnected system. Related evidence concerning social media addiction and mental health has documented both potential benefits and substantial psychological risks of intensive platform use, including anxiety, depressive symptoms, impaired self-regulation, and reduced well-being (Awopetu et al., 2024).

The relationship between cybervictimization and disordered eating may be partly explained by appearance comparison. Appearance comparison refers to the tendency to evaluate one's physical characteristics by comparing them with those of other individuals. Social comparison is common during adolescence, but image-centered online environments make such comparison unusually frequent and difficult to avoid. Adolescents may compare their bodies with peers, celebrities, influencers, athletes, or edited representations of strangers. These comparisons are often upward, meaning that individuals compare themselves with people perceived as more attractive, thinner, fitter, or more socially desirable. Because the comparison targets are frequently idealized and digitally modified, the result may be a persistent perception of personal inadequacy.

Research examining women's body image has emphasized that social media can increase appearance comparison by presenting a continuous stream of highly curated bodies and encouraging users to assess their own appearance relative to these images (Xiong, 2023). Studies of young adults have likewise shown that contemporary social media use is associated with body image concerns, appearance pressure, and dissatisfaction with physical characteristics (Fatima, 2025). Instagram and similar image-based platforms may be especially relevant because their visual structure makes physical appearance central to social interaction, self-presentation, and feedback. Evidence indicates that Instagram use is related to body satisfaction and self-esteem, highlighting the importance of examining how platform-based appearance exposure influences self-evaluation (Flores-Mata & Castellano-Tejedor, 2024).

Appearance comparison may become particularly intense after cybervictimization. When an adolescent is criticized or mocked for her appearance, she may attempt to understand the criticism by comparing herself more closely with others. This process may increase attention to perceived bodily flaws and strengthen the belief that social acceptance depends on meeting appearance standards. Cybervictimization may therefore function as a trigger for self-surveillance, repeated checking of others' bodies, and heightened sensitivity to differences in weight, shape, or attractiveness. Appearance-related cyberbullying has been

linked with emotional eating, and intervention research suggests that self-compassion may help reduce the harmful effects of these experiences (Wang, 2023). This finding implies that cybervictimization can influence eating behavior through appearance-focused cognitive and emotional responses rather than through a single direct pathway.

Body dissatisfaction is another central mechanism that may connect cybervictimization with disordered eating. Body dissatisfaction refers to negative thoughts, emotions, and evaluations concerning one's body shape, size, weight, or appearance. It can include shame, preoccupation, avoidance, self-criticism, and a perceived discrepancy between one's actual body and an internalized ideal. Body dissatisfaction has consistently been identified as a major risk factor for restrictive eating, compensatory behaviors, binge eating, and other eating-related disturbances. Evidence from different populations demonstrates that body dissatisfaction is closely connected with eating attitudes and broader psychological functioning (Nia et al., 2024). It has also been identified as a significant predictor of maladaptive body image in physically active and university populations, indicating that participation in health- or appearance-related environments does not necessarily protect individuals from dissatisfaction (Jakobek et al., 2024).

Cybervictimization may increase body dissatisfaction by drawing attention to body characteristics and presenting appearance as a legitimate basis for criticism or exclusion. Negative online comments may become internalized, particularly when they are repeated, endorsed by peers, or visible to a large audience. Adolescents may subsequently interpret ordinary body changes as evidence of failure or social inadequacy. Research on school bullying and eating-disorder risk has shown that body dissatisfaction can mediate the relationship between victimization and eating pathology, providing support for the proposition that negative body evaluation is a key explanatory process (Xie et al., 2024). Although bullying contexts differ, the mediating role of body dissatisfaction is theoretically relevant to cybervictimization because digital aggression often magnifies public exposure and social comparison.

Cultural and gender factors also shape body dissatisfaction. Reviews of body perception and psychological well-being indicate that body image is influenced by social norms, gender expectations, physical measurements, media exposure, and culturally specific definitions of attractiveness (Merino et al., 2024). Adolescent girls may experience simultaneous pressure to

appear thin, fit, feminine, attractive, and effortlessly confident. These standards are often contradictory and unattainable, making dissatisfaction more likely even among girls whose body size falls within a healthy range. Lifestyle factors may modify risk but do not eliminate it. Research examining physical activity and dietary patterns suggests that recreational activity and adherence to healthy eating traditions can relate to body image and eating-disorder outcomes, yet their effects depend on the motivations and meanings attached to weight, health, and appearance (Tsartsapakis et al., 2024).

Self-esteem constitutes a further mechanism through which cybervictimization may influence disordered eating. Self-esteem reflects an individual's global evaluation of personal worth, competence, and acceptability. During adolescence, self-esteem may become especially dependent on peer relationships and perceived social inclusion. Cybervictimization can undermine self-esteem by exposing adolescents to rejection, humiliation, and negative judgments that remain visible within their social networks. When online criticism targets appearance, adolescents may generalize dissatisfaction with the body into a broader negative evaluation of the self. Low self-esteem may then increase susceptibility to disordered eating by encouraging efforts to gain control, achieve social approval, or change the body as a means of improving self-worth.

Evidence supports close relationships among body dissatisfaction, self-esteem, and eating-disorder symptoms. Research in clinical and health-related populations has shown that body dissatisfaction and low self-esteem are both associated with elevated eating-disorder symptomatology (Kiropoulos et al., 2025). Broader reviews of body image also indicate that negative body perception can impair self-esteem and mental health, while positive body evaluation may function as a protective factor (Merino et al., 2024). The relationship is likely reciprocal at the experiential level: body dissatisfaction may reduce self-esteem, while low self-esteem may make appearance-related criticism more personally damaging. However, a sequential model in which cybervictimization increases appearance comparison, appearance comparison strengthens body dissatisfaction, and body dissatisfaction reduces self-esteem provides a plausible developmental explanation for increasing disordered eating risk.

Direct evidence connecting cybervictimization, self-esteem, and eating disorders is emerging. A study conducted among university students in Singapore found that cybervictimization was associated with eating disorders

through processes involving peer context and self-esteem (Lee et al., 2025). This finding supports the idea that self-esteem can operate as a psychological pathway between digital victimization and eating pathology. Nevertheless, the developmental and social context of adolescent girls differs from that of university students. Younger adolescents may have less stable self-concepts, greater dependence on peer approval, and fewer coping resources for managing online aggression. These differences highlight the need to test an integrated model specifically among adolescent girls.

The available literature also indicates that the effects of social media and cybervictimization are not inevitable. Digital interventions designed to reduce body dissatisfaction among children, adolescents, and emerging adults have demonstrated promising effects, suggesting that cognitive, emotional, and media-literacy processes are modifiable (Tan et al., 2025). Interventions that reduce appearance comparison, challenge unrealistic ideals, strengthen self-compassion, and improve self-esteem may therefore interrupt the progression from cybervictimization to disordered eating. However, effective intervention development requires a clearer understanding of which mechanisms are most influential and whether they operate independently, sequentially, or simultaneously.

Despite increasing research on social media, body image, and eating pathology, several important gaps remain. Much of the existing evidence examines general social media exposure rather than direct experiences of cybervictimization. Other studies focus on adults or university students, limiting conclusions about adolescent developmental processes. Research frequently evaluates body dissatisfaction or self-esteem separately rather than testing their combined contribution within one explanatory model. Appearance comparison is also often treated as a general consequence of social media use rather than as a potential response to online victimization. In addition, few studies have simultaneously estimated direct, parallel indirect, and sequential indirect pathways from cybervictimization to disordered eating. A structural equation model is well suited to address these limitations because it allows several interrelated mechanisms to be evaluated while accounting for measurement error and estimating the relative strength of competing pathways.

An integrated model may clarify how external online aggression becomes translated into internal body-related distress and maladaptive eating. Cybervictimization may first heighten appearance comparison by increasing adolescents' attention to how they differ from socially

valued standards. Appearance comparison may then intensify body dissatisfaction, while both cybervictimization and negative body evaluation may weaken global self-esteem. Body dissatisfaction and low self-esteem may subsequently increase disordered eating as adolescents attempt to control weight, regulate distress, avoid criticism, or achieve a more socially acceptable appearance. Cybervictimization may also retain a direct association with disordered eating because online aggression can generate emotional distress and maladaptive coping independently of appearance-related mechanisms.

Accordingly, the aim of the present study was to test a structural equation model of the direct and indirect relationships between cybervictimization and disordered eating among adolescent girls in Canada, with appearance comparison, body dissatisfaction, and self-esteem examined as parallel and sequential mediating mechanisms.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a quantitative, cross-sectional, correlational design using structural equation modeling to investigate the direct and indirect relationships between cybervictimization and disordered eating among adolescent girls. Appearance comparison, body dissatisfaction, and self-esteem were examined as potential psychological mechanisms through which experiences of online victimization might be associated with disordered eating attitudes and behaviors. The target population consisted of adolescent girls enrolled in public secondary schools in Canada during the 2025–2026 academic year. Participants were recruited from 12 English-language secondary schools located in Ontario, British Columbia, and Alberta. These provinces were selected to increase geographical and sociocultural diversity, and the participating schools included institutions serving urban, suburban, and rural communities.

A multistage cluster sampling procedure was used to recruit the participants. In the first stage, school districts from the three provinces were contacted and invited to participate. All students in the selected classes who met the eligibility criteria received information about the study. The final analytic sample consisted of exactly 648 adolescent girls between 13 and 18 years of age, with a mean age of 15.47 years and a standard deviation of 1.38 years. Of the participants, 226 were recruited from Ontario, 214 from British Columbia, and 208 from Alberta. The sample

included students in Grades 8 through 12 and represented different socioeconomic, cultural, and family backgrounds.

Eligibility criteria included being between 13 and 18 years of age, self-identifying as a girl, being enrolled in one of the participating Canadian secondary schools, having sufficient English-language proficiency to understand the questionnaires, having regular access to at least one internet-enabled digital device, and reporting the use of social media, online messaging platforms, or other internet-based communication services during the previous six months. Participants were excluded when they submitted substantially incomplete questionnaires, demonstrated a patterned or indiscriminate response style, completed the questionnaire in an implausibly short period, or failed more than one embedded attention-check item. Adolescents who were experiencing acute psychological distress at the time of data collection were not required to participate and were referred to the appropriate school counseling or mental health services when necessary.

Data were collected between September 2025 and February 2026. Before data collection, authorization was obtained from the research ethics board of the coordinating Canadian university, the participating school boards, and the administrators of the selected schools. Written informed consent was obtained from parents or legal guardians when required by provincial and school-board regulations, and informed assent was obtained from the adolescent participants. Participation was voluntary, and students were informed that they could decline participation or discontinue the survey at any stage without academic, disciplinary, or personal consequences. No teachers or school administrators were permitted to view individual responses.

The questionnaires were administered electronically through a secure online survey platform during a scheduled class period under the supervision of a trained research assistant. Participants completed the survey individually using school computers, tablets, or their own digital devices. The average completion time was approximately 25 to 35 minutes. To reduce social desirability concerns and encourage honest reporting, no identifying information, such as names, student identification numbers, personal email addresses, or social media usernames, was collected. At the conclusion of the survey, participants received information about school counseling services, youth mental health resources, eating-disorder support organizations, and confidential crisis services available in Canada.

2.2. Measures

A demographic and digital-media-use questionnaire was developed to collect information about participants' age, grade level, province of residence, family structure, perceived family economic status, average daily time spent online, frequently used social media platforms, and the approximate duration of social media membership. Participants were also asked to report their height and weight, which were used to calculate body mass index. Age- and sex-standardized body mass index values were considered as control variables because body size may be associated with appearance-related concerns and disordered eating. Participants were informed that they could omit their height or weight when they felt uncomfortable providing this information.

Cybervictimization was assessed using the victimization subscale of the European Cyberbullying Intervention Project Questionnaire. The subscale contains 11 items evaluating experiences of being harmed, humiliated, threatened, excluded, impersonated, or targeted through digital communication technologies. The items address behaviors such as receiving insulting online messages, having embarrassing information or images distributed without permission, being deliberately excluded from online groups, being threatened through electronic communication, and having another person use a false identity to cause harm. Participants indicated how often they had experienced each behavior during the previous two months using a five-point response scale ranging from never to more than once a week. Item scores were summed, with higher scores representing more frequent and severe experiences of cybervictimization. The specified two-month period was retained to improve recall accuracy and distinguish recent victimization from isolated historical experiences. The internal consistency of the cybervictimization subscale was evaluated in the present sample using Cronbach's alpha and McDonald's omega.

Appearance comparison was measured using the Physical Appearance Comparison Scale-Revised. This 11-item instrument assesses the extent to which individuals compare their physical appearance with that of other people in social and everyday contexts. The items capture comparisons involving body shape, body size, weight, facial features, clothing, and general physical attractiveness. Participants rated how frequently they engaged in each form of comparison on a five-point scale ranging from never to always. A total appearance-comparison score was calculated after applying the appropriate scoring procedures. Higher

scores indicated a stronger tendency to evaluate one's physical appearance in relation to peers, social media users, celebrities, influencers, and other individuals. In the context of this study, appearance comparison was conceptualized as an important cognitive and social process that could connect negative online experiences with unfavorable body evaluations.

Body dissatisfaction was assessed using the 16-item version of the Body Shape Questionnaire. This measure evaluates dissatisfaction, worry, self-consciousness, and emotional distress related to body shape and weight. Participants reported how often they had experienced each thought or feeling during the previous four weeks. The items address concerns such as feeling ashamed of one's body, worrying about body size, comparing body shape with that of other girls, avoiding situations in which the body may be observed, and feeling distressed after eating. Responses were recorded on a six-point scale ranging from never to always. The item scores were summed to produce a total score, with higher scores indicating greater body dissatisfaction and more persistent body-related concern. The short version was selected because it reduces participant burden while providing a comprehensive assessment of body-shape dissatisfaction among adolescents.

Global self-esteem was measured using the Rosenberg Self-Esteem Scale. This instrument consists of 10 statements assessing overall feelings of self-worth, self-respect, personal competence, and self-acceptance. Five statements are positively worded, whereas the remaining statements are negatively worded. Participants rated their agreement with each statement on a four-point scale ranging from strongly disagree to strongly agree. Negatively worded items were reverse-scored before calculating the total score. Higher total scores represented more positive global self-esteem. In the proposed structural model, self-esteem was treated as a protective psychological resource that might be negatively affected by cybervictimization, appearance comparison, and body dissatisfaction and might, in turn, reduce vulnerability to disordered eating.

Disordered eating was measured using the Eating Attitudes Test-26. The questionnaire contains 26 items assessing problematic attitudes and behaviors related to dieting, food preoccupation, fear of weight gain, restrictive eating, perceived pressure to eat, and symptoms associated with bulimic tendencies. Participants indicated how frequently each statement applied to them using a six-category response format ranging from never to always. Items were scored according to the standard scoring

procedure, and the scores were summed to obtain a total disordered-eating score. Higher scores indicated greater severity of restrictive eating attitudes, excessive concern about weight and food, and other eating-related difficulties. A total score at or above the established screening threshold was interpreted as indicating an elevated risk of clinically significant eating problems rather than confirming the presence of an eating disorder. The instrument was used exclusively as a screening and continuous research measure, and no diagnostic conclusions were made on the basis of questionnaire scores alone.

Before the main data collection, the complete questionnaire package was reviewed by specialists in adolescent psychology, eating behavior, cyberpsychology, and quantitative research methodology. A pilot administration was conducted with 30 adolescent girls from a Canadian secondary school that was not included in the main sample. The pilot participants evaluated the clarity, age appropriateness, readability, and sensitivity of the items and instructions. Minor modifications were made to the introductory instructions and demographic questions, but the wording and scoring of the standardized measures were not altered. Data from the pilot study were not included in the final analyses. The reliability of all measures in the main study was examined using both Cronbach's alpha and McDonald's omega, with coefficients of .70 or higher considered indicative of acceptable internal consistency.

2.3. Data Analysis

Data analysis was conducted using IBM SPSS Statistics for preliminary analyses and Mplus for confirmatory factor analysis and structural equation modeling. Before testing the hypothesized model, the dataset was examined for coding errors, duplicate submissions, missing values, univariate outliers, multivariate outliers, and implausible response patterns. The percentage and distribution of missing data were evaluated for each variable. Cases with substantial missing information were excluded, whereas the remaining missing responses were handled using full-information maximum likelihood estimation. The pattern of missingness was examined to determine whether the data were consistent with a missing-at-random mechanism. Univariate normality was evaluated through skewness and kurtosis statistics, histograms, and normal probability plots. Multivariate normality was also examined, and a robust maximum likelihood estimator was used to reduce the influence of nonnormality on standard errors and model-fit statistics.

Descriptive statistics, including the mean, standard deviation, observed range, skewness, and kurtosis, were calculated for cybervictimization, appearance comparison, body dissatisfaction, self-esteem, and disordered eating. Pearson correlation coefficients were computed to examine the preliminary relationships among the principal variables. Relationships involving demographic variables, average daily internet use, and body mass index were also examined to identify theoretically relevant covariates. Multicollinearity was evaluated using tolerance values, variance inflation factors, and correlations among the predictors. Variance inflation factor values below 5 and tolerance values above .20 were regarded as evidence that problematic multicollinearity was absent. Internal consistency was evaluated using Cronbach's alpha and McDonald's omega, while corrected item-total correlations were examined to identify items that performed poorly in the Canadian adolescent sample.

A two-stage structural equation modeling procedure was used. In the first stage, a confirmatory factor analysis was conducted to evaluate the adequacy of the measurement model. Cybervictimization, appearance comparison, body dissatisfaction, self-esteem, and disordered eating were specified as distinct latent constructs represented by their corresponding questionnaire items. Each indicator was permitted to load only on its hypothesized latent factor, and the latent factors were allowed to correlate. The measurement model was examined for standardized factor loadings, residual variances, construct reliability, convergent validity, and discriminant validity. Standardized factor loadings of .40 or greater were considered acceptable. Convergent validity was evaluated using average variance extracted and composite reliability, whereas discriminant validity was examined by comparing the shared variance between constructs with the variance explained by their respective indicators. A single-factor model was also estimated and compared with the proposed five-factor model to determine whether the observed relationships were unlikely to be explained solely by common method variance.

In the second stage, the hypothesized structural model was tested. Cybervictimization was specified as the primary exogenous predictor, and disordered eating was specified as the principal outcome variable. Direct paths were estimated from cybervictimization to appearance comparison, body dissatisfaction, self-esteem, and disordered eating. Appearance comparison was specified as a predictor of body dissatisfaction, self-esteem, and disordered eating. Body dissatisfaction was specified as a predictor of self-esteem

and disordered eating, while self-esteem was specified as a predictor of disordered eating. This structure made it possible to test several theoretically meaningful indirect pathways, including the effects of cybervictimization on disordered eating through appearance comparison, through body dissatisfaction, through self-esteem, and through sequential combinations of these variables. Age, body mass index, average daily internet use, and perceived family economic status were entered as covariates when their preliminary associations with the endogenous variables were statistically or theoretically meaningful.

Overall model fit was evaluated using multiple indices rather than relying exclusively on the chi-square statistic, which is sensitive to large sample sizes. The reported indices included the chi-square value, degrees of freedom, comparative fit index, Tucker–Lewis index, root mean square error of approximation with its 90% confidence interval, and standardized root mean square residual. Comparative fit index and Tucker–Lewis index values of .90 or higher were considered indicative of acceptable fit, while values of .95 or higher represented strong fit. Root mean square error of approximation and standardized root mean square residual values below .08 were regarded as acceptable, and values close to or below .06 indicated good model fit. Modification indices were reviewed only when the initial model showed inadequate fit, and parameters were modified only when the changes were theoretically defensible and did not alter the substantive meaning of the proposed model.

The significance of direct, indirect, and total effects was examined using standardized path coefficients. Indirect effects were evaluated through a bias-corrected bootstrap procedure based on 10,000 resamples. An indirect effect was considered statistically significant when its 95% bootstrap confidence interval did not include zero. Both specific indirect effects and the total indirect effect of cybervictimization on disordered eating were calculated. The proportion of variance explained in appearance comparison, body dissatisfaction, self-esteem, and disordered eating was reported using squared multiple correlations. All statistical tests were two-tailed, and a probability value below .05 was considered statistically significant.

3. Findings and Results

A total of 702 adolescent girls were invited to participate in the study. Of these, 686 provided the required consent and

assent, and 676 completed the online questionnaire. Twenty-eight questionnaires were excluded from the final analysis because of substantial missing data, failure on more than one attention-check item, implausibly short completion time, or evidence of invariant responding. Consequently, the final analytic sample consisted of 648 adolescent girls, representing 95.9% of those who completed the questionnaire. The participants ranged in age from 13 to 18 years, with a mean age of 15.47 years and a standard deviation of 1.38 years. The age distribution included 72 participants aged 13 years, 112 aged 14 years, 143 aged 15 years, 139 aged 16 years, 120 aged 17 years, and 62 aged 18 years. With regard to grade level, 86 participants were enrolled in Grade 8, 128 in Grade 9, 145 in Grade 10, 150 in Grade 11, and 139 in Grade 12. Consistent with the planned provincial distribution, 226 participants were recruited from Ontario, 214 from British Columbia, and 208 from Alberta.

Regarding family characteristics, 431 participants reported living with both parents, 157 lived in single-parent households, and 60 lived in blended families or other caregiving arrangements. In terms of perceived family economic status, 124 participants described their family economic circumstances as below average, 383 as average, and 141 as above average. The participants reported spending an average of 4.36 hours per day on social media, messaging applications, video-sharing platforms, or other online communication services, with a standard deviation of 1.89 hours. Seventy-four participants reported less than two

hours of daily online activity, 236 reported between two and four hours, 217 reported between four and six hours, and 121 reported more than six hours per day. The mean body mass index was 21.74 kg/m², with a standard deviation of 3.56. Based on the conventional screening threshold of 20 on the Eating Attitudes Test–26, 149 participants, representing 23.0% of the sample, were classified as being at elevated risk for clinically significant eating-related concerns. This classification was treated as a screening indicator rather than a clinical diagnosis.

Before conducting the principal analyses, the data were examined for missing values, univariate outliers, multivariate outliers, normality, and multicollinearity. Item-level missingness ranged from 0.3% to 1.8%, and the available data were retained using full-information maximum likelihood estimation. Examination of Mahalanobis distance identified nine potentially influential multivariate cases; however, sensitivity analyses indicated that retaining or removing these cases did not materially alter the estimated coefficients or model fit. Therefore, the cases were retained to preserve the representativeness of the sample. The absolute skewness values ranged from 0.12 to 1.02, while the absolute kurtosis values ranged from 0.26 to 0.88, indicating no severe departure from univariate normality. Variance inflation factor values ranged from 1.29 to 2.41, and tolerance values ranged from .41 to .78, demonstrating that problematic multicollinearity was not present.

Table 1

Descriptive Statistics, Internal Consistency Coefficients, and Correlations among the Study Variables

Variable	Possible Range	Mean	SD	Skewness	Kurtosis	Cronbach's α	McDonald's ω	1	2	3	4	5
Cybervictimization	11–55	20.11	7.04	0.71	0.28	.90	.91	—				
Appearance comparison	11–55	36.42	8.13	–0.18	–0.41	.92	.92	.35***	—			
Body dissatisfaction	16–96	49.87	16.52	0.32	–0.26	.94	.94	.41***	.61***	—		
Self-esteem	10–40	25.63	5.74	–0.12	–0.37	.89	.89	–.38***	–.52***	–.63***	—	
Disordered eating	0–78	15.84	11.26	1.02	0.88	.91	.91					—

As presented in Table 1, all study measures demonstrated satisfactory internal consistency. Cronbach's alpha coefficients ranged from .89 for self-esteem to .94 for body dissatisfaction, while McDonald's omega coefficients ranged from .89 to .94. These findings indicated that the instruments provided reliable assessments of their respective constructs in the present sample of Canadian adolescent girls. Cybervictimization was positively associated with appearance comparison, body dissatisfaction, and disordered

eating and was negatively associated with self-esteem. The correlation between cybervictimization and appearance comparison was moderate and positive, indicating that girls who reported more frequent online victimization were more likely to compare their physical appearance with that of other people. Cybervictimization was also positively related to body dissatisfaction and disordered eating, while its negative relationship with self-esteem indicated that more

frequent cybervictimization was associated with less favorable global self-evaluation.

Appearance comparison had a strong positive correlation with body dissatisfaction and a moderate positive correlation with disordered eating. It was also negatively correlated with self-esteem, suggesting that frequent comparison of one's appearance with peers, influencers, celebrities, and other social media users was associated with less favorable body evaluations and lower global self-worth. Body dissatisfaction showed the strongest positive correlation with disordered eating, indicating that dissatisfaction with

body shape and weight was closely associated with restrictive eating, food preoccupation, fear of weight gain, and other problematic eating attitudes. Body dissatisfaction was also strongly and negatively related to self-esteem. Finally, self-esteem was negatively correlated with disordered eating, showing that girls with a more positive sense of self-worth generally reported fewer disordered eating attitudes and behaviors. Although several correlations were substantial, none exceeded .80, providing additional evidence that the variables were related but empirically distinguishable.

Table 2

Confirmatory Factor Analysis and Construct Reliability Results

Latent Construct	Number of Indicators	Standardized Factor-Loading Range	Cronbach's α	McDonald's ω	Composite Reliability	Average Variance Extracted
Cybervictimization	11	.57–.82	.90	.91	.91	.51
Appearance comparison	11	.62–.86	.92	.92	.93	.56
Body dissatisfaction	16	.58–.88	.94	.94	.95	.57
Self-esteem	10	.55–.81	.89	.89	.90	.50
Disordered eating	26	.52–.84	.91	.91	.93	.50

The confirmatory factor analysis supported the proposed five-factor measurement structure. All observed indicators loaded significantly on their intended latent constructs, and standardized factor loadings ranged from .52 to .88. The lowest loading was observed for one of the disordered-eating indicators, while the highest loading was observed for a body-dissatisfaction indicator. No item had a standardized loading below .50, and no negative residual variance or other inadmissible estimate was observed. Therefore, all indicators were retained in the measurement model. The composite reliability coefficients ranged from .90 to .95, exceeding the recommended minimum value of .70 and demonstrating adequate construct reliability. The average variance extracted values ranged from .50 to .57, indicating that each latent construct explained at least half of the variance in its corresponding indicators.

Convergent validity was supported by the statistically significant factor loadings, strong composite reliability coefficients, and acceptable average variance extracted values. Discriminant validity was evaluated using the heterotrait–monotrait ratio and comparisons between the square root of the average variance extracted and

interconstruct correlations. The heterotrait–monotrait ratios ranged from .39 to .84 and remained below the conservative threshold of .85. Moreover, the square root of the average variance extracted for each construct was greater than its correlations with the remaining constructs. These results demonstrated that cybervictimization, appearance comparison, body dissatisfaction, self-esteem, and disordered eating represented related but distinct psychological constructs.

A potential common method effect was further evaluated by estimating a single-factor model in which all questionnaire indicators were constrained to load on one latent factor. This model produced substantially poorer fit than the hypothesized five-factor model. The strong improvement in the comparative fit index, Tucker–Lewis index, root mean square error of approximation, and standardized root mean square residual indicated that the covariance among the observed variables could not be adequately explained by a single general response factor. Accordingly, common method variance was unlikely to account fully for the observed relationships.

Table 3

Fit Indices for the Measurement and Structural Models

Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	90% CI for RMSEA	SRMR
Single-factor measurement model	3658.41	1095	3.34	.694	.682	.060	.058–.062	.104
Five-factor measurement model	1738.26	1085	1.60	.951	.947	.031	.028–.034	.041
Fully mediated structural model	1792.63	1091	1.64	.946	.942	.033	.030–.036	.048
Partially mediated structural model	1754.91	1090	1.61	.950	.946	.031	.029–.034	.043

As shown in Table 3, the hypothesized five-factor measurement model demonstrated good fit to the observed data. The comparative fit index and Tucker–Lewis index approached or exceeded .95, while the root mean square error of approximation and standardized root mean square residual were well below .05. In contrast, the single-factor measurement model showed poor fit, with comparative fit index and Tucker–Lewis index values substantially below acceptable levels and a standardized root mean square residual above .10. The chi-square difference between the five-factor and single-factor models was statistically significant, confirming that the five constructs should not be represented as a single undifferentiated factor.

The fully mediated structural model, in which the direct path from cybervictimization to disordered eating was constrained to zero, provided acceptable fit. However, the partially mediated model, which included both direct and indirect relationships between cybervictimization and disordered eating, demonstrated a statistically significant improvement in fit, $\Delta\chi^2(1) = 37.72$, $p < .001$. The partially mediated model produced a comparative fit index of .950, a Tucker–Lewis index of .946, a root mean square error of approximation of .031, and a standardized root mean square residual of .043. These values indicated that the proposed structural model reproduced the observed covariance matrix adequately. The finding that the partially mediated model fit the data better than the fully mediated model suggested that appearance comparison, body dissatisfaction, and self-esteem explained a substantial proportion, but not all, of the relationship between cybervictimization and disordered eating.

The standardized residuals were generally small and symmetrically distributed, and no large modification index suggested the omission of a theoretically essential path.

Although several residual covariances between similarly worded items were examined, they were not included unless they were supported by the substantive content of the measures. The final model remained theoretically parsimonious and statistically adequate. Sensitivity analysis using the model without the nine potentially influential multivariate cases produced nearly identical fit indices and path coefficients, demonstrating that the findings were not driven by a small number of extreme observations.

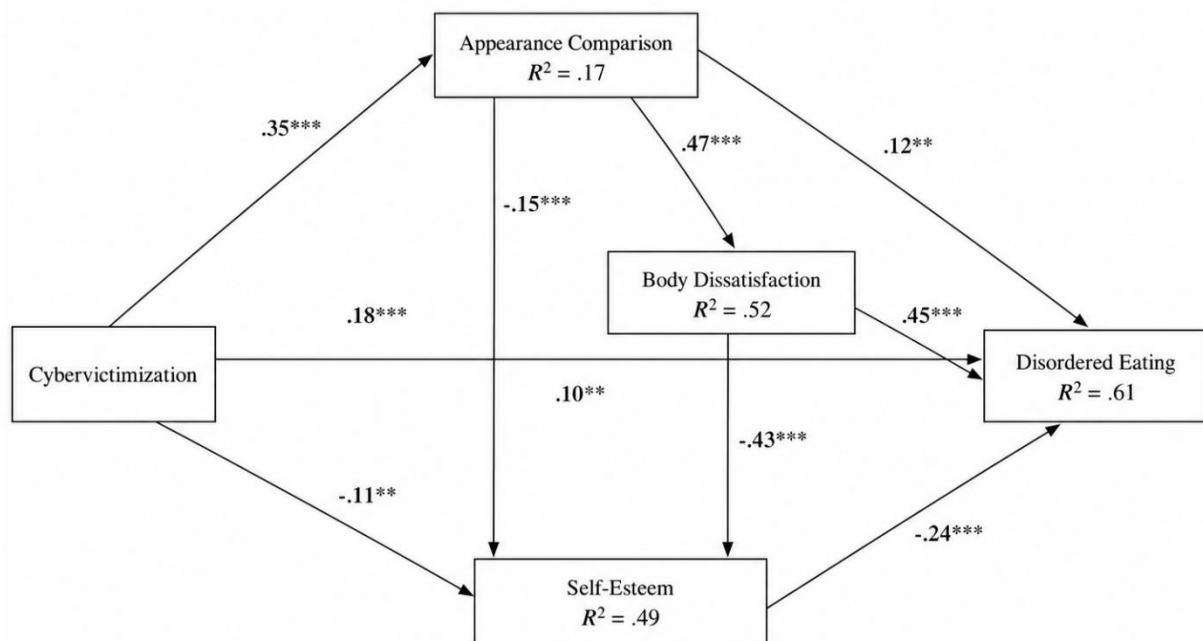
Figure 1 presents the standardized structural relationships among the principal study variables. All hypothesized paths were statistically significant and remained in the final model. Cybervictimization was positioned as the exogenous predictor and was directly associated with greater appearance comparison, greater body dissatisfaction, lower self-esteem, and greater disordered eating. Appearance comparison was positively associated with body dissatisfaction and disordered eating and negatively associated with self-esteem. Body dissatisfaction was negatively associated with self-esteem and positively associated with disordered eating, whereas self-esteem was negatively associated with disordered eating. The figure also reflects the partial mediation structure of the model, as the direct path from cybervictimization to disordered eating remained statistically significant after the mediating pathways were included. The magnitude of the coefficients indicated that the strongest proximal predictor of disordered eating was body dissatisfaction, followed by self-esteem, appearance comparison, and the remaining direct effect of cybervictimization. Overall, the model supported a cumulative psychological process in which cybervictimization was associated with disordered eating both independently and through interrelated appearance-focused and self-evaluative mechanisms.

Table 4*Standardized Direct, Indirect, and Total Effects in the Structural Equation Model*

Effect	Standardized Estimate	SE	95% Bootstrap CI	p
Direct effects				
Cybervictimization → Appearance comparison	.35	.04	.28 to .42	<.001
Cybervictimization → Body dissatisfaction	.18	.04	.10 to .26	<.001
Cybervictimization → Self-esteem	-.11	.04	-.19 to -.03	.006
Cybervictimization → Disordered eating	.10	.04	.03 to .17	.008
Appearance comparison → Body dissatisfaction	.47	.04	.39 to .55	<.001
Appearance comparison → Self-esteem	-.15	.04	-.23 to -.07	<.001
Appearance comparison → Disordered eating	.12	.04	.05 to .19	.001
Body dissatisfaction → Self-esteem	-.43	.04	-.51 to -.35	<.001
Body dissatisfaction → Disordered eating	.45	.04	.37 to .53	<.001
Self-esteem → Disordered eating	-.24	.04	-.32 to -.16	<.001
Specific indirect effects of cybervictimization on disordered eating				
Cybervictimization → Appearance comparison → Disordered eating	.042	.013	.019 to .071	<.001
Cybervictimization → Body dissatisfaction → Disordered eating	.081	.019	.045 to .121	<.001
Cybervictimization → Self-esteem → Disordered eating	.026	.012	.006 to .051	.011
Cybervictimization → Appearance comparison → Body dissatisfaction → Disordered eating	.074	.015	.047 to .105	<.001
Cybervictimization → Appearance comparison → Self-esteem → Disordered eating	.013	.005	.004 to .025	.004
Cybervictimization → Body dissatisfaction → Self-esteem → Disordered eating	.019	.006	.008 to .033	<.001
Cybervictimization → Appearance comparison → Body dissatisfaction → Self-esteem → Disordered eating	.017	.005	.009 to .029	<.001
Summary effects				
Total indirect effect	.272	.029	.218 to .330	<.001
Direct effect	.100	.037	.029 to .173	.008
Total effect	.372	.033	.309 to .436	<.001

Figure 1

Standardized Structural Equation Model of the Relationships among Cybervictimization, Appearance Comparison, Body Dissatisfaction, Self-Esteem, and Disordered Eating



The structural coefficients presented in Table 4 indicated that cybervictimization had significant direct associations with all four endogenous psychological variables. Cybervictimization positively predicted appearance comparison, showing that greater exposure to online harassment, humiliation, exclusion, impersonation, or threatening communication was associated with a stronger tendency to compare physical appearance with that of other people. Cybervictimization also positively predicted body dissatisfaction after accounting for appearance comparison and the covariates. Therefore, exposure to cybervictimization was associated not only with increased comparison behavior but also with more negative evaluations of body shape and weight. The direct effect of cybervictimization on self-esteem was negative, indicating that girls who experienced more frequent cybervictimization reported lower global self-worth. Cybervictimization additionally retained a small but statistically significant direct effect on disordered eating after all mediating variables had been included in the model.

Appearance comparison significantly predicted all subsequent endogenous variables. Its strongest direct effect was observed for body dissatisfaction, indicating that frequent comparison with peers, social media users, influencers, and culturally valued appearance standards was strongly associated with dissatisfaction with one's body. Appearance comparison also had a negative direct effect on self-esteem and a positive direct effect on disordered eating. These findings suggested that appearance comparison was associated with eating-related concerns both directly and indirectly through less favorable body evaluations and reduced self-worth.

Body dissatisfaction was a substantial negative predictor of self-esteem and the strongest direct predictor of disordered eating in the model. The standardized coefficient from body dissatisfaction to disordered eating was .45, indicating that adolescent girls who experienced greater concern, shame, or distress about body shape and weight were considerably more likely to report dieting behavior, food preoccupation, fear of weight gain, and other problematic eating attitudes. Self-esteem had a significant negative effect on disordered eating, demonstrating that a more positive overall sense of personal worth was associated with lower levels of eating-related disturbance after accounting for cybervictimization, appearance comparison, and body dissatisfaction.

All seven hypothesized specific indirect effects of cybervictimization on disordered eating were statistically

significant because none of their bias-corrected bootstrap confidence intervals included zero. The indirect pathway through appearance comparison alone indicated that cybervictimization was associated with greater disordered eating partly because victimized girls engaged in more frequent appearance comparisons. The pathway through body dissatisfaction alone was larger, suggesting that the negative impact of cybervictimization on body evaluation represented a particularly important mechanism. The indirect pathway through self-esteem was smaller but remained significant, indicating that diminished self-worth also contributed to the association between cybervictimization and disordered eating.

The sequential indirect effects provided additional support for the proposed psychological process. Cybervictimization predicted greater appearance comparison, which subsequently predicted greater body dissatisfaction and, in turn, more severe disordered eating. This sequential pathway was among the largest specific indirect effects. A further significant pathway showed that cybervictimization was associated with appearance comparison, greater appearance comparison was related to lower self-esteem, and lower self-esteem predicted greater disordered eating. Another significant sequential pathway operated from cybervictimization through body dissatisfaction and self-esteem, showing that the body-related consequences of online victimization were associated with disordered eating partly because they weakened global self-worth.

The longest sequential pathway was also statistically significant. In this pathway, cybervictimization predicted appearance comparison, appearance comparison predicted body dissatisfaction, body dissatisfaction predicted lower self-esteem, and lower self-esteem predicted greater disordered eating. This result supported the theoretical proposition that online victimization may initiate a multistage process in which girls become increasingly attentive to appearance-based social comparisons, develop more negative evaluations of their bodies, experience deterioration in global self-worth, and subsequently become more vulnerable to problematic eating attitudes and behaviors.

The total indirect effect of cybervictimization on disordered eating was .272 and was statistically significant. The direct effect remained significant at .100 after the mediators were entered, while the total standardized effect was .372. Approximately 73.1% of the total relationship between cybervictimization and disordered eating was

transmitted through appearance comparison, body dissatisfaction, self-esteem, and their sequential combinations. The remaining 26.9% was represented by the direct effect and may reflect psychological processes not explicitly measured in the present model, such as depressive symptoms, emotion dysregulation, social anxiety, perceived rejection, or maladaptive coping.

The model explained 17% of the variance in appearance comparison, 52% of the variance in body dissatisfaction, 49% of the variance in self-esteem, and 61% of the variance in disordered eating. The relatively high proportion of explained variance in disordered eating indicated that the combined contribution of cybervictimization, appearance comparison, body dissatisfaction, and self-esteem was substantial. Among the covariates, body mass index had significant positive effects on body dissatisfaction and disordered eating, while average daily internet use was positively associated with cybervictimization and appearance comparison. Perceived family economic status had a small positive association with self-esteem, whereas age did not have a statistically significant direct effect on disordered eating after the remaining variables were controlled. Inclusion or removal of the nonsignificant age path did not meaningfully change the substantive findings.

4. Discussion

The present study examined the relationship between cybervictimization and disordered eating among adolescent girls in Canada and tested whether appearance comparison, body dissatisfaction, and self-esteem explained this relationship through parallel and sequential pathways. The findings supported the proposed structural model and showed that cybervictimization was directly associated with greater appearance comparison, higher body dissatisfaction, lower self-esteem, and more severe disordered eating. Appearance comparison was positively related to body dissatisfaction and disordered eating and negatively related to self-esteem. Body dissatisfaction emerged as the strongest proximal predictor of disordered eating and was also associated with lower self-esteem, while self-esteem was negatively associated with disordered eating. All hypothesized indirect effects were statistically significant, and the model explained 61% of the variance in disordered eating. The findings therefore indicate that cybervictimization is associated with eating-related disturbance not only directly but also through a multistage psychological process involving appearance-focused

comparison, negative body evaluation, and diminished global self-worth.

The significant direct association between cybervictimization and disordered eating suggests that online harassment, humiliation, exclusion, impersonation, and appearance-related aggression may represent meaningful risk factors for maladaptive eating attitudes among adolescent girls. This result is consistent with evidence showing that cybervictimization can produce broad psychosomatic and psychological consequences, including emotional distress, social withdrawal, anxiety, and impaired well-being (Makarova & Makarova, 2023). Online victimization may increase disordered eating because food restriction, binge eating, emotional eating, or excessive weight-control behavior can become maladaptive strategies for coping with shame, rejection, helplessness, and loss of control. The persistence and visibility of online attacks may be particularly harmful because adolescents can repeatedly encounter humiliating content, observe peer reactions, and anticipate further judgment even outside school settings. In this way, cybervictimization may create a continuous social-evaluative threat that increases vulnerability to disturbed eating.

The direct relationship between cybervictimization and disordered eating also corresponds with previous findings linking cybervictimization to eating-disorder symptoms through peer and self-evaluative mechanisms (Lee et al., 2025). Although that study involved a university sample, the present findings extend the association to adolescent girls, who may be especially sensitive to peer approval and appearance-based evaluation. Adolescents generally have less consolidated identities and fewer established coping resources than adults, making public online criticism more likely to influence self-perception and behavior. Weight-based and appearance-related cybervictimization may be particularly damaging because they attack physical characteristics that are visible, socially evaluated, and often difficult to change. The growing recognition of pediatric weight-based cybervictimization as a public health concern reinforces the importance of treating online appearance-based aggression as more than a transient interpersonal conflict (Zumaglini et al., 2025).

Cybervictimization significantly predicted appearance comparison, indicating that girls who experienced more frequent online victimization were more likely to evaluate their physical appearance relative to peers, influencers, celebrities, and other social media users. One explanation is that appearance-related criticism heightens self-focused

attention and motivates adolescents to identify why they were targeted. A girl who is mocked for her weight, facial features, clothing, or body shape may begin examining other girls more closely and assessing whether she deviates from perceived social standards. Digital platforms provide an almost unlimited supply of comparison targets, many of whom present edited, filtered, posed, or selectively displayed images. Consequently, cybervictimization may transform ordinary social comparison into persistent appearance surveillance.

This finding aligns with research showing that social media environments intensify women's appearance comparison by repeatedly exposing users to idealized and carefully curated bodies (Xiong, 2023). Studies of young adults have similarly indicated that social media use is associated with greater concern about appearance and increased pressure to meet idealized standards (Fatima, 2025). Image-centered platforms may be particularly influential because appearance is embedded in the basic structure of interaction through photographs, videos, likes, comments, and follower-based feedback. Research examining Instagram has also identified relationships among platform engagement, body satisfaction, and self-esteem (Flores-Mata & Castellano-Tejedor, 2024). The present findings suggest that cybervictimization may amplify these general social media effects by making appearance comparison personally threatening rather than merely observational.

Appearance comparison significantly predicted body dissatisfaction and was one of the central mechanisms connecting cybervictimization with disordered eating. This result is theoretically plausible because upward appearance comparisons frequently produce a perceived discrepancy between the actual body and the socially valued ideal. When comparison targets are highly selected or digitally altered, adolescents may judge ordinary pubertal changes, body diversity, or minor appearance differences as evidence of personal inadequacy. Repeated comparison may therefore strengthen dissatisfaction even when a girl's body is healthy or developmentally typical. Existing literature has emphasized that social media can influence body image by normalizing unrealistic standards and encouraging constant comparison with idealized bodies (Gao, 2023; Wang & Ding, 2023). The present results add that such comparison is not merely correlated with body dissatisfaction but may form part of a sequential pathway through which cybervictimization becomes associated with disordered eating.

Appearance comparison also had a direct positive association with disordered eating. This finding indicates that comparison may influence eating attitudes even after body dissatisfaction and self-esteem are taken into account. One possible explanation is that repeated comparison exposes adolescents to behavioral norms as well as physical ideals. Girls may observe dieting practices, weight-loss content, fitness routines, calorie restriction, or "what I eat" posts and adopt these behaviors in an attempt to reduce perceived appearance differences. Social media has been linked with dietary restriction, fear of weight gain, food preoccupation, and other eating-related risks (Liu, 2023; Pérez-Jiménez et al., 2025). Appearance comparison may therefore influence disordered eating through both dissatisfaction with the body and imitation of perceived appearance-management practices.

The significant negative association between appearance comparison and self-esteem further demonstrates that comparison can extend beyond evaluation of the body to global judgments of personal worth. Adolescents may interpret failure to resemble idealized comparison targets as evidence that they are unattractive, unsuccessful, unpopular, or socially inferior. Because online environments often connect appearance with visible indicators of approval, such as likes, comments, and follower counts, physical comparison may become inseparable from broader social comparison. Reviews of body perception and psychological well-being indicate that social media, cultural standards, and gendered appearance expectations can substantially affect self-esteem and mental health (Merino et al., 2024). Thus, the negative relationship observed in this study likely reflects the generalization of appearance-based inadequacy into a more comprehensive negative self-evaluation.

Body dissatisfaction was the strongest direct predictor of disordered eating in the structural model. This result supports extensive evidence that negative body evaluation is among the most immediate and influential risk factors for maladaptive eating. Adolescents dissatisfied with their body shape or weight may attempt to reduce the discrepancy between their actual and ideal appearance through restrictive dieting, meal skipping, binge eating, compensatory behavior, or excessive concern with food and calories. The finding is consistent with systematic evidence identifying body dissatisfaction as a major factor in the onset and maintenance of eating disorders during adolescence (Varela et al., 2023). It also aligns with research demonstrating close relationships among body image, body esteem, and eating attitudes (Nia et al., 2024).

The mediating role of body dissatisfaction is supported by previous research showing that body dissatisfaction can explain the association between bullying victimization and eating-disorder risk (Xie et al., 2024). Although the social contexts of school bullying and cybervictimization are not identical, both can communicate rejection and appearance-based devaluation. Cybervictimization may be especially potent because the harmful material can be distributed widely, revisited repeatedly, and evaluated by an audience. The victim may consequently internalize the aggressor's judgment and become increasingly preoccupied with perceived flaws. The present study showed that cybervictimization predicted body dissatisfaction both directly and indirectly through appearance comparison, indicating that negative online experiences may affect body image through more than one route.

The strong association between body dissatisfaction and lower self-esteem suggests that dissatisfaction with physical appearance may become incorporated into adolescents' broader self-concept. During adolescence, the body is not simply a physical object but a central component of identity, belonging, perceived attractiveness, and social acceptability. When girls experience persistent dissatisfaction with body shape or weight, they may begin to evaluate themselves negatively across unrelated domains. Evidence from different populations has shown that body dissatisfaction and low self-esteem are closely related to eating-disorder symptoms (Kiroopoulos et al., 2025). The present findings extend this relationship by demonstrating that self-esteem may operate downstream from body dissatisfaction within a broader cybervictimization model.

Self-esteem had a significant negative direct effect on disordered eating, indicating that girls with more positive global self-worth reported fewer maladaptive eating attitudes. Low self-esteem may increase vulnerability to disordered eating because adolescents may seek self-worth through appearance control, weight reduction, or conformity to beauty standards. Eating-related behaviors can also provide a temporary sense of control when interpersonal experiences produce helplessness or rejection. Conversely, stronger self-esteem may protect adolescents by reducing dependence on external appearance validation and increasing resilience to peer criticism. The finding is consistent with research showing that self-esteem contributes to the relationship between cybervictimization and eating-disorder symptoms (Lee et al., 2025). It also supports the broader view that positive body image and body

esteem are associated with healthier eating attitudes (Nia et al., 2024).

The significant sequential pathway from cybervictimization through appearance comparison, body dissatisfaction, and self-esteem to disordered eating represents one of the most important findings of the study. This pathway suggests that online victimization may initiate a cumulative psychological process. Cybervictimization first increases attention to appearance-based differences, appearance comparison then intensifies dissatisfaction with the body, body dissatisfaction weakens global self-esteem, and reduced self-esteem increases vulnerability to disordered eating. The significance of this complete sequence supports an integrated explanation rather than a model based on one isolated mediator. It demonstrates how an external social experience may gradually become internalized and translated into eating-related behavior.

The result is also consistent with qualitative evidence showing that body shaming and violence can turn the body into a central site of psychological conflict among vulnerable adolescents (Rizk-Hildbrand et al., 2025). Online body shaming may be especially influential among girls because it reflects wider gendered expectations regarding thinness, attractiveness, femininity, and bodily discipline. Body shaming has therefore been described as both a mental health concern and a gender-equity challenge (Omari et al., 2026). The present results support this perspective by showing that appearance-related psychological mechanisms account for a substantial proportion of the relationship between cybervictimization and disordered eating.

The total indirect effect was considerably larger than the remaining direct effect, and approximately 73% of the total association between cybervictimization and disordered eating was transmitted through the proposed mediators. This indicates that appearance comparison, body dissatisfaction, and self-esteem are not secondary correlates but central explanatory processes. Nevertheless, the direct effect remained significant, suggesting partial rather than complete mediation. Other unmeasured mechanisms may include depressive symptoms, anxiety, emotional dysregulation, loneliness, shame, perceived social rejection, self-compassion, and affiliation with peers who normalize disordered eating. Problematic social media use may also contribute because it increases both exposure to victimization and contact with harmful appearance and eating-related content. Previous research has linked problematic social media use with psychological distress and eating-disorder symptoms (Soh, 2025), while broader

reviews have documented substantial mental health risks associated with intensive social media exposure among young people (Álvarez-Mon et al., 2024; Marano et al., 2025).

The model's explanation of 61% of the variance in disordered eating indicates substantial predictive value. Body dissatisfaction contributed the strongest proximal effect, but the findings show that it should not be considered independently of the social and cognitive processes that precede it. Appearance comparison may be a key point at which external online experiences become internalized, while self-esteem may shape whether body dissatisfaction develops into broader eating-related disturbance. These distinctions are clinically important because they identify multiple intervention targets. Digital interventions addressing body dissatisfaction have shown promising effects among children, adolescents, and emerging adults (Tan et al., 2025). Interventions may be strengthened by adding components that reduce appearance comparison, challenge online beauty standards, improve self-esteem, and teach adaptive responses to cybervictimization.

5. Conclusion

The findings also support the potential relevance of self-compassion and healthier coping responses. Research involving women exposed to appearance-related cyberbullying has shown that self-compassion writing may be beneficial in the context of emotional eating (Wang, 2023). Self-compassion may reduce the tendency to accept online criticism as an accurate reflection of personal worth and may interrupt the progression from shame to body dissatisfaction and eating-related coping. Similarly, recreational physical activity and healthy dietary patterns may support body image when they are framed around well-being rather than appearance control (Tsartsapakis et al., 2024). Prevention efforts should therefore avoid reinforcing weight-focused messages and instead promote body functionality, self-acceptance, media literacy, and flexible eating.

6. Limitations & Suggestions

Several limitations should be considered when interpreting the findings. The cross-sectional design does not permit causal or temporal conclusions, and the direction of some relationships may be reciprocal. For example, adolescents with body dissatisfaction or disordered eating may use social media differently, perceive online

interactions more negatively, or become more vulnerable to appearance-related targeting. All variables were measured through self-report questionnaires, which may have introduced recall bias, social desirability, and shared method variance. Although the measurement analyses supported the distinctiveness of the constructs, the findings were not confirmed through clinical interviews, parent reports, peer reports, or digital behavioral data. The sample included girls attending English-language public schools in three Canadian provinces, and the findings may not generalize to boys, gender-diverse adolescents, students in private or French-language schools, adolescents outside formal education, or young people in other cultural settings. Height and weight were self-reported, and the study did not distinguish fully between general cybervictimization and specifically weight- or appearance-based cybervictimization.

Future studies should employ longitudinal and prospective designs to establish the temporal ordering of cybervictimization, appearance comparison, body dissatisfaction, self-esteem, and disordered eating. Repeated assessments could determine whether cybervictimization predicts subsequent changes in the mediators and whether disordered eating also increases later vulnerability to online victimization. Experimental and ecological momentary assessment designs would help clarify short-term reactions to appearance-related online content and victimization episodes. Future research should include more diverse samples across gender identities, cultural groups, provinces, school systems, and socioeconomic contexts and should examine whether the structural pathways differ across these groups. It would also be useful to separate weight-based, appearance-based, sexualized, and general cybervictimization and to incorporate additional mechanisms such as shame, depressive symptoms, emotion regulation, self-compassion, perceived social support, perfectionism, and peer norms. Clinical interviews, objective social media indicators, and reports from parents or peers could reduce reliance on self-report data.

Schools, families, mental health professionals, and digital-platform providers should treat appearance-related cybervictimization as a significant risk indicator for body image disturbance and disordered eating. School-based prevention programs should combine cyberbullying education with media literacy, body acceptance, self-esteem development, and instruction on healthy social comparison. Screening procedures in schools and adolescent health services should include questions about online appearance criticism, body dissatisfaction, and eating-related behaviors,

particularly when girls report repeated cybervictimization. Counseling interventions should help adolescents challenge unrealistic appearance standards, reduce compulsive comparison, separate personal worth from physical appearance, and develop adaptive coping responses to online rejection. Parents and teachers should be trained to recognize subtle signs of cybervictimization and disordered eating and to respond supportively rather than focusing on weight. Digital platforms should improve reporting systems, strengthen moderation of appearance-based harassment, and limit the circulation of humiliating images and comments involving minors.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this article.

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