

Online Appearance Preoccupation in and Beyond Adolescence: A Longitudinal Study of Social Media Use, Anxiety, and Depression as Correlates of Growth and Stability

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Online appearance preoccupation has been linked to a range of mental health concerns among youth. However, little is known about the trajectory of appearance preoccupation across this developmental period and what might account for variability. In this study, three potential correlates of change in online appearance preoccupation over time were investigated: gender, baseline social media use, and baseline emotional health problems (social anxiety and depressive symptoms). Utilizing a longitudinal design, 565 Australian youth, ages 13–22 years at Time 1 ($M = 17.5$, $SD = 1.8$; 40% boys, 60% girls), completed three surveys over 5 years to report their online appearance preoccupation, social media use, and emotional health. Controlling for age, online appearance preoccupation was higher in young women (than young men), as well as those who reported more social media use and more social anxiety and depressive symptoms at baseline. For those with an initially higher level of appearance preoccupation, as well those with initial higher levels of media use or emotional problems, the extent of preoccupation remained steadily high over time. In contrast, those with lower appearance preoccupation at baseline (i.e., young men, those lower in social media use, and those with fewer emotional problems) increased in preoccupation over time, with the majority of participants converging toward a higher degree of such preoccupation by the end of the study. Although young women were at more risk for online appearance preoccupation overall, gender did not significantly moderate these patterns of change over time.

Public Policy Relevance Statement

Social media use and its impact on the mental health of young people have become a topic of much public discussion with some of this discussion centered on its role in body dissatisfaction, appearance concerns, and associated disorders. As a first longitudinal study of online appearance preoccupation, defined as preoccupation with comparing and presenting an ideal appearance online, this study extends past research to show that the most elevated preoccupation both at baseline and over time is found among young women, intense social media users, and youth highest in social anxiety and depressive symptoms. Yet, the findings also reveal prevalent longitudinal increases in preoccupation that result in a closing of the gap, whereby high preoccupation is very common by the late teenage years and early 20s.

Keywords: social media use, appearance, body image, social anxiety, depression

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Appearance preoccupation, which is common during adolescence and adulthood and can be a symptom of body dysmorphic disorder (BDD; Phillips & Kelly, 2021; Roberts et al., 2018; Veale et al., 2014; Zimmer-Gembeck et al., 2018), involves an excessive concern about perceived physical flaws (i.e., preoccupation) and excessive engaging in negative thoughts about one's own appearance (Phillips & Kelly, 2021). Although a majority of past research has focused on appearance preoccupation in an offline context, the advent of social media, and its highly visual nature, has resulted in appearance preoccupation being similarly found in online spaces. More specifically, online appearance preoccupation encompasses upward appearance comparison (i.e., comparison of oneself to others deemed more attractive), online self-presentation such as checking and curation of self-images, and more general engagement with appearance-based content (Zimmer-Gembeck et al., 2021, 2023).

Such online aspects of preoccupation with appearance are increasingly being recognized as problematic when excessive, given their links to a range of mental health concerns, such as general social and emotional difficulties of depression and social anxiety (Fardouly et al., 2020; Twomey & O'Reilly, 2017), as well as appearance anxiety and appearance rejection sensitivity (Zimmer-Gembeck et al., 2021), and disordered eating (Fardouly et al., 2020). However, much of this research has been cross-sectional and no previous study has tracked changes in online appearance preoccupation over time. Thus, it is not known if patterns of online appearance preoccupation have their foundations in social media use, as well as existing mental health problems. To address these research gaps, the aim of the current 5-year longitudinal study was to identify patterns of change in online appearance preoccupation for both males and females, across adolescence and into emerging adulthood, and to compare patterns of change by baseline risk factors including level of social media use, depression, and social anxiety.

Social Media Use and Online Appearance Preoccupation

Social media use has become increasingly embedded in everyday life, especially among youth. U.S. data indicate that about 67% of adolescents aged 13–17 years (Rideout et al., 2021) and 84% of emerging and young adults aged 18–29 years (Auxier & Anderson, 2021) use social media and, on average, report between 5 and 8 hr of daily use (Giorgiev & Ivanov, 2023). The exponential rise in social media use (Vogels et al., 2022), at the same time that prevalence rates of depression (Goodwin et al., 2022), social anxiety (Jefferies & Ungar, 2020), and body dissatisfaction (Milton et al., 2021) have been rising, has led to research that suggests social media may be playing a role in young people's mental health (Primack & Escobar-Viera, 2017).

More frequent use and greater feelings of connection to social media may be particularly relevant to appearance-related outcomes, given the visual nature of many social media platforms (Boer et al., 2021; Mérelle et al., 2017; Twenge et al., 2018). Engagement with idealized imagery (e.g., celebrities, influencers, peers) and interactive features (e.g., editing tools, likes, followers, comments) on visual platforms such as TikTok, Snapchat, and Instagram are specific aspects of social media use that have been demonstrated to correlate with heightened concerns about one's appearance in youth (Vandenbosch et al., 2022). Similarly, chronic exposure to idealized imagery directs youth to focus on their own online presentation to maximize metrics on their images (i.e., number of followers, likes, and comments; Fatt & Fardouly, 2023; Seekis et al., 2020, 2021; Wang et al., 2022).

Furthermore, elements of online appearance preoccupation, such as appearance comparisons and body checking behaviors, have been found to increase as engagement with appearance-focused content increases in young adult women and men (Seekis et al., 2020, 2021). In a mixed gender study of adolescents, Wang et al. (2022) indicated that greater frequency of viewing others' selfies, along with the number of likes and comments these selfies garnered, correlated with heightened appearance self-consciousness. More generally, Marengo et al. (2018) found that students who reported frequent use of highly visual social media (>2 hr per day) reported significantly higher body image concerns than peers reporting no use of highly visual social media. Similarly, adolescent females and males with higher social media-related body dissatisfaction engaged more with social media in general (Charamaraman et al., 2021).

Evidence in relation to body dysmorphic symptoms more broadly also highlights the role that social media use can have. Body dysmorphia and the symptoms associated with it are perplexing and debilitating, involving marked preoccupation with perceived appearance flaws. Body dysmorphic symptoms (BDS) can motivate withdrawal from social interactions and relationships, school dropout or work problems, and heightened suicidality (Phillips et al., 2006; Veale et al., 1996). Notably, the term "digitized dysmorphia" was coined by Coy-Dibley (2016) to describe an excessive preoccupation with appearance and engagement in comparison processes online that can be shaped by unrealistic societal beauty standards. Ryding and Kuss (2020), in their systematic review, also highlighted frequent social media usage as a potential risk factor in the development of BDS. Indeed, research has underscored connections between appearance-focused content on social media, (upward) appearance comparisons, online self-presentation, online interactions, and BDS (Fardouly et al., 2017; Seekis & Barker, 2022; Zimmer-Gembeck et al., 2022). Overall, Nesi et al.'s (2018) transformation framework posits that the visual nature and "24/7" availability of social media are key features that trigger self-consciousness in adolescents, which has been linked to body image dissatisfaction (Choukas-Bradley et al., 2019, 2022). Although such findings provide practical information about the links between social media use and online appearance preoccupation in adolescents and emerging adults, research has yet to examine the trajectories of online preoccupation across adolescence and into young adulthood to identify whether these trajectories might differ depending on baseline (adolescent) level of social media use.

Social Anxiety, Depression, and Online Appearance Preoccupation

In addition to exploring the course of online appearance preoccupation based on social media use, the role of other mental health concerns needs to be considered. Broadly, BDS are highly comorbid with social anxiety and depression in young people. For example, estimates of comorbidity indicate that 37.3% of people with BDD have major depressive disorder and 32.9% have social anxiety disorder (Phillips et al., 2008). Similarly, Krebs et al. (2023) found that, consistent with clinical studies (e.g., Phillips et al., 2006), approximately 70% of adolescents meeting *Diagnostic and Statistical Manual of Mental Disorders*-fifth edition diagnostic criteria for BDD also met criteria for either depressive or anxiety-related disorders.

The types of interactions and comparisons on social media representative of online appearance preoccupation have been associated with greater depression and social anxiety among

adolescents and young adults in a few cross-sectional survey studies (Fardouly et al., 2020; Maheux et al., 2022). For example, the use of strategies to enhance physical attractiveness in online selfies has been linked to depressive symptoms (Nesi et al., 2021) and social anxiety (Liu et al., 2022) in both adolescent girls and boys. Similarly, adolescent boys and girls who followed celebrities or reported social-media related body dissatisfaction also reported symptoms of depression and social anxiety (Charamaraman et al., 2021). With regards to young adults, Toh et al. (2022) found that, relative to people with low or moderate social anxiety, those with high social anxiety reported more monitoring of numbers of followers, spent more time on Instagram, and report more social comparison. In a sample of adolescents and young adults from these data, Hawes et al. (2020) showed that appearance-related social media preoccupation had unique positive associations with depression and social anxiety. Furthermore, young women reported significantly more social media use, appearance-related social media preoccupation, depressive symptoms, and social anxiety compared with young men.

A few longitudinal studies have extended some cross-sectional research to address the direction of the associations between adolescents' appearance-related social media experiences and mental health. Maheux et al. (2022) examined temporal associations between appearance-related social media consciousness (ASMC) and depressive symptoms in U.S. high school adolescents. They found that girls reported higher levels of ASMC and depressive symptoms than boys, baseline ASMC was associated with higher depressive symptoms 1 year later for girls and boys, even when controlling for time spent on social media. When considering the alternative pathway, from depressive symptoms to ASMC, no significant association was found. In contrast, in a study based on earlier time points of the data used in the current study (Zimmer-Gembeck et al., 2023), social anxiety and negative affect were identified as early risk factors of online appearance preoccupation among adolescents. These limited and mixed findings suggest there is a need for more longitudinal research examining how emotional symptoms, such as social anxiety and depression, relate to online appearance preoccupation over the developmental transition from adolescence to emerging adulthood. It also is not yet known whether elevations in emotional problems might predict a steeper escalation in online appearance preoccupation over time.

Gender and Appearance Preoccupation

According to objectification theory (Fredrickson & Roberts, 1997), girls and women are more likely to be objectified and predominantly valued for their physical appearance relative to boys and men. Moreover, when girls begin to view themselves from an observer's perspective, or self-objectify, they form a connection between their appearance and self-worth (Choukas-Bradley et al., 2019, 2022; Fredrickson & Roberts, 1997; Veldhuis et al., 2020). This gender imbalance occurs because females, compared with males, are more frequently exposed to images that portray females as sexual objects, face immense pressure to conform to societal beauty standards, and internalize these messages and pressures. Such pressures to conform to high benchmarks lead to upward appearance comparisons, body checking behaviors, appearance anxiety, and shame (Fredrickson & Roberts, 1997; Seekis et al., 2020, 2021). Accordingly, research has consistently

demonstrated that adolescent girls and young adult women exhibit higher levels of appearance-related anxiety (Bjornsson et al., 2013; Enander et al., 2018; Veale et al., 2014), general social anxiety (Rief et al., 2006; Seekis et al., 2023; Zimmer-Gembeck et al., 2018), appearance comparisons (Bowker et al., 2013; Hjetland et al., 2022; Zimmer-Gembeck et al., 2021), and appearance preoccupation (Zimmer-Gembeck et al., 2021). Unlike teenage boys, teenage girls have also highlighted the widespread use of filters to improve facial features as a contributing factor to their appearance insecurities (Hjetland et al., 2022).

Nonetheless, the substantial focus on girls and young women in prior research has made it challenging to make definitive conclusions regarding gender disparities linked to online appearance preoccupation and social media use. However, a growing body of evidence indicates that both girls/young women and boys/young men exhibit concerns related to body image and aspects of appearance preoccupation when engaging in activities online, albeit with gender-specific nuances. For instance, Yau and Reich (2019) showed that adolescent boys often convey masculinity and muscularity through their social media photos, whereas girls actively invest more time in selecting and editing photos to create more "favorable" self-presentations online. In young men, heightened exposure to male celebrities, fashion models, and grooming content on social media, as well as the importance placed on likes and comments, was associated with body checking behaviors, social appearance anxiety, and a desire for a more muscular physique (Seekis et al., 2021). Conversely, young women who placed importance on likes and comments and were exposed to excessive female celebrity, fashion model, and beauty content on social media reported a stronger drive for thinness, fueled by upward appearance comparisons, body checking, and social appearance anxiety (Seekis et al., 2020). Given these findings and the dynamic nature of societal attitudes and evolving norms, it is imperative to investigate these complex relationships longitudinally to gain a deeper understanding of how gender shapes online appearance preoccupation from adolescence through young adulthood among both young men and young women. Moreover, it is important to consider any differences in the findings for young women compared to young men by testing gender differences and gender moderation when conducting research in the areas of appearance, body image, and social media use.

The Current Study

Online appearance preoccupation, including social comparisons of appearance and concern about self-presentation in online spaces, is a known correlate of poorer body image, disordered eating, appearance anxiety, and general symptoms of anxiety and depression. Despite the evidence that online appearance preoccupation is involved in such negative self-perceptions and internalizing problems, we have not yet had available longitudinal data to identify whether online appearance preoccupation escalates over time from adolescence into emerging adulthood. Our aim in this longitudinal study was to examine baseline level and linear patterns of change across three waves of data collected over 5 years to (a) describe growth patterns and the variability in growth patterns over time, and (b) investigate if gender (young men and young women), baseline social media use, and baseline emotional symptoms (depressive and social anxiety) account for some of the variability in patterns of online appearance preoccupation over time.

Moreover, we considered whether the risks for online appearance preoccupation over time were moderated by gender, testing the interaction of other risk factors with gender in the growth curve models.

Method

Participants

Participants were 565 adolescents and emerging adults residing in Australia, ages 13.7 to 21.8 years at T1 ($M = 17.5$ years, $SD = 1.8$ years). Participants reported their current gender resulting in two categories with 40% young men and 60% young women. The students were initially drawn from three secondary schools and one university. At T1, secondary school participants were in Grades 9–12 and between the ages of 13.7 and 17.9 years ($M = 15.8$, $SD = 0.9$). University students ranged from 15.6 to 21.8 years ($M = 18.9$, $SD = 0.9$; just two participants were under 16). Of the high school students, 80% reported they were White, with others reporting Asian Australian (15%), Aboriginal Australian/Torres Strait Islander/Pacific Islander (<1%), or other racial/ethnic backgrounds (5%). To capture information from university students, participants were able to select multiple options, with most (84%) reporting they were White, 12% instead or in addition reporting Asian, 3% Australian Aboriginal/Torres Strait Islander/Pacific Islander, and 9% a diverse range of other backgrounds. The mean body mass index (BMI) (based on self-reported weight and height) was 21.9 ($SD = 4.5$) and was significantly higher in the university students ($M = 23.0$, $SD = 4.73$) than in the high school students ($M = 20.5$, $SD = 3.69$), $t(561) = 6.90$, $p < .001$. Age and BMI were correlated ($r = .26$, $p < .001$), but BMI did not significantly differ by gender, $t(561) = 0.23$, $p = .818$. In 2 (gender) \times 2 (school type: high school vs. university) analyses of variance, there were no significant differences in any measure between high school and university students, $F(1, 561)$ ranged from 0.12 to 3.56 (all $p > .07$). Differences between young women and young men are described in detail in the results.

Procedure

Approval for this study was obtained from the Griffith University Human Research Ethics Committee. High school students had been involved in a previous study of students recruited from three Australian schools, who completed up to five repeated surveys from 2013 to 2015. Parents provided consent for recontact regarding participation in future research. For this study, we recontacted the parents and students to invite the students to participate in two additional surveys in 2018 (T1 in this study) and 2019 (T2) and then another follow-up in 2022 (T3). For the university student participants, students were invited through personal contact during orientation week and in the first week of classes in 2018 to coincide with a high school student follow-up. At T2 (2019) and T3 (2022), all participants were recontacted via email and text and invited to complete another survey online.

To be included in the analyses for this study, participation at T1 (2018) and in one of the other 2 times of data collection (2019 or 2022) was required. This subset included 214 high school students (93% of the T1 sample) and 317 university students (64% of the T1 sample). Overall, 758 students participated at T1, 567 at T2, and 265 at T3. At T1, each high student received a \$20 gift card and university students received a small gift. At T2 and T3, each participant received a \$20 gift card.

Measures

T1, T2, and T3 Online Appearance Preoccupation

At each time of measurement, five items measured upward social comparison and concern about appearance self-presentation online, which are indicative of online appearance preoccupation (Hawes et al., 2020, for example, “How I feel about my body and appearance is influenced by other people’s social media pictures”). Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). A total score was calculated by averaging the items, Cronbach’s $\alpha = .93$ at T1, .92 at T2, and .91 at T3. We used these five items because they were the items included at T1, which we subsequently expanded with additional items at T2 and T3. Thus, these five items were those included across all three time points of data collection. Scores for these five items were validated by correlating them with the complete Social Media Preoccupation Scale (see Zimmer-Gembeck et al., 2021); the correlations of the five-item composite score with the full score were $r = .88$ at T2 and $r = .89$ at T3.

T1 Depressive and Social Anxiety Symptoms

Negative affectivity was measured with the 13-item Short Mood and Feelings Questionnaire (Angold & Costello, 1987; e.g., “I felt lonely”). After reading the instruction, “Circle one answer for each item that best describes you in the past 2 weeks,” response options for all items ranged from 1 (*not true*) to 5 (*very true*). A total score was formed by averaging all items, with higher scores indicating greater depressive symptoms, Cronbach’s $\alpha = .95$.

Social anxiety symptoms were measured with the 18-item Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998; e.g., “I worry what others say about me”). Response options for all items ranged from 1 (*not true*) to 5 (*very true*). The SAS-A contains items that focus on fear of negative evaluation (eight items), social avoidance and distress in new situations (six items), and general social avoidance and distress (four items). Items for each area were averaged and then the three subscale scores were averaged to produce a composite social anxiety symptom score, with higher scores indicating greater social anxiety symptoms, Cronbach’s $\alpha = .95$.

T1 Social Media Use

Items from the Facebook Intensity Scale (Ellison et al., 2007) were modified slightly to measure social media use (rather than only Facebook) in daily life (e.g., “Using social media is part of my everyday activity”; Hawes et al., 2020). Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*) and items were averaged to form an overall use score, Cronbach’s $\alpha = .86$. Only 23 participants (4%) had a score of 1 suggesting very little or no social media use.

Overview of the Data Analyses

Missing data were examined using Little’s test of whether data were missing completely at random (MCAR). All primary measures plus age and gender were included, with the result significant, suggesting the data were not MCAR, $\chi^2(20) = 48.39$, $p < .001$. Thus, we used multiple imputation, entering all key variables, age and gender, to impute missing data. This maintained all T1 participants in

the descriptive statistics and correlations. We imputed 20 data sets and report the pooled means (*Ms*), standard deviations, and correlations for all measures, either those available within the output from SPSS or by averaging results across the 20 data sets. We also report the results of gender comparisons of all measures.

Following these preliminary analyses, unconditional latent growth curves were estimated for appearance preoccupation over time using AMOS V.28, and we tested whether there was significant interindividual variability in growth of appearance preoccupation among participants. Next, we built upon the unconditional latent growth model to test whether growth patterns were conditional on participant gender, age, depression, social anxiety, and social media use. BMI was not included as a covariate in the analyses, given that it was not associated with any other measures once age was controlled. Time was coded to indicate the years since Time 1, so that 0 = *Time 1*, 1 = *Time 2*, and (given the 3-year lag between Time 2 and Time 3) 4 = *Time 4*. For the growth curve analysis, we used full information maximum likelihood to estimate missing values.

Results

Correlations Between Measures

The correlations in Table 1 show that appearance preoccupation had moderate stability over the three measurement times, and all measures of appearance preoccupation and all baseline measures (social anxiety symptoms, depressive symptoms, and social media use) had significant positive associations with each other. In addition, older participants scored higher in online appearance preoccupation at T1 and reported more social anxiety symptoms at T1.

Gender Differences

Means and standard deviations of all measures and results of independent groups *t* tests comparing young women and young men are shown in Table 2. As can be seen, young women were higher than young men in online appearance preoccupation at all 3 times of measurement, social anxiety, depression, and social media use. However, the gender difference in depressive symptom level was small, relative to other gender differences.

The Unconditional Growth Model of Online Appearance Preoccupation

The unconditional model of linear growth in appearance preoccupation had a good fit to the data, $\chi^2(3) = 6.63$, $p = .085$, comparative

fit index = .99, root-mean-square error of approximation = .046 (90% confidence interval [CI] [.00, .10], $p = .471$). Both the average intercept and the linear slope of appearance preoccupation from T1 to T3 (across 5 years) were significantly greater than 0 (intercept = 3.04, $p < .001$; slope = .18, $p < .001$). Thus, the average participant started with an appearance preoccupation score slightly below the midpoint of the scale and increased by about .18 on this scale each year. The intercept and slope were negatively correlated ($r = -.44$, $p < .001$), suggesting that participants with a higher initial score showed less increase in online appearance preoccupation over the next years (i.e., their scores were more stable over time). In addition, the variances of the intercept and the slope were each significant, both $p < .001$, providing evidence for interindividual differences in growth patterns (i.e., interindividual differences in intraindividual change) and justifying considering factors that relate to differences in intercepts and slopes across the participants.

Conditional Growth in Online Appearance Preoccupation

The linear growth model of appearance preoccupation conditional on gender, age, depressive symptoms at T1, social anxiety at T1, and social media use at T1 had a good fit to the data on most indicators, $\chi^2(11) = 34.22$, $p < .001$, comparative fit index = .98, root-mean-square error of approximation = .061, 90% CI [.039, .085], $p = .191$. Overall, the model accounted for 64% of the variance in the intercept and 31% of the variance in the slope of appearance preoccupation.

Young women were higher in baseline appearance preoccupation than young men ($\beta = .25$, $p < .001$), but the patterns of linear growth in appearance preoccupation did not differ by gender (i.e., there was no gender difference in the slope of appearance preoccupation across the 5 years, $\beta = -.04$, $p = .689$). To illustrate, Figure 1 shows the average levels of appearance preoccupation across time and the estimated slopes by gender. As can be seen, young women reported more online appearance preoccupation across all time points and both young women and young men increased significantly in their appearance preoccupation over time, with a slope of .14 ($p < .001$) for females and .22 ($p < .001$) for males (which did not significantly differ). In this same model, age group (<18 vs. 18+) was not associated with either initial level or change over time in online appearance preoccupation, $\beta = .01$ and .09, respectively, $p = .823$ and .335, respectively.

After accounting for gender, age, and social media use, social anxiety and depressive symptoms were each associated with a higher level of appearance preoccupation at baseline, $\beta = .41$ and .27, respectively, both $p < .001$. Social anxiety was not associated with

Table 1
Means and Standard Deviation of All Measures and Correlations Between Measures (N = 565)

Measure	1	2	3	4	5	6	7
1. T1 online appearance preoccupation	—						
2. T2 online appearance preoccupation	.61***	—					
3. T3 online appearance preoccupation	.40***	.55***	—				
4. T1 social anxiety symptoms	.55***	.44***	.36***	—			
5. T1 depressive symptoms	.50***	.32***	.21***	.56***	—		
6. T1 social media use	.37***	.32***	.19***	.19**	.18***	—	
7. Age	.10*	.06	.05	.09*	.02	.06	—

Note. T1–T3 indicate the three times of measurement (1, 2, or 3).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Means and Standard Deviations of All Measures and Comparisons Between Young Women and Men (N = 565; 342 Young Women, 223 Young Men)

Measure	All		Young women		Young men		<i>t</i> (1563)	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
T1 online appearance preoccupation	3.05	1.73	3.53	1.75	2.33	1.44	−8.56***	−0.74
T2 online appearance preoccupation	3.21	1.75	3.66	1.79	2.52	1.43	−7.92***	−0.68
T3 online appearance preoccupation	3.76	1.71	4.05	1.65	3.33	1.66	−4.42***	−0.45
T1 social anxiety symptoms	2.61	0.95	2.76	0.97	2.39	0.87	−4.49***	−0.39
T1 depressive symptoms	1.99	0.96	2.07	0.98	1.88	0.92	−2.24*	−0.19
T1 social media use	3.51	1.10	3.76	1.00	3.12	1.14	−7.08***	−0.61

Note. T1–T3 indicate the three times of measurement (1, 2, or 3).

* $p < .05$. *** $p < .001$.

the slope of appearance preoccupation ($\beta = -.08$, $p = .494$), but a higher depressive symptom level was associated with a less steep slope over time ($\beta = -.40$, $p < .001$). To illustrate the patterns for social anxiety and depressive symptoms separately, Figures 2 and 3 show the average levels of online appearance preoccupation for groups designated as low (bottom 75% of scores in the sample) or high (top 25% of scores in the sample) in social anxiety or depressive symptoms by gender. Although we illustrate growth curves by gender and symptoms in Figures 2 and 3, note that the Gender \times Symptom interactions were not significant when tested and the number of young men with a high level of symptoms was rather small relative to other groups illustrated.

As can be seen in Figure 2, young women high in social anxiety symptoms showed the most elevated levels of online appearance preoccupation, young men low in symptoms were lowest, and young men high in symptoms and young women low in symptoms fell in between. Also shown in Figure 2, the level of online appearance preoccupation did not change significantly over time for young women and men high in social anxiety symptoms (young women slope = .02, $p = .740$; young men slope = .08, $p = .333$), but young women and men low in symptoms increased in online appearance preoccupation across the 5 years (female slope = .23, male slope = .26, both $p < .001$).

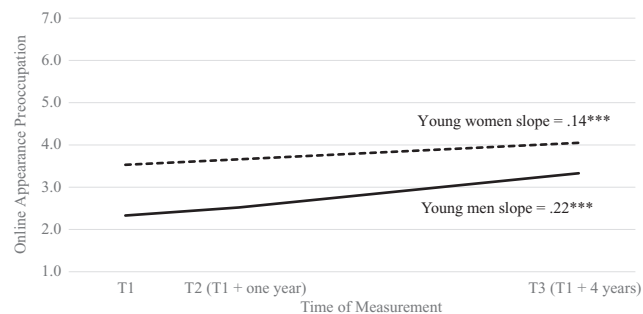
As can be seen in Figure 3, participants high in depressive symptoms of either gender showed less increase in online appearance

preoccupation over time relative to individuals low in depressive symptoms, explaining why there was a significant negative association between depressive symptoms and the linear slope of appearance preoccupation. Yet, young men high in depressive symptoms (slope = .17, $p < .05$), and young women and men low in symptoms increased in online appearance preoccupation over time (young women slope = .23, young men slope = .24, both $p < .001$). Young women high in depressive symptoms showed a pattern of high baseline online appearance preoccupation that did not significantly change (i.e., remained high) over time (slope = $-.07$, $p = .239$).

Finally, after accounting for gender, age, and depressive and social anxiety symptoms, social media use was associated with a higher initial level of appearance preoccupation, $\beta = .25$, $p < .001$, and had a small negative association with the slope of appearance preoccupation, $\beta = -.23$, $p = .020$. To illustrate, Figure 4 shows the average levels of online appearance preoccupation over time

Figure 1

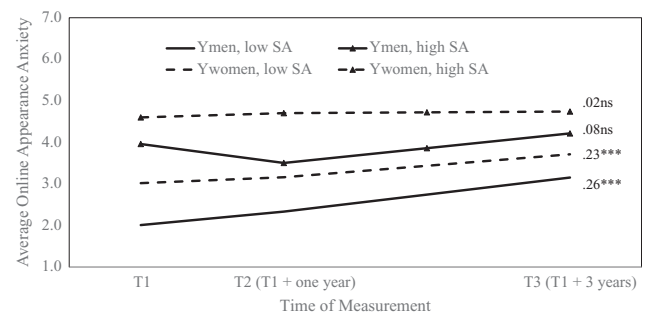
Online Appearance Preoccupation Scores Over Time for Young Women (n = 342) and Young Men (n = 223)



Note. Average levels between T1 and T3 were estimated for display in the figure. T1–T3 indicate the three time points of measurement (1, 2, or 3). *** $p < .001$.

Figure 2

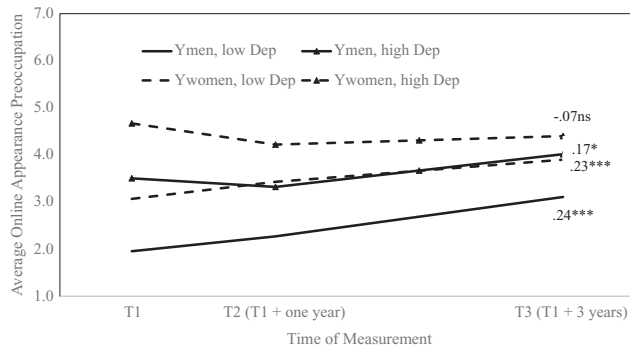
Online Appearance Preoccupation Scores Over Time for Ywomen and Ymen Separated by a Low Versus High Level of SA Symptoms (High Defined as Top 25% or a Score > 3.2777)



Note. Growth patterns did not differ significantly between young men and young women, and gender interactions were not significant. Ymen low social anxiety $n = 187$, Ymen high social anxiety $n = 36$, Ywomen low social anxiety $n = 223$, Ywomen high social anxiety $n = 110$. Average levels of appearance preoccupation between T1 and T3 were plotted for display in the figure. Overall, the slopes of online appearance preoccupation did not differ significantly between young men and young women, and gender interactions were not significant. Ywomen = young women; Ymen = young men; SA = social anxiety; ns = not significant ($p > .05$); T1–T3 indicate the three time points of measurement (1, 2, or 3). *** $p < .001$.

Figure 3

Online Appearance Preoccupation Scores Over Time for Ywomen and Ymen Separated by a Low Versus High Level of Dep Symptoms (High Defined as Top 25% or a Score > 2.4614)



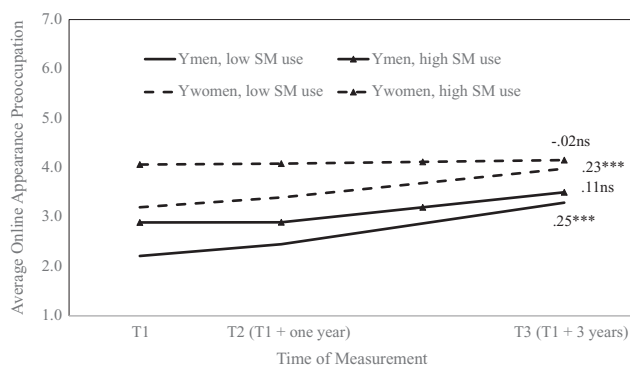
Note. Ymen low depressive symptoms $n = 170$, Ymen high depressive symptoms $n = 53$, Ywomen low depressive symptoms $n = 244$, Ywomen high depressive symptoms $n = 98$. Average levels of appearance preoccupation between T1 and T3 were plotted for display in the figure. Overall, the slopes of online appearance preoccupation did not differ significantly between young men and young women, and gender interactions were not significant. Ywomen = young women; Ymen = young men; Dep = depressive; ns = not significant ($p > .05$); T1–T3 indicate the three time points of measurement (1, 2, or 3).

* $p < .05$. *** $p < .001$.

for young women and men designated into two social media use groups (low defined as the lowest 75% of scores vs. high). As can be seen, young women and young men with baseline high social media use had higher baseline online appearance preoccupation that did not significantly change (i.e., remained high) over time (young women slope = $-.02$, $p = .748$; young men slope = $.11$,

Figure 4

Online Appearance Preoccupation Scores Over Time for Ywomen and Ymen Separated by SM Use Lowest 75% Versus Highest 25% of Scores (or a Score > 4.3333)



Note. Ymen low use $n = 185$, Ymen high use $n = 38$, Ywomen low use $n = 211$, Ywomen high use $n = 131$. Average levels between T1 and T3 were estimated for display in the figure. Overall, the slopes of online appearance preoccupation did not differ significantly between young men and young women, and gender interactions were not significant. Ywomen = young women; Ymen = young men; SM = social media; ns = not significant ($p > .05$); T1–T3 indicate the three time points of measurement (1, 2, or 3). *** $p < .001$.

$p = .332$). In contrast, both groups lowest in social media use showed an increase in online appearance preoccupation over time (young women slope = $.23$, young men slope = $.25$, both $p < .001$). Although we illustrate growth curves by gender and social media use in Figure 4, there were no significant Gender \times Social Media Use interactions in the conditional growth model.

Discussion

The aim of this study was to map the progression of online appearance preoccupation patterns across 5 years from adolescence into the adult years for young women and young men and to determine whether higher baseline levels of emotional problems of depression and social anxiety and more social media use are risks for greater escalation in appearance preoccupation at baseline and over time. Thus, the study was designed to extend past cross-sectional research that had not yet been able to pinpoint whether an escalation in appearance-related concerns can be fueled by mental health problems and digital technology use, some of the topics at the forefront of concern about declining adolescent emotional and social well-being in recent years (Nesi et al., 2021; Primack & Escobar-Viera, 2017; Zimmer-Gembeck et al., 2023). In general, the findings support many of the expected associations. Most notably, online appearance preoccupation increased (had a positive slope), on average, across time for both young women and young men. In addition, young women, as well as those with more elevated emotional problems and higher social media use at baseline, do report more online appearance preoccupation, as we have reported in a previous study (Zimmer-Gembeck et al., 2023). Yet, diverging somewhat from what was expected, when baseline online appearance preoccupation was high, it remained steadily high over the following 5 years. In contrast, when online appearance preoccupation was lower at baseline (e.g., for young men or for those lower in baseline emotional problems or social media use) it tended to increase over time, starting to close the gap in online appearance preoccupation among all youth. Overall, these findings suggest that online appearance preoccupation increases from the teenage years into the 20s (on average), and a moderate or high level of online appearance preoccupation becomes almost mainstream as youth move into young adulthood.

In the present study, we first estimated the typical (i.e., average) trajectory of online appearance preoccupation across the 5 years for all participants and for young women separate from young men. Consistent with the research findings across many areas of appearance and body image concerns (e.g., Sharpe et al., 2018), we found appearance preoccupation to increase over time. In addition, this growth in appearance preoccupation was found for both young women and men and there was a gender difference in the level of online appearance preoccupation across all waves of this study. This identified young women as at more risk for elevated appearance preoccupation, but not necessarily at risk for a greater increase than young men over time. Overall, these findings support the many theories and extend on past evidence of the greater appearance pressures on young women across most years of adolescence (and beyond; Choukas-Bradley et al., 2022; Fredrickson & Roberts, 1997; Frisén et al., 2015; Seekis et al., 2020, 2021; Veldhuis et al., 2020) and the evidence that appearance is also a preoccupation that increases over time for many young men (Eisenberg et al., 2006; Frisén et al., 2015; Seekis et al., 2021; Yau & Reich, 2019). However, the findings also suggest that online appearance

preoccupation may reach a level of concern (on average) somewhat later in adolescence for young men compared to young women, similar to what has been found for appearance anxiety and body dysmorphic symptoms (e.g., Zimmer-Gembeck et al., 2018).

Above and beyond gender, there were two patterns, one of stability and one of change, identified when emotional problems (depressive and social anxiety symptoms examined separately) and social media use at baseline were considered. When youth were relatively highest in emotional problems or highest in social media use, they had the most elevated online appearance preoccupation at baseline and they showed general stability in this high level over time (i.e., there was no significant linear increase or decrease). In contrast, youth who were lower in emotional problems or lower in their social media use at baseline increased in online appearance preoccupation across the years. Therefore, elevated social anxiety symptoms, elevated depressive symptoms, and higher social media use are all risks for high appearance preoccupation in later adolescence and into young adulthood. Yet, because of the stability for those highest in emotional problems and social media use and the increasing preoccupation for other youth, the online appearance preoccupation gap closes as youth get older. By the end of this study, almost all youth reported a moderate-to-high level of online appearance preoccupation (i.e., above a score of 3.5 on a 7-point scale) suggesting most are engaging in quite frequent upward comparisons of their appearance and spending significant time concerned with presenting an ideal appearance. Only young men low in symptoms or young men who report the lowest levels of social media use seemed to avoid this preoccupation, but even these young men increase in online appearance preoccupation over time. Thus, it seems that some moderate level of online appearance preoccupation becomes typical by later adolescence and young adulthood.

These patterns and the closing gap in appearance preoccupation over time raise questions about how they link to the onset and subsequent dynamics of body image concerns and internalizing symptoms (depression and social anxiety) found across the earlier years of adolescence (e.g., Patalay et al., 2015) while considering social media use in later adolescence and young adulthood. For example, research inspired by theories of negative body image and eating disorder onset and progression (e.g., van den Berg et al., 2002) has concentrated on testing two interesting, but not mutually exclusive, models on the interrelationships of body dissatisfaction and internalizing symptoms from early adolescence through emerging adulthood. These two models of increasing dissatisfaction and internalizing disorders have identified a body dissatisfaction-driven pathway and an internalizing-driven pathway (Patalay et al., 2015; Sharpe et al., 2018; Stice & Bearman, 2001). Studies testing these two models suggest somewhat different patterns of risk for young women and men. Young women (more often than young men) experience a range of physiological, psychological, and social pressures in childhood and early adolescence that can lead to the early onset of body dissatisfaction (probably just prior to or during puberty), which in turn drives increases in both body dissatisfaction and internalizing problems throughout adolescence and beyond. In contrast, evidence regarding young men indicates that bidirectional pathways are more likely to be found over the course of adolescence and beyond.

Although body dissatisfaction was not measured in this study, findings suggest that high appearance preoccupation, internalizing symptoms, and social media use are closely intertwined for some young women and men by early adulthood. These findings

likely identified young women who experienced early onset body dissatisfaction and are now exhibiting heightened preoccupation with their appearance, putting them at increased risk for chronic internalizing symptoms. Additionally, some young men may follow a similar pathway. For most young men in the current study, as well as for young women with lower baseline appearance preoccupation or internalizing symptoms, appearance preoccupation may be driven by internalizing symptoms, the pervasive appearance pressures of social media, or both. However, it remains unclear how these factors relate to future changes in body dissatisfaction. Future research should include measures of body dissatisfaction and consider other relevant variables identified in theories of body image and disordered eating, such as the impact of appearance internalization from the tripartite sociocultural theory of body image and eating concerns (Thompson et al., 1999) or self-objectification from objectification theory (Fredrickson & Roberts, 1997).

The present findings of a narrowing gap in appearance preoccupation over time for young women and men suggest the need for additional measures to determine when and why online appearance comparisons and self-presentation interfere with mental health throughout adolescence and into adulthood. Thus, future research could map these patterns again starting with a young age group, while also addressing body image and related disorders, and other emotional, social, and behavioral problem development. Such research may help pinpoint when, how, and for whom appearance preoccupations escalate earliest and most rapidly as well as when they interfere with daily emotional or social functioning or drive problem behaviors. These insights could assist in developing a suite of targeted recommendations and interventions to reduce appearance- and body-related disorders.

Limitations and Future Research Directions

This study had the strength of a longitudinal design and a solid sample size, using validated and reliable measures of all constructs. However, there are three study limitations to consider. First, the longitudinal design also brought some challenges; the lag between the first 2 times of measurement (T1 and T2) was 1 year, but the third follow-up (T3) was conducted 3 years after T2 (with COVID-19 pandemic restrictions occurring between T2 and T3) for a total of a 5-year period of follow-up. The lag from T2 to T3 meant that loss to follow-up was higher than from T1 to T2, and the COVID19 changes could have had unknown influences on the modeling of stability and change over time, as well as possibly having an influence on the variables under study. For example, young people may have been home more and on social media (or using other media) more frequently than usual. In addition, we could not test curvilinear patterns in growth with only 3 times of measurement. For some subgroups (young men high in depressive symptoms or young men high in social anxiety symptoms), the average appearance preoccupation appeared to dip at T2 relative to T1, suggesting that having the capacity to model curvilinear changes with additional times of measurement could be relevant for some subgroups or individuals.

A second limitation is our inability to examine social media connections in this study, such as the number of followers or other characteristics of online connections. Future research could consider these features of social media use in addition to those we considered here.

Third, a limitation is the demographic characteristics of participants and geographic location of the study. Although the participants were

drawn from schools and a university which had diverse populations by socioeconomic status, and the participants were also diverse in race/ethnicity (and similar to the region where the study was conducted), about 80% reported White race/ethnicity. In addition, the study was conducted in one area of Australia, so the findings may not generalize to other young people or regions of the world.

Finally, it is relevant to note that we examined emotional problems and social media use as foundations for changes in online appearance preoccupation over time, but it is easy to also argue that elevated online appearance preoccupation is a risk for the development of emotional problems or may serve as a catalyst for youth's immersion in social media. Past research has extensively tested how other aspects of appearance and body consciousness and preoccupation are risks for later emotional problems, so we did not test these associations here. By testing the alternative pathways in this article, we now have the evidence needed to move forward and test escalating cycles of emotional problems and online appearance preoccupation, potentially also considering how these escalating cycles could be instigated by early and chronic integration of social media into daily life.

Conclusion

This was the first 5-year longitudinal study of online appearance preoccupation, which involves upward social comparisons of appearance and attention to appearance self-presentation online. The findings identified emotional symptoms of depression and social anxiety, and social media use as risks for elevated and stable appearance preoccupation over the 5 years, with young women also at more risk than young men. Moreover, the patterns of appearance preoccupation among all youth revealed that even those lower in symptoms and lower in social media use are susceptible to increasing online appearance preoccupation over time, showing a lower level at baseline but also an increase across the 5 years. Taken together, these findings add to past research by identifying how the links between emotional problems, social media use, and appearance preoccupation extend from adolescence into young adulthood, and suggest that a moderate or high level of online appearance preoccupation becomes almost normative by young adulthood.

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