Appearance-related teasing, rejection sensitivity, acceptance, and coping as risks and resources associated with online appearance preoccupation over one year

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ABSTRACT

Online appearance preoccupation is a known correlate of poorer body image, social problems, and mental health symptoms among youth. Yet, this study is the first to investigate individual and social risks and resources expected to explain the level of concurrent, as well as change in, online appearance preoccupation across one year. We focused on two risk factors of appearance teasing online by peers and appearance-based sensitivity to rejection, and two positive resources of appearance neutral support from important others and ways of coping with appearance-related stressors. A total of 752 Australian adolescents and emerging adults (14–21 years; M = 17.8 years, SD = 1.8 years; 41% young men; about 95% White or Asian) recruited from secondary schools or university were included. Results of regression analyses suggested that, concurrently, online appearance teasing, appearance rejection sensitivity, and positive coping were uniquely associated with online appearance preoccupation. Further, the positive association of peer appearance teasing with online appearance preoccupation was stronger among young men than young women. Over time and once all risks and resources were considered, positive coping with appearance pressures was associated with a decrease in online appearance preoccupation from T1 to T2. Gender (girl/young woman) and intensity of social media use were notable risks for concurrent online appearance preoccupation and predictors of increases in preoccupation over one year. Findings are discussed in light of theory and provide practical suggestions for future research and interventions among youth.

Many youth (those between the ages of 13 and 25 years) report that they are focused on or preoccupied with their own and others' physical appearance when they are online, especially when using social media (Choukas-Bradley et al., 2022; Fardouly et al., 2018; Frison & Eggermont, 2016; Rogers & Rosseau, 2022; Seekis et al., 2020; Tie et al., 2024). Recently, this has been referred to as online appearance preoccupation (Hawes et al., 2020; Zimmer-Gembeck et al., 2021; Zimmer-Gembeck, 2023a), defined as directing attention towards cultivating a preferred visual appearance, engaging in appearance comparisons in online environments, and engaging in high levels of general activities that involve interacting with appearance-based content. In one of the three past studies referring to online appearance preoccupation, it was associated with more elevated appearance anxiety (body dysmorphic symptoms), depression, and anxiety (Hawes et al., 2020). These findings are consistent with other studies that measured engagement in

appearance comparisons and judgements similar in form to online appearance preoccupation, such as appearance-related social media consciousness (Choukas-Bradley et al., 2020; Fardouly et al., 2020; Maheux et al., 2022; Rojo et al., 2023; Tie et al., 2024).

Despite this past research on the mental health correlates of online appearance preoccupation or the social media impact on appearance or body-related outcomes (Tylka et al., 2023), understanding the *earlier predictors of* online appearance preoccupation remains a new area of research in the social media and body image literature. Research focused on identifying the antecedent risks of later online appearance preoccupation is currently limited to one previous study (Zimmer-Gembeck, Hawes, et al., 2023). In this past study, which followed adolescents for five years, early risks (measured at age 10–13 years; M = 12.0, SD = 0.89) for later elevated online appearance preoccupation (measured at age 15–18 years) included gender (young women were at more risk than

young men), engaging in more appearance conversations with friends (for young women), and perceiving that parents were more negative about their own weight and appearance (for young men). However, although considering early risk factors was notable, this longitudinal study spanned a time when the idea of online appearance preoccupation was newly introduced. Hence, the study was not designed to gather repeated measures of preoccupation (instead, controlling for earlier body image concerns). Thus, no previous study has identified risks for online appearance preoccupation measured repeatedly over time. Moreover, studying resources alongside risk factors for online appearance preoccupation could identify social and individual characteristics that reduce appearance preoccupation over time or might protect against the detrimental impact of risks. To begin to fill this gap, the aim of this 2-wave longitudinal study conducted over one year was to consider the impact of two social and two individual factors that could be risks or resources for youth's online appearance preoccupation, both concurrently and over one year.

1. Risks and resources related to online appearance preoccupation

It is becoming widely known that online behaviors that involve elevated attention on appearance, such as reading about techniques to improve appearance, comparing personal appearance to others, or online curation of appearance (or other forms of preoccupation), can identify adolescents and young adults who have and could develop anxiety, depression, social problems, and eating or other body-related problems (e.g., Choukas-Bradley et al., 2022; Hawes et al., 2020; Tylka et al., 2023; Zimmer-Gembeck et al., 2021, 2023a). This growing body of research suggests that time spent online and the continuous ability to compare images and videos of a wide-range of individuals (Saunders & Eaton, 2018; Talbot et al., 2017) is linked to the growth in appearance anxiety and other associated markers of mental health, such as depression, anxiety, and loneliness (Charamaraman et al., 2021; Fardouly et al., 2020; Maheux et al., 2022; Nesi et al., 2021). This new area of research is supplementing the much longer history of research on body dissatisfaction, appearance anxiety, and body dysmorphic symptoms (see Buhlmann & Wilhelm, 2004; Lavell et al., 2018; Levinson & Rodebaugh, 2012; Park et al., 2009; Veale, 2004) to identify contemporary risks and resources, located within the offline or online social environment or within individual themselves, that foreshadow appearance and body concerns today when social media is becomingly fully integrated into the daily life of almost all young people (Vogels et al., 2022).

Factors that identify youth who are at more risk of online appearance preoccupation concurrently and into the future can be social or individual. For example, social pressures related to appearance ideals can be a risk but, conversely, support from others that is neutral about appearance could be a resource; personal negative expectations could be a risk but, conversely, positive self-beliefs and ways of coping with appearance pressures using positive self-talk and compassion could be a resource. Following a consideration of past research, two social and two individual factors aligned with this past research stood out as potential risks and resources to consider in the current study. These included the social risk of online peer teasing about appearance, the individual risk of appearance-based rejection sensitivity (appearance-RS), the social resource of appearance neutral acceptance, and the individual resource of more positive coping responses to appearance concerns and comments. Notably, all four factors are potentially amenable to intervention, making their consideration important for future intervention efforts.

1.1. Risks: peer teasing about appearance and Appearance-RS

There has been a long history of considering interactions with peers as important to the development of concerns about appearance and body shape and size, appearance anxiety, and disordered eating (e.g.,

Buhlmann & Wilhelm, 2004; Lavell et al., 2018). For example, the tripartite sociocultural influence model is a commonly applied model that identifies peers as one main social influence that underlies the development of appearance ideals and expectations that become internalized and link directly to self-image, self-esteem, and body dissatisfaction (Thompson et al., 1999; Webb et al., 2014). During adolescence, peers are an especially important socio-cultural influence (Rogers & Rosseau, 2022). Time spent interacting with peers increases throughout adolescence (Nesi et al., 2018) and peers are particularly influential because adolescents value their opinions or share similar attitudes, even with regards to appearance (Choukas-Bradley et al., 2022; Webb et al., 2014). This explains why adolescents who report more appearance-related teasing by peers also report more appearance anxiety symptoms (Webb et al., 2014) and more online appearance preoccupation (Zimmer-Gembeck et al., 2021).

Adolescents who report more appearance teasing or victimization also score higher on the second risk factor considered in the present study – appearance-based rejection sensitivity (Appearance-RS). Defined as anxiously over-expecting rejection because of perceived appearance flaws (Park, 2007; Webb et al., 2017), appearance-RS has been described in the cognitive behavioral model (Buhlmann & Wilhelm, 2004; Neziroglu et al., 2018; Veale, 2004) as the foundation for appearance anxiety and body dysmorphia (Calogero et al., 2010; Gao et al., 2017; Park et al., 2010; Zimmer-Gembeck, Rudolph, & Pariz, 2022).

Notably, research on appearance-RS emerged from research on general RS, coupled with the idea that the interpretation of rejection experiences can be tied to self-values and beliefs (Downey & Feldman, 1996; Gao et al., 2017; Levy et al., 2001). Like the research linking higher appearance-RS to more experiences of peer appearance teasing (Bowker et al., 2013; Park, 2007; Zimmer-Gembeck, Rudolph, & Gardner, 2022), general rejection sensitivity has been related to sociocultural experiences, especially elevated experiences of teasing, rejection, exclusion, ostracism, and victimization (e.g., Gao et al., 2021; Levy et al., 2001; Wang et al., 2012).

Research also suggests that appearance-RS would be associated with online appearance preoccupation and increasing preoccupation over time. In one study of the bidirectional relationships between appearance-RS and body dysmorphic symptoms, which measured body dysmorphic symptoms as preoccupation and attempts to change or camouflage appearance over time, individuals higher in appearance-RS increased in body dysmorphic symptoms over time (and the reverse was also found, with appearance-RS increasing over time for those with more body dysmorphic symptoms; Zimmer-Gembeck, Rudolph, & Pariz, 2022). Thus, the preoccupation and self-presentation behaviors (measured as body dysmorphia) escalated over time for those higher in appearance-RS. In other research, these associations have been described as support for the idea that body dysmorphic symptoms of preoccupation and self-presentation may be "safety," protective, or compensatory responses that are motivated by the need to avoid or minimize expected social rejection (Densham et al., 2017; Veale, 2004). Given that social comparison, seeking reassurance, and camouflaging or changing appearance are behaviors that are part of online preoccupation, they may also be outcomes of appearance-RS.

1.2. Resources: appearance neutral acceptance and coping with appearance pressures

A continuing trend in the body image literature has been examining associations between interacting with appearance-based content online and body dissatisfaction. Some of this research has demonstrated that viewing idealized, appearance-focused content on social media – particularly content related to *thinspiration* (inspiring weight loss) and *fitspiration* (inspiring fitness goals) – increases negative mood and body dissatisfaction, particularly among women and mostly studied in women (for a review, see Cohen et al., 2021). However, over time, various

movements including that of body *positivity* have challenged appearance ideals and aimed to encourage acceptance and appreciation for all bodies regardless of shape, size, and features (Cohen et al., 2021) despite a continued focus on the appearance of the body (Pellizzer & Wade, 2023). More recently, body *neutrality*, characterized by holding a neutral attitude toward the body, appreciating the functionality of the body, and an acknowledgement that self-worth is not defined by appearance (Pellizzer & Wade, 2023), has emerged as a distinct alternative to body positivity. These movements have a growing online presence and have shaped social attitudes towards appearance-related content online.

Research on body positivity and, more recently, body neutrality has demonstrated that exposure to body positive content (e.g., images) and captions online has positive outcomes for body image, mood, and appearance comparison tendencies. For example, Cohen et al. (2019) demonstrated improvements in young women's positive mood, body satisfaction and body appreciation, as well as increases in self-objectification, following brief exposure to body positive posts, relative to thin-ideal and appearance-neutral posts on Instagram. Researchers have also demonstrated decreases in body dissatisfaction and appearance comparisons over time, after viewing body positive posts on Facebook (Fardouly et al., 2023). Viewing body neutral posts on TikTok (e.g., videos sharing affirmations to foster body neutrality), when compared to thin-ideal content, has also been shown to promote greater body functionality appreciation, body satisfaction, positive mood, and fewer upward appearance comparisons among young women (Seekis & Lawrence, 2023). Thus, much of this research to date has focused exclusively on the outcomes of exposure to appearance-related content online. However, it is also possible that body neutral *acceptance* from close others may play a role in protecting individuals from appearance preoccupation online and associated behaviors.

In recent research, findings suggest that interactions with one's social network can be a key predictor of greater online appearance preoccupation (Zimmer-Gembeck, Hawes, et al., 2023), whereby appearance-focused conversations increased online appearance preoccupation years later. This finding aligns with past research in which lower perceptions of peer acceptance have been shown to predict body image concerns (Gerner & Wilson, 2005). Conversely, receiving affection and support from family members and friends have previously been shown to be protective against body dissatisfaction (Gonzaga et al., 2021), and researchers have suggested that reducing perceptions of appearance-related pressures from family and friends is important for enhancing body image and combating harmful weight-related behaviors (Ata et al., 2007). Further, one study employing a single-session intervention to promote appreciation and valuing of one's body for its functionality, regardless of appearance satisfaction, demonstrated that activities supporting body neutrality (e.g., self-reflection, psychoeducation, and providing body-neutral advice to fictional peers) were effective in improving body dissatisfaction scores and reducing hopelessness among adolescents (Smith et al., 2023). Somewhat diverging from but inspired by this past research, we focused in the current work on appearance neutral acceptance from important others, expecting it to be protective factor against online appearance preoccupation. Indeed, Pellizzer and Wade (2023) acknowledged body talk, conversations with others, and de-emphasizing one's focus on appearance as strategies for supporting body neutrality.

Coping has been defined as "efforts to manage adaptational demands and the emotions they generate" (Lazarus, 2006, p. 10). Stress and coping theories (and decades of related research) have described how environmental experiences can yield negative emotions. These negative experiences then prompt coping responses to alleviate distress or change the environment that is responsible for the distress (Compas et al., 2017; Lazarus & Folkman, 1984). In the area of appearance concerns and body dissatisfaction, young people experience many situations that require a certain appearance, they hear appearance-related comments that are (or are perceived as) negative, and they experience aversive attention to appearance. In general, young people find social interactions that can

involve these expectations or judgments about appearance to be stressful and they can use numerous ways of coping that serve to reduce or enhance their appearance-related distress (Park & Pinkus, 2009). Thus, the ways young people cope with appearance-related stressors could be a resource that mitigates against increasing anxiety and preoccupation with appearance. Some ways of coping that have been associated with lower levels of (or declines in) body dissatisfaction and appearance-related concerns include self-acceptance or self-compassion (Maxwell & Cole, 2012; Turk & Waller, 2020) and compensatory or positive thinking (Maxwell & Cole, 2012; Zimmer-Gembeck, Rudolph, & Gardner, 2022), Zimmer-Gembeck, Rudolph, & Pariz, 2022). In addition, there has been some (but limited) evidence that these ways of coping could protect against risks for appearance or body image concerns (Rodgers et al., 2018). Moreover, it is known that these positive responses do not always mean that negative ways of coping are avoided. In fact, some studies find that positive coping responses can correlate with the use of more negative responses, such as withdrawing and avoiding, ruminating, feeling helpless, or having a desire for appearance change (Zimmer-Gembeck, Rudolph, & Gardner, 2022). Thus, it has been useful in past research to use multiple methods to gather ways of coping and to profile coping as a composite of positive net of negative ways of coping. It is this profile that might be most relevant for mitigating against online appearance preoccupation or for protecting against the risks of online peer appearance teasing and appearance-RS for online appearance preoccupation.

2. Gender

Appearance concerns are closely tied to gender, making it important to consider both gender differences and moderation in a study of online appearance preoccupation. First, with regards to appearance and body dissatisfaction, there has been a long history of research identifying that girls and women as more objectified and valued for their bodies and appearance than are boys and men (Choukas-Bradley et al., 2022; Fredrickson & Roberts, 1997; Seekis et al., 2020; Veldhuis et al., 2020). Girls face an enormous pressure to conform to appearance ideals, they are more likely than boys to link their appearance to their value and worth, and they are more anxious and preoccupied with their appearance relative to boys (Bowker et al., 2013; Enander et al., 2018; Veale et al., 2014; Zimmer-Gembeck et al., 2021). Further, girls and women report more body and appearance dissatisfaction (Thompson et al., 1999; Thompson & Lougheed, 2012; Vincent & McCabe, 2000; Wertheim et al., 2009) than boys and men, and girls report more online appearance preoccupation than boys (Zimmer-Gembeck et al., 2021; 2023a).

Second, there are also gender differences in the online behavior of social media use that can bring with it the greatest risk for appearance concerns and preoccupation. Girls report more problematic social media use (i.e., preoccupation, mood modification, tolerance, withdrawal, unsuccessful attempts to limit use, and interpersonal conflict) than boys (Andreassen et al., 2016; Choukas-Bradley et al., 2022; Monacis et al., 2017). However, the jury is still out on this conclusion, given that some research has reported no significant difference between boys' and girls' problematic social media use (Boursier et al., 2020).

3. The current study

Online appearance preoccupation, including excessive social comparisons with others' appearance and concern about self-presentation, is a known correlate of poorer body image, disordered eating, appearance anxiety, and general symptoms of anxiety and depression. Despite knowing that appearance preoccupation is implicated in such negative self-perceptions and internalizing problems, we have not yet had available longitudinal data to identify who is most at risk for increases in online appearance preoccupation or, conversely, what factors might reduce risk for appearance social comparisons when online. We also

have not yet examined whether the factors that reduce risk may also protect against risk (risk × resource interactions) and have not isolated whether any of these associations are stronger among girls/young women relative to boys/young men.

The predictors of relevance in the present study were one social and one individual risk and one social and one individual resource. The two risk factors were online appearance teasing by peers and appearance-based sensitivity to rejection. The two positive resources were appearance neutral support and acceptance from important others, and ways of coping with appearance-related stressors. All four factors have been identified in theory, research literature or in interventions as important to address to reduce appearance anxiety, poor body image, and body dysmorphia. Thus, it was possible to test the unique role of each factor in the level of concurrent, as well as change in, online appearance preoccupation and it was hypothesized that the two risk factors would be associated increasing online appearance preoccupation across the time points (H1), whereas the two resources would be associated with decreases over time (H2).

We also explored whether appearance neutral support and acceptance by others and more use of positive ways of coping could protect against the negative impacts of appearance teasing and appearance-RS on online preoccupation, but we made no specific hypotheses. We asked the following two research questions: Does appearance neutral acceptance by important others reduce the negative association of appearance teasing and appearance-RS with online appearance preoccupation? Does the use of positive coping with appearance pressures reduce the negative association of appearance teasing and appearance-RS with online appearance preoccupation? At their core, the questions address whether positive social support and ways of coping can mitigate against the negative effect on appearance preoccupation of being teased about appearance by others or the negative effect of personal excessive concern about rejection because of appearance, concurrently or into the future.

Finally, gender differences and moderation of all main and interaction effects were tested. We hypothesized that girls/young women would be at more risk for online appearance preoccupation than boys/young men (H3) but did not make hypotheses regarding gender moderation. In all analyses we controlled for the intensity of social media use, given that use can vary and could be associated with online appearance preoccupation.

4. Method

4.1. Participants

Participants were 752 Australian adolescents and emerging adults (14–21 years; $M = 17.8$ years, $SD = 1.8$ years; 41% young men, 59% young women) attending secondary school ($n = 268$, 14–17 years ($M = 15.8$, $SD = 0.9$, 49% young men, 51% young women) or university ($n = 484$, 16–21 years, $M = 18.9$, $SD = 0.9$, 36% young men, 64% young women). Secondary school students reported their sociocultural background as 80% White, with others identifying as Asian (15%), Australian First Peoples/Torres Strait Islander/Pacific Islander (<1%), or a diverse range of other backgrounds (5%). University students were asked to endorse as many options as applied, with most (84%) reporting White, 12% instead or in addition reporting Asian, 3% reporting Australian First Peoples/Torres Strait Islander/Pacific Islander, and 9% describing a diverse range of other backgrounds. Participants' body mass index (BMI) average was 21.9 ($SD = 4.0$), which was significantly higher in the university students ($M = 22.9$, $SD = 4.20$) than in the high school students ($M = 20.25$, $SD = 2.94$), $t(751) = -9.01$, $p < 0.001$. Age and BMI were positively correlated, $r = 0.28$, $p < 0.001$, but BMI did not differ between young men and young women, $t(751) = 1.44$, $p = 0.151$. Overall, the full available number of participants was 802. However, to focus on participants aged 14–21 years, 12 participants who were under age 14, and 17 over age 21 (at T1 of this study) were not included. In addition, we removed 21 participants who missed all T1 items for the measures included in this study.

4.2. Procedure

Approval for this study was obtained from the Griffith University Human Research Ethics Committee (Protocol #2013/13). The sample included secondary (i.e., high) school and young university students. Within the region of Australia where this study was conducted, primary schools include students from grades 1 to 6 and secondary schools include students from grades 7 to 12. Secondary school participants had been involved in a previous study of 393 students in Grades 5 to 7 from three Australian primary schools. In this previous study, parents had provided consent for recontact regarding participation in future research. We attempted to contact the 353 families that gave consent for recontact (four years after the students had first participated). In total, 289 parents (82%) consented to their children's participation, and 276 secondary school students completed at least some of the T1 survey. Students from two schools completed the T1 45-min survey online. One school opted to have T1 surveys completed during school time under research assistant supervision. The T2 surveys were completed online. Each secondary school participant received a $20 gift card at both T1 and T2.

University student participants were invited to participate in person during orientation week (the week before the start of the first term of classes) and the first week of classes. At T1, these students completed a paper survey under the supervision of a research assistant, receiving a chocolate bar or muffin for their time. Some university student participants were recruited through a first-year psychology research participation program. These students were supplied with a link to complete the T1 survey online, receiving partial course credit (0.5%) for participation. All T2 surveys were completed online, and each participant received a $20 gift voucher. Any differences between high school and university student participants are described in the Results section.

5. Measures

5.1. T1 and T2 online appearance preoccupation

At T1 and T2, five items measured appearance preoccupation when online (e.g., "How I feel about my body and appearance is influenced by other people's social media pictures"; Hawes et al., 2020). Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). A total score was calculated by averaging the items, Cronbach's α = 0.93 at T1 and 0.92 at T2.

5.2. T1 perceived online peer appearance teasing

One item with two parts was used to measure online appearance teasing, "In the past year, how often have you been teased about the way you look on social media?" with the two parts asking students to rate the frequency they were teased by same-gender peers and by other-gender peers (1 = *never*, 5 = *very often*). The responses were strongly correlated, $r = 0.61$, $p < 0.001$, so were averaged to form a total score, with higher scores indicating more frequent appearance teasing by peers. This measure has been validated in multiple past studies, showing it to be a significant concurrent and prospective correlate of appearance-RS, body image concerns, and appearance anxiety symptoms (e.g., Webb et al., 2017).

5.3. T1 appearance rejection sensitivity (Appearance-RS)

To measure appearance-RS, participants read 10 hypothetical scenarios portraying events that involve the possibility of rejection (Webb et al., 2017; e.g., "You are leaving your house to go to school/university when you notice a big pimple on your face"). Participants indicated their

concern/anxiety about being rejected based on appearance (e.g., "How concerned or anxious would you feel that others would think you were less attractive because of the way you look?") on a scale from 1 (*not concerned or anxious*) to 6 (*very concerned*). Their expectation of appearance-based rejection was also measured (e.g., "Do you think that other people would find you unattractive?") on a scale from 1 (*No*) to 6 (*Yes*). Appearance-RS was calculated by multiplying the degree of anxious concern with the degree of rejection expectation for each scenario, creating ten cross-product scores, and averaging these scores. A higher appearance-RS score indicates greater sensitivity to rejection due to appearance concerns, Cronbach's α for the 10 cross-product items was 0.92.

5.4. Appearance neutral acceptance

Four items were developed for this study to measure support for appearance neutral support and acceptance by important others (see Appendix 1). To develop the items, we considered past research on support for agency and autonomy (e.g., Soenens et al., 2017), as well as the emerging literature on body positivity and neutrality (e.g., Pellizzer & Wade, 2023; e.g., "Important people in my life help me to see that there are more important things than how I look"). Item response options ranged from 1 (*never or very rarely true*) to 5 (*very often or always true*). An exploratory factor analysis (principal axis factoring) supported one factor with an eigenvalue of 3.0, accounting for 74.6% of the variance in the items. The factor loadings of the four items were high, ranging from 0.76 to 0.87. Responses were averaged to form a total score, with higher scores indicating greater appearance neutral acceptance, Cronbach's α = 0.88.

5.5. T1 coping with appearance pressures

Two methods were used to measure multiple ways of coping with appearance-related pressures. First, items from the Adolescent Responses to Body Dissatisfaction (ARBD; Maxwell & Cole, 2012) was used to measure self-acceptance (4 items; e.g., "Say to yourself or think 'I am perfect the way I am'", Cronbach's α = 0.86) and compensatory thinking (4 items; e.g., "Try to get it off your mind by doing something else", Cronbach's α = 0.89). Items were averaged to produce composite scores. Second, an analog procedure based on the Reactions to Implied Rejection Scale for Children and Adolescents (Zimmer-Gembeck & Nesdale, 2013) was used that involved presenting two vignettes portraying events that place the focus on appearance comments and similar pressures. Two scenarios were presented:

1. You receive a message sent to you and a number of your friends. The message continues a discussion about how you and your friends look. Worse, you read that the others have been teasing you about your looks. How would you feel? Would you –
2. You hear that someone you know is throwing a big birthday party on the beach. Most of your group of friends expect to go. You hear that some of your friends are worried about how you would look in your beach togs (i.e., swimsuit, bathers). How would you feel? Would you –

After imagining themselves in the situation, participants completed items to measure six anticipated ways of coping including positive thinking (1 item per scenario; "Try to think positive thoughts about my appearance"), support seeking (1 item per scenario; "Talk about it or how you were feeling with someone close to you [e.g., friend, parent]"), social withdrawal (3 items per scenario, e.g., "Think of ways to avoid seeing people"), rumination (1 item per scenario; "Keep thinking and worrying about the situation"), helplessness ("Feel helpless and not know what to do"), and desiring appearance change (1 item per scenario, "Spend time considering how to change your appearance"). Item response options ranged from 1 (*not at all*) to 5 (*very much*). To create

composite scores, items on each subscale were averaged within each scenario, when needed, and then averaged across the two scenarios.

Both measures have been validated and their factor structures have been supported in previous research (Maxwell & Cole, 2012; Zimmer-Gembeck, Rudolph, & Gardner, 2022). To form a score for *positive coping*, scores from the two subscales of the ARBD (self-acceptance and compensatory thinking) and scores for positive thinking and social support seeking from the vignette procedure were averaged. To form a score for *negative coping*, the four scores for social withdrawal, rumination, helplessness, and desire for appearance change from the vignette responses were averaged. To produce a final score that combined both positive and negative ways of coping for the analysis, we considered the many procedures that have been used to combine different coping subscales into aggregate scores, such as using relative scores, ratios or proportions of positive to negative ways of coping. These procedures are often applied because it helps to disentangle stress experienced or stress reactivity from the level of coping, whereby higher objective stress and greater stress reactivity are positively related to more coping of every kind – both positive and negative (Raine et al., 2023; Zimmer-Gembeck et al., 2013, 2023c). Drawing from this, we used an ipsative procedure to consolidate the multiple ways of coping measured here. Thus, a composite score was formed as the balance of positive to negative ways of coping (i.e., positive coping – negative coping), with a higher score indicating favoring adaptive over maladaptive ways of coping.

5.6. T1 and T2 intensity of social media use

Three items from the Facebook Intensity Scale (Ellison et al., 2007) measured emotional connectedness and the integration of social media use into daily life after modifying the items to refer to all forms of social media (rather than only Facebook; e.g., "Using social media is part of my everyday activity"). This measure was included to control for level of social media use when examining associations of risks and resources with online appearance preoccupation. Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*) and items were averaged to form an intensity score at T1 and T2, with Cronbach's α = 0.87 and 0.88, respectively.

6. BMI

Participants reported their weight in kilograms and their height in centimeters.

6.1. Overview of the data analyses

Prior to addressing the main study aims, hypotheses and research questions, data were examined for missing values and whether data were missing completely or random. Further, the distributions of variables were investigated whereby the participants who were retained at T2 were compared to those not retained at T2 on all T1 primary measures, and gender, school level, age, and BMI using independent *t*-tests and χ^2-tests. ANOVA was used to compare mean levels of each variable by school status (secondary school/university), gender, and the school status × gender interaction, and correlations between all measures were estimated.

Primary analyses included estimating zero-order correlations between all variables, and fitting regression models. Two primary hierarchical regression models were estimated. The first model regressed T1 online appearance preoccupation on all T1 risks and resources to test *concurrent* associations. The second model regressed T2 online appearance preoccupation on all T1 risks and resources, as well as T1 online appearance preoccupation to test *prospective* associations. Each model involved three steps. Control variables were entered in Step 1 (age, gender, BMI, intensity of social media use, and [for the longitudinal model] T1 online appearance preoccupation). The two risks (T1 online peer appearance teasing and T1 appearance-RS) were entered in Step 2.

The two resources (T1 appearance neutral acceptance by important others and T1 positive coping) were entered in Step 3. Model diagnostics conducted while testing these regression models showed no violations to the assumptions of homoscedasticity, normality, or linearity.

The PROCESS macro for SPSS (Hayes, 2013) was used to test 2-way interactions of gender with each risk and resource (four interactions total), and 3-way interactions of gender with a risk and a resource (four interactions total). PROCESS automatically centers all continuously scored measures to reduce multicollinearity between the independent variables and the interaction terms. Significant interaction effects were then plotted using simple slopes analyses generated by using plus or minus one standard deviation above and below the mean, respectively.

6.2. Transparency and openness

This study was not preregistered, but it had been proposed in the grant funding application for this work. All data analysis code and research materials are available from the first author upon reasonable request. All data analyses were conducted with SPSS v.29 and all data exclusions, and all measures and manipulations of data, are reported in this manuscript.

7. Results

7.1. Missing data and multiple imputation

Of the 752 participants with T1 data, 12 participants (1.5%) were missing 1, 2, or 3 items on the T1 survey. Little's MCAR test was not significant for T1 data, $\chi^2(199) = 177.44$, $p = 0.862$, supporting the conclusion that T1 data were missing completely at random at T1. At T2, 196 participants were not retained (25 high school and 171 university students). When these T2 missing data were considered, Little's MCAR test was significant, $\chi^2(384) = 446.22$, $p = 0.015$. Independent groups t-tests were used to compare participants retained at T2 to other participants on all key T1 measures, BMI, and age. In addition, χ^2 tests were used to compare the gender and school level (high school vs. university) distribution between the two groups. There were two significant differences across these nine comparisons; these were for age and school status. Both findings indicated that younger participants were more likely to be retained than older participants. The mean age of participants retained at T1 was 17.5 years (SD = 1.75 years) and was slightly older at was 18.6 years (SD = 1.45 years) for those not retained at T2, $t(750) = 7.95$, p < 0.001. Consistent with the age difference, 91% ($n = 243$) of high school participants completed T2, but 65% ($n = 313$) of university students completed T2, $\chi^2 = 60.52$, $p < 0.001$. Thus, we used multiple imputation to impute T2 data to maintain all 752 T1 participants in both the cross-sectional and the longitudinal analyses. We imputed 20 datasets and report the pooled results, either those available within SPSS or by averaging results across the 20 datasets. For transparency, we also present the longitudinal results including the subset of participants who participated at both T1 and T2. The results with imputed as compared to the results with completed data showed no substantive differences (see supplemental Table).

7.2. Student school level, gender, and age

We applied 2 × 2 (student grouping × gender) ANOVAs to compare high school and university students (to determine whether this should be included as a covariate in the multivariate models) and to test differences between young men and young women. In addition, we also examined associations of age and BMI with all measures. As can be seen in Table 1, there were no significant interaction effects (student status × gender) or main effects of student grouping (i.e., high school versus university) on any measure. In contrast, most measures differed between young men and women – the one exception to this pattern was for online appearance teasing. Young women, relative to young men, reported more T1 and T2 online appearance preoccupation, appearance-RS, intensity of social media use, and appearance neutral acceptance, and less positive/adaptive coping with appearance concerns. For age, older adolescents were higher in T1 (but not T2) online appearance preoccupation, appearance-RS, and BMI. Youth with a higher BMI were higher in T1 and T2 online appearance preoccupation, appearance-RS, and appearance teasing, as well as lower in positive coping and less appearance neutral acceptance.

7.3. Descriptive statistics and correlations between all measures

Correlations between all measures (as well as all means and standard deviations) are reported in Table 2. There was significant stability in online appearance preoccupation from T1 to T2, and online appearance preoccupation was positively correlated with intensity of social media use and significantly correlated with all four social and personal risk and resource factors in the expected directionsm with one exception. The one exception was a nonsignificant association of T2 online appearance preoccupation with appearance neutral acceptance.

7.4. Concurrent associations

The results of the concurrent model linking the two risk and two resource factors to T1 online appearance preoccupation are presented in Table 3. Overall, the full model accounted for 58% of the variance in online appearance preoccupation. In Step 1, gender, BMI, and T1 intensity of social media use (but not age) were each significantly associated with online appearance preoccupation. Girls, individuals with a higher BMI, and those who reported more emotional connectedness to social media reported greater online appearance preoccupation (all p's < 0.001). Thus, H3 was supported, with young women higher in online appearance preoccupation than young men.

Table 1
Comparisons of all measures by student status and gender ($N = 752$).

	Secondary School				University				Student Status Effect			Gender Effect		
	Boys (n = 130)		Girls (n = 138)		Young men (n = 175)		Young women (n = 309)							
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F(1,748)*	*p*	*Eta²*	*F(1,748)*	*p*	*Eta²*
Online app preocc	2.13	1.27	3.41	1.67	2.52	1.53	3.64	1.78	6.08	0.014	0.01	90.32	<0.001	0.11
T2 Online app preocc	2.35	1.24	3.64	1.68	2.71	1.68	3.62	1.80	1.76	0.203	0.00	72.85	<0.001	0.09
Appearance-RS	8.23	6.52	12.56	7.63	9.46	6.60	13.32	8.56	2.88	0.090	0.00	48.22	<0.001	0.06
Peer app teasing	4.83	4.88	5.73	6.74	5.86	7.85	6.81	8.22	3.40	0.066	0.01	2.64	0.104	0.00
Positive app coping	0.17	0.95	−0.13	1.22	0.27	0.94	−0.06	1.20	1.12	0.290	0.00	13.44	<0.001	0.02
App neutral acceptance	3.88	0.99	4.11	0.81	3.84	0.95	4.16	0.89	0.00	0.974	0.00	15.74	<0.001	0.02
T1 SM intensity use	3.10	1.12	3.72	1.03	3.24	1.10	3.81	0.97	2.25	0.134	0.00	54.86	<0.001	0.07
T2 SM intensity use	3.17	1.02	3.62	1.00	3.15	1.15	3.61	0.96	0.45	0.502	0.00	32.00	<0.001	0.06

Note. Interactions (school level x gender) were not significant, *F* ranged from 0.00 to 2.22, *p* ranged from 0.160 to 0.961. All measures are from T1 except for those indicated with T2. App = appearance. Preocc = preoccupation. RS = rejection sensitivity. SM = social media.

Table 2

Means and standard deviation of all measures, and correlations between measures ($N = 752$).

	Measures	1	2	3	4	5	6	7	8	9
1	Online app preoccupation									
2	T2 Online app preoccupation	0.60***								
3	Appearance-RS	0.71***	0.51***							
4	Peer app teasing	0.34***	0.25***	0.40***						
5	Positive app coping	−0.54**	−0.43***	−0.60***	−0.28***					
6	App neutral acceptance	−0.11**	−0.07	−0.11**	−0.11**	0.30***				
7	T1 SM intensity use	0.35***	0.30***	0.30***	0.09*	−0.18***	0.00			
8	T2 SM intensity use	0.23***	0.35***	0.19***	0.02	−0.09*	0.06	0.60***		
9	Body mass index	0.15***	0.10*	0.18***	0.10**	−0.09*	−0.09*	0.01	−0.03	
10	Age	0.12***	0.07	0.09*	0.05	−0.02	0.00	0.09*	0.02	0.29***
	Mean	3.08	3.19	11.40	6.04	0.05	4.03	3.54	3.43	21.94
	SD	1.74	1.75	7.90	7.40	1.11	0.90	1.08	1.04	4.00

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Note. All measures are from T1 except for those indicated with T2. App = appearance. RS = rejection sensitivity. SM = social media.

Table 3

Results of regressing T1 online appearance preoccupation on concurrent social and individual risk and resource factors, controlling for demographic characteristics, body mass index, and intensity of social media use (support = 752).

Independent variables	B	SE (B)	β	p	95% CI L	95% CI U
Step 1						
Age	0.03	0.03	0.03	0.314	−0.03	0.10
Gender (1 = YM, 2 = YW)	0.97	0.12	0.28	<0.001	0.74	1.21
Body mass index	0.07	0.01	0.16	<0.001	0.04	0.10
SM intensity of use	0.43	0.05	0.27	<0.001	0.32	0.53
Step 2						
Age	0.03	0.03	0.03	0.246	−0.02	0.08
Gender (1 = YM, 2 = YW)	0.53	0.09	0.15	<0.001	0.35	0.71
Body mass index	0.02	0.01	0.04	0.174	−0.01	0.04
SM intensity of use	0.19	0.04	0.12	<0.001	0.11	0.27
Peer appearance teasing	0.02	0.01	0.07	0.007	0.00	0.03
Appearance-RS	0.13	0.01	0.60	<0.001	0.12	0.14
Step 3						
Age	0.04	0.02	0.04	0.144	−0.01	0.09
Gender (1 = YM, 2 = YW)	0.55	0.09	0.16	<0.001	0.37	0.73
Body mass index	0.02	0.01	0.04	0.157	−0.01	0.04
SM intensity of use	0.19	0.04	0.12	<0.001	0.11	0.27
Peer appearance teasing	0.01	0.01	0.06	0.017	0.00	0.03
Appearance-RS	0.11	0.01	0.50	<0.001	0.10	0.12
App neutral acceptance	−0.03	0.05	−0.02	0.523	−0.13	0.07
Positive appearance coping	−0.27	0.05	−0.18	<0.001	−0.37	−0.18

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Note. Step 1 $\Delta R^2 = 0.22$, $\Delta F(4,747) = 51.16$, $p < 0.001$, Step 2 $\Delta R^2 = 0.34$, $\Delta F(2,745) = 286.70$, $p < 0.001$, Step 3 $\Delta R^2 = 0.02$, $\Delta F(2,743) = 18.71$, $p < 0.001$, Full model $R^2 = 0.58$, $F(8,743) = 127.05$, $p < 0.001$. SM = social media. app = appearance. RS = rejection sensitivity. CI = confidence interval. L = Lower. U = Upper. YM = young men. YW = young women.

In Step 2, the addition of risk factors of peer online appearance-related teasing and appearance-RS explained an additional significant 34% of the variance in online appearance preoccupation. As expected, and supporting H1, both risk factors contributed to significantly greater online appearance preoccupation, especially appearance-based sensitivity to rejection; adolescents and emerging adults who reported more frequent online appearance teasing and higher appearance-RS were higher in online appearance preoccupation.

In Step 3, positive coping with appearance pressures (but not appearance neutral acceptance) was significantly associated with a lower level of online appearance preoccupation, partially supporting

H2. Step 3 accounted for an additional 2% of the variance in online appearance preoccupation, and once all factors were included in the model, BMI was no longer significantly associated with online appearance preoccupation. Thus, after Step 3, two covariates (gender, $p < 0.001$; intensity of SM use, $p < 0.001$) and two risk factors (online appearance teasing, $p = 0.017$; appearance-RS, $p < 0.001$) had unique concurrent associations with a higher level of online appearance preoccupation, whereas one resource factor (positive coping, $p < 0.001$) was uniquely associated with a lower level of online appearance preoccupation. Although we examined whether appearance neutral acceptance from important others and more positive ways of coping could protect against the negative impacts of appearance-related teasing and appearance-RS on online appearance preoccupation, no risk × resource factor interaction was significant (teasing × appearance neutral acceptance $p = 0.918$, appearance-RS × appearance neutral acceptance $p = 0.556$, teasing × coping $p = 0.841$, appearance-RS × coping $p = 0.276$). Interaction terms were removed from the model shown in Table 3 for parsimony.

When 2-way interactions of risks or resources with gender (e.g., peer teasing × gender) were tested, one of the four interactions was significant. The association of peer appearance teasing with online appearance preoccupation was moderated by gender, $B = -0.029$, $p = 0.021$, with the association stronger among young men than young women (see Fig. 1). The other three tested moderation effects were not significant, appearance-RS × gender, $B = 0.00$, $p = 0.936$; appearance neutral acceptance × gender, $B = 0.04$, $p = 0.669$; coping × gender, $B = 0.00$, $p = 0.961$.

Three-way interactions were also tested to examine if the protective effect of the resources differed for young men and young women. No 3-way interaction was significant, appearance neutral acceptance × appearance-RS × gender, $B = 0.01$, $p = 0.527$; appearance neutral acceptance × peer teasing × gender, $B = -0.01$, $p = 0.493$; coping × appearance-RS × gender, $B = 0.00$, $p = 0.907$; coping × peer teasing ×
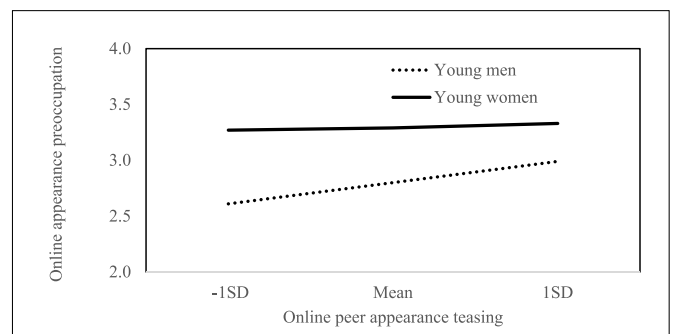

Fig. 1. Illustration of the gender moderated association of T1 online peer appearance teasing with T1 online appearance preoccupation ($N = 752$).

gender, $B = -0.03$, $p = 0.179$.

7.5. Longitudinal associations

The results of the longitudinal model of the two T1 risk and two T1 resource factors as associated with T2 online appearance preoccupation (adjusting for T1 online appearance preoccupation, age, gender, BMI, and intensity of social media use) are presented in Table 4. Overall, a significant 44% of the variance in T2 online appearance preoccupation was explained.

At each step of the longitudinal model, young women increased more in online appearance preoccupation from T1 to T2 relative to young men, supporting H3. Also, youth who reported more intense social media use increased more in online appearance preoccupation. At Step 2 of the model and partially supporting H1, T1 appearance-RS was associated with a greater increase in online appearance preoccupation from T1 to T2. At Step 3, partially supporting H2, youth who reported more T1 positive coping with appearance pressures showed less increase in appearance preoccupation from T1 to T2, suggesting the benefits of strategies such as using more self-acceptance, compensatory thinking,

Table 4
Results of regressing T2 online appearance preoccupation on social and individual risk and resource factors measured one year earlier, controlling for demographic characteristics, body mass index, and T2 intensity of social media use (N = 752).

Independent variables	B	SE (B)	β	p	95% CI L	95% CI U
Step 1						
T1 Age	−0.01	0.03	−0.01	0.736	−0.07	0.05
T1 Gender (1 = YM, 2 = YW)	0.28	0.12	0.08	0.018	0.05	0.51
T1 Body mass index	0.02	0.02	0.04	0.296	−0.01	0.05
T1 Online app preoccupation	0.53	0.04	0.52	<0.001	0.46	0.60
T2 SM intensity of use	0.35	0.06	0.21	<0.001	0.24	0.46
Step 2						
T1 Age	−0.01	0.03	−0.01	0.779	−0.07	0.05
T1 Gender (1 = YM, 2 = YW)	0.28	0.12	0.08	0.018	0.05	0.50
T1 Body mass index	0.01	0.02	0.02	0.495	−0.02	0.04
T1 Online app preoccupation	0.42	0.05	0.42	<0.001	0.32	0.52
T2 SM intensity of use	0.35	0.05	0.21	<0.001	0.24	0.46
T1 Peer appearance teasing	0.01	0.01	0.05	0.255	−0.01	0.03
T1 Appearance-RS	0.03	0.01	0.13	0.010	0.01	0.05
Step 3						
T1 Age	0.00	0.03	0.00	0.936	−0.06	0.06
T1 Gender (1 = YM, 2 = YW)	0.30	0.12	0.08	0.011	0.07	0.53
T1 Body mass index	0.01	0.02	0.03	0.437	−0.02	0.04
T1 Online app preoccupation	0.38	0.05	0.38	<0.001	0.29	0.48
T2 SM intensity of use	0.36	0.05	0.22	<0.001	0.25	0.47
T1 Peer appearance teasing	0.01	0.01	0.04	0.297	−0.01	0.03
T1 Appearance-RS	0.02	0.01	0.07	0.169	−0.01	0.04
T1 App neutral acceptance	0.01	0.07	0.01	0.876	−0.12	0.14
T1 Positive appearance coping	−0.22	0.07	−0.14	0.001	−0.35	−0.09

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Note. Step 1 $\Delta R^2 = 0.42$, $\Delta F(5,746) = 106.59$, $p < 0.001$, $\Delta R^2 = 0.01$, $\Delta F(2,744) = 8.40$, $p = 0.004$, $\Delta R^2 = 0.01$, $\Delta F(2,742) = 8.11$, $p = 0.006$, Full model $R^2 = 0.44$, $F(9,742) = 65.25$, $p < 0.001$. SM = social media. app = appearance. RS = rejection sensitivity. CI = confidence interval. L = Lower. U = Upper. YM = young men. YW = young women.

positive thinking, and social support seeking relative to negative ways of coping. Moreover, at Step 3, appearance-RS was no longer significantly associated with T2 online appearance preoccupation. Thus, after Step 3, two covariates (gender, $p = 0.011$; intensity of SM use, $p < 0.001$) were uniquely associated with more online appearance preoccupation over time, and one positive resource factor (positive coping, $p = 0.001$) was uniquely associated with less online appearance preoccupation over time. Furthermore, as found in the concurrent model, no risk × resource factor interactions were significant (teasing × appearance neutral acceptance $p = 0.512$, appearance-RS × appearance neutral acceptance $p = 0.719$, teasing × coping $p = 0.471$, appearance-RS × coping $p = 0.728$). Interaction terms were removed from the model shown in Table 4 for parsimony.

When 2-way interactions of risks or resources with gender (e.g., peer teasing × gender) were tested, no interaction was significant, peer appearance teasing × gender, $B = 0.00$, $p = 0.668$; appearance-RS × gender, $B = 0.00$, $p = 0.115$; appearance neutral acceptance × gender, $B = 0.00$, $p = 0.189$; coping × gender, $B = 0.00$, $p = 0.560$.

Three-way interactions were also tested to examine if the protective effect of the resources differed for young men and women. No 3-way interaction was significant, appearance neutral acceptance × appearance-RS × gender, $B = -0.01$, $p = 0.464$; appearance neutral acceptance × peer teasing × gender, $B = -0.01$, $p = 0.724$; coping × appearance-RS × gender, $B = -0.01$, $p = 0.829$; coping × peer teasing × gender, $B = 0.01$, $p = 0.613$.

8. Discussion

Researchers have described how appearance pressures witnessed or transmitted via social media can lead to the onset or escalation of mental health and eating disturbances for children and youth (e.g., Fardouly et al., 2020; Hawes et al., 2020; Maheux et al., 2022; Nesi et al., 2018; Tylka et al., 2023). Thus, there is strong evidence that using social media as a tool to understand, compare, find ways to improve, or display personal appearance identifies individuals at more risk of a range of emotional, social, and body-related mental health problems. Yet, there has been little investigation of the foundational risks or resources, which could be amendable to early intervention, that might help explain later online appearance preoccupation. To address this, the present study was the first to investigate social and individual risks and resources expected to explain change in online appearance preoccupation across one year among youth (aged 14–21 years at T1). We investigated the social risk of online peer teasing about appearance, the individual risk of appearance-based rejection sensitivity (appearance-RS), the social resource of appearance neutral acceptance, and the individual resource of more positive ways of coping with appearance-related stress. Although the two risks and two resources were concurrently associated with online appearance preoccupation in the expected directions at a bivariate level, the findings suggest that it is primarily the individual risk (appearance-RS) and resource (positive coping) that are associated with increases or decreases in youth's online appearance preoccupation over time. Surprisingly, however, none of the interaction terms between risks and resources were significant, suggesting that the factors that were expected to reduce appearance preoccupation risk (coping and appearance neutral acceptance from important others) are not necessarily protective in this way. Furthermore, girls and those who reported higher intensity social media use were at more risk for concurrent online appearance preoccupation and increases in preoccupation over one year.

8.1. Significant correlates of online appearance preoccupation

We quantified associations of risks and resources with both concurrent and later online appearance preoccupation. Overall, preoccupation was best predicted by the risk factor appearance-RS, with ways of coping with appearance-related stress also identified as a resource related to a

decline in appearance occupation. These findings support past research that has isolated a bias towards expecting more social rejection and judgement about appearance as particularly problematic for body image disturbance and appearance-related concerns or disorders (Anson et al., 2012; Bowker et al., 2013; Densham et al., 2017; Kelly et al., 2014). These beliefs also have a unique impact on increases in online appearance preoccupation, standing out even when considered alongside social experiences of peer teasing about appearance. Such findings, along with previous research (Butler et al., 2007; Clark & Tiggemann, 2008; Webb et al., 2017) and influential models of body image and disordered eating (Thompson et al., 1999; Thompson & Smolak, 2001), support a developmental model, whereby social experiences are very relevant to the development of appearance-and body-related concerns and disorders, but the biases and beliefs that develop through these social interactions create a lasting legacy that becomes the more proximal and salient influence on future appearance-related concerns and preoccupations.

There was also positive news from this study. Youth can offset some appearance preoccupation if they can call upon more positive (and fewer negative) ways of coping with appearance-related stressors. We specifically found that adolescents who anticipated coping with appearance stressors in a way that was tipped more towards self-acceptance and positive thinking (and support seeking) and less towards rumination about appearance and desire to change appearance were lower in online appearance preoccupation and showed a greater decline in appearance preoccupation over time. We expect this operationalization of positive coping with appearance-related stress tapped cognitive activities related to kind feelings and compassion for the self, confirming past research findings of the benefits of self-acceptance and self-compassion for mitigating against body image and appearance-related disorders (Braun et al., 2016; Kelly & Stephen, 2016; Seekis et al., 2017).

Despite the encouraging findings for coping as a resource helping to reduce online appearance preoccupation and the coherence of these findings with past research on self-acceptance and self-compassion, it is relevant to note that the approach to coping in the present study differed in two ways from most previous research. First, coping was measured specific to ways of responding to appearance-related stress using an analog method to present the same appearance-relevant stressful events to all participants, whereas self-compassion inventories are designed to capture the general use of self-kindness and positive self-talk, usually making no reference to stressors or domain. Asking about specific ways of coping with appearance stressors *and* more general self-compassion, self-acceptance, and self-judgement could be a topic for future research to identify how they co-occur and whether they have unique roles in appearance-related disorders and dissatisfaction.

Second, positive coping was determined as the balance of positive to negative ways of coping, given past research that positive and negative ways of coping can be positively associated (e.g., Raine et al., 2023; Zimmer-Gembeck et al., 2013, 2023c) and the balance of positive to negative ways of coping is one accurate way to represent an overall profile of coping with stress (e.g., see details in Raine et al., 2023). By taking this approach, the findings highlight the need to not only practice self-acceptance and positive self-talk but also to find strategies to reduce rumination about perceived appearance flaws or improvements. Together, this suggests a capacity for cognitive restructuring and for self-compassion are beneficial together when faced with appearance-related stressors. In addition, such ways of coping with appearance-related stress could also naturally improve with age. As adolescents get older, many should show advances in understanding of complex cognitive strategies to use to cope with stress (Skinner & Zimmer-Gembeck, 2016). These developments, tied to cognitive and emotional maturity, possibly aided by practice with coping and changes in peer relationships and shifting priorities (e.g., from school to work, or to parenting), could yield some reduction in appearance preoccupation into the future.

8.2. Age, gender, and intensity of social media use

Three additional covariates – age, youth's gender, and reported intensity of social media use – were considered in all multivariate analyses. Two of these, gender and intensity of social media use, provide strong evidence of the risk for girls/young women and those who are more intense social media users for elevated online appearance preoccupation, and increasing preoccupation over time. These findings support a long history of research studies on appearance and body image concerns that have placed girls and women at higher risk relative to boys and men (Fredrickson & Roberts, 1997; Vincent & McCabe, 2000; Wertheim et al., 2009). The present findings also support studies that have reported links between frequency of social media use and emotional connectedness to social media, and poorer mental health (e. g., Mérelle et al., 2017; Twenge et al., 2018), including appearance-related outcomes such as appearance self-consciousness (Wang et al., 2020).

The lack of associations of age with online appearance preoccupation in the multivariate models raises the question of age-related patterns and development of appearance-related pressures and concerns. We are generally hesitant to conclude that age does not matter even within the adolescent years, because much more research is needed before drawing this conclusion. For example, age effects could be gender-specific or interact with pubertal development or other markers of maturation. Moreover, some risks (and resources) might have more impact at some ages than others, suggesting the need to conduct research specifically focused on testing age (or other markers of maturation) with gender and with risk factors or resource factors. In addition, appearance concerns might have different implications for relationships or personal adjustment and mental health dependent on age or maturation level.

Finally, we found one association that differed between young women and men. Young men were particularly at risk for reporting online appearance preoccupation (concurrently) if they experienced more online appearance-related teasing, relative to young women. One possibility relates back to the anticipated developmental pattern described earlier, whereby experiences leave a legacy of biases and expectations that become the more proximal links to online appearance preoccupation. It could be that this developmental pathway is slightly delayed in young men relative to young women. Thus, in adolescence and emerging adulthood, the impact of experienced peer teasing about appearance is having more impact on young men than young women.

8.3. Appearance neutral acceptance and lack of protective effects

In the current study, two of the expected findings were not substantiated. First, we proposed that appearance neutral acceptance would be a resource that would deflect youth from online appearance preoccupation. Yet, we only found very small zero-order correlations of appearance neutral acceptance with online appearance preoccupation, and we did not find significant associations once accounting for covariates and other risks and resources. Acceptance and support from others could still be beneficial, especially given that social support for appearance stressors was included in the measure of positive coping. However, the measure of appearance neutral acceptance was new and might need improvements in future research. Also, it is possible that appearance neutral acceptance could play a beneficial role in another way; for example, perceived more appearance neutral acceptance by important others might be related to accessing a greater variety of content online that could deflect from the negative impact of online appearance preoccupation on mental health (e.g., depression or social anxiety) or social outcomes (e.g., social isolation or relationship difficulties). Future research could add on to this study by examining socioemotional problems that have been found to be elevated among those who report more online appearance preoccupation (Hawes et al., 2020). It may be that the resources measured here could protect against the negative impact of online appearance preoccupation *on* general

emotional and social problems.

8.4. Strengths, limitations, and future directions

Despite the strengths of this study including the longitudinal study design, solid sample size and the reliance on measures that have been shown to be valid in past research, there are some limitations of this study to describe, with most due to study design. First, two waves of data over one year are rather limiting for drawing conclusions about risks and resources associated with developmental changes in online appearance preoccupation. Thus, analyses should be interpreted as identifying associations of risks and resources with T2 online appearance preoccupation after adjusting for T1 online appearance preoccupation. Second, pre-existing body and appearance concerns can also be foundations for later individual biases and social relationships. Thus, future research could examine bidirectional interrelations over time. Third, we focused on two risks and two resources that we identified as very relevant to online appearance preoccupation that are modifiable, but there are additional risks and resources that could also be important to add on in future research, such as biological and personality traits, other aspects of peer relationships, and parent-youth relationship qualities. Finally, the study was conducted in Australia in an area of the country with high body consciousness (i.e., a beach and surf culture), and – although the substantive findings did not differ when analyzed only including those with complete T1 and T2 data – there were age differences in retention of participants between T1 and T2 whereby younger participants were more likely to be retained than older participants. Thus, despite having participants with diverse background by socioeconomic status, age, and race/ethnicity representative of the region, generalizability may be limited.

8.5. Practical implications of the findings

The findings suggest prevention and intervention programs and social media literacy activities should continue to implement strategies to build personal cognitive skills that aid more adaptive coping with the stress within online interactions. Although it increasingly seems like a very simple recommendation to address a complicated social issue, the findings also suggest that intervention to reduce connections to social media, such as implementing boundaries around social media use and supporting adolescents to understand how they can control their own engagement with social media, will likely have positive downstream effects on appearance preoccupation and, possibly, associated mental health problems. In addition, the findings suggest that it is very important to implement support programs to build skills in self-compassion, cognitive restructuring, and other ways of coping, while also providing youth will opportunities for positive interactions offline that solidify quality and accepting social relationships in offline spaces, especially those that can shield against sensitivity to rejection by others due to appearance or for other reasons.

9. Conclusion

We examined the social risk of online appearance teasing by peers and the individual risk of appearance-based sensitivity to rejection for online appearance preoccupation. We also examined two resources that could reduce online appearance preoccupation, including the social resource of appearance neutral support and acceptance from important others, and the individual resource of positive ways of coping with

appearance-related stressors as factors. We investigated risk and resources, plus gender and intensity of social media use, as related to concurrent appearance preoccupation and changes in preoccupation over time. Adding to the past evidence of the importance of social influences in the development of internalized appearance ideals and expectations (Thompson et al., 1999; Webb et al., 2014), we found that individual level risks and resources were identified in the current study as particularly salient predictors of youth's online appearance preoccupation. The most pertinent risk or resource factor of note was positive ways of coping (relative to negative ways of coping), which predicted a decline in online appearance preoccupation over time. Also, girls/young women and those who are more intense social media users are at more risk of increased online appearance preoccupation over time. Thus, the findings highlight that mitigating risks of social media use to protect well-being can mean reducing negative appearance-related social interactions, but in the later teen years it is also relevant to concentrate on individual characteristics, predispositions, and capacity to cope with stress. Particularly among young women, enhancing individual strengths and resources to manage appearance concerns and comments is critical for engaging in an online environment that is so visually oriented and saturated with quantifiable indicators of peer approval and status (i.e., comments, reactions, and shares).

CRediT authorship contribution statement

Melanie J. Zimmer-Gembeck: Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation. **Riley A. Scott:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Tanya Hawes:** Writing – review & editing, Project administration, Methodology, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at.https://doi.org/10.1016/j.chb.2024.108319.

Appendix 1

Appearance Neutral Acceptance

Think about some of the important people in your life …	Never or very rarely true	Rarely true	Some-times true	Often true	Very often or always true
Important people in my life make me feel important regardless of how I look	1	2	3	4	5
Important people in my life tell me that they like me for me	1	2	3	4	5
Important people in my life help me to take my mind off my looks	1	2	3	4	5
Important people in my life help me to see that there are more important things then how I look	1	2	3	4	5

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