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The relationship between social media use and disordered eating in young adolescents

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Abstract

Background: The relationship between social media (SM) use and disordered eating (DE) has not been adequately explored in young adolescents.

Methods: Data from 996 Grade 7 and 8 adolescents (*n* = 534 girls; *M* age = 13.08) was investigated. DE cognitions (Eating Disorder Examination-Questionnaire [EDE-Q]), DE behaviors (Project Eating Among Teens), and SM use measures related to Facebook, Instagram, Snapchat, and Tumblr were completed.

Results: DE behaviors were reported by 51.7% of girls and 45.0% of boys, with strict exercise and meal skipping the most common. A total of 75.4% of girls and 69.9% of boys had at least one SM account where Instagram was the most common, used by 68.1% of girls and 61.7% of boys. Global EDE-Q scores were significantly higher for girls and boys with each type of SM account, except for Facebook and Instagram for girls. A greater number of SM accounts was associated with higher DE scores for both cognitions and behaviors. Girls with Snapchat and Tumblr accounts and boys with Snapchat, Facebook and Instagram were significantly more likely to have both DE behaviors and over-evaluation of shape and weight in the clinical range. Greater daily time spent using Instagram was associated with significantly higher Global EDE-Q scores and DE behaviors for girls, while this pattern was also found for Snapchat usage and DE behaviors for girls.

Conclusions: A clear pattern of association was found between SM usage and DE cognitions and behaviors with this exploratory study confirming that these relationships occur at younger-age than previously investigated.

KEYWORDS

eating disorders, prevention, risk factors, social media

1 | INTRODUCTION

The relationship between media usage, body image, and eating disorder risk has been studied for decades. Initially, magazines and television were the primary forms of media examined, while more recently online media and particularly social media (SM) has been explored (Holland & Tiggemann, 2016). However, while there has been a proliferation of research investigating the relationship between SM and body image-related constructs (e.g., body dissatisfaction and objectification: Holland & Tiggemann, 2016), the relationship between SM use and disordered eating (DE), particularly DE behaviors (e.g., skipping meals, binge eating, and compensatory behaviors) has received much less attention. Further, the majority of this research has been

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conducted with young-adult women (e.g., Hummel & Smith, 2015; Smith, Hames, & Joiner, 2013). Thus, the relationship between SM and DE in young-adolescent girls and boys has not been adequately investigated. This needs to be addressed given that 13 years is the minimum required age for accessing many SM accounts (e.g., Facebook, Instagram, Snaphcat, and Tumblr), and early adolescence is a time of increased DE risk (Gowers & Shore, 2001). Further, given that media literacy is the leading approach to ED risk reduction in young-adolescence (Wilksch et al., 2015), if SM is associated with increased DE risk, content targeting SM use could readily be incorporated in such programs.

DE consists of both cognitions (measured in the current study with the Eating Disorder Examination-Questionnaire global [EDE-Q Global]: Fairburn & Beglin, 1994) and behaviors (Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006). A recent Australian study found 25.3% of adolescents aged 13 and 35.4% aged 14 were engaging in DE behaviors (N = 202: Sparti, Santomauro, Cruwys, Burgess, & Harris, 2019) as assessed by the Youth Risk Behavior Surveillance System (Kolbe, Kann, & Collins, 1993). Another Australian study investigating DE behaviors (EDE-Q) in adolescents aged 12–13 (N = 433: Bentley, Gratwick-Sarll, Harrison, & Mond, 2015; Mond et al., 2014) found: 15.2% of girls and 11.2% of boys to be engaging in objective binge-eating episodes; 3.0% of girls and 2.% of boys to be engaging in self-induced vomiting; and, 18.6% of girls and 20.4% of boys to be engaging in compulsive exercise. The proportion of girls and boys with clinical levels (≥4) of over-evaluation of shape or weight (Fairburn & Beglin, 1994) suggestive of current or future DE (Gowers & Shore, 2001) was 17.3 and 4.6%, respectively. Mean levels of EDE-Q Global scores were 1.11 (SD = 1.27) for girls and 0.55 (SD = 0.81) for boys (Bentley et al., 2015). This suggests that DE is already common by early-adolescence, consistent with international findings (Croll, Neumark-Sztainer, Story, & Ireland, 2002).

In 2017 Australians aged 14–17 spent an average of 3.3 hr daily on SM, compared to 2.6 hr by adults (Australian Psychological Society, 2017). Facebook, Instagram, and Snapchat were most commonly used, by 80.8, 66.0, and 64.7% of adolescents, respectively. This study also identified that 60% of parents reported never monitoring their child's SM use and 15% of adolescent Facebook users reported being contacted daily by strangers. The nature of SM uptake and preferred platforms is rapidly changing but the current study chose to focus on the investigation of the relationship between young-adolescent SM use of four specific sites—Facebook, Instagram, Snapchat, and Tumblr—and DE cognitions and behaviors. These platforms were informed by previous body image research with young-adolescents (Slater, Varsani & Diedrichs, 2017; Tiggemann & Slater, 2013).

In the context of eating disorder risk, SM is thought to impact the well-established risk factors of media internalization and peer influences (Mabe, Forney, & Keel, 2014). A review of the relationship between SM and body image and DE outcomes by Holland and Tiggemann (2016) found that, of the 20 studies included, only four included a measure of DE as an outcome variable with three of these being with samples of undergraduate adults focusing on Facebook usage (Hummel & Smith, 2015; Mabe et al., 2014; Smith et al., 2013). The fourth study (Ferguson, Muñoz, Garza, & Galindo, 2014) explored the relationship between SM use in 237 Hispanic female adolescents (M = 14.11 years) from Texas, United States and found no relationship with either television exposure to the thin ideal or SM use and *Eating Attitudes Test* scores.

To the best of our knowledge, of the few studies to examine the relationship between SM use and DE, all apart from one have focused exclusively on cognitions, while Smith et al. (2013) also included one specific behavior, namely overeating. Maladaptive Facebook usage (defined as using Facebook for social comparisons) at baseline was found to be positively associated with episodes of over-eating at 4-week follow-up (Smith et al., 2013). One of the few studies to use the EDE-Q to measure DE explored racial differences in young-adult women (N = 922). Findings indicated that the frequency of Facebook usage was not related to DE, but users who sought reassurance from their Facebook followers (e.g., expecting followers to comment on their posts) had higher DE scores than those who did not (Howard, Heron, MacIntyre, Myers, & Everhart, 2017). There has been some exploration of brief measures of DE (SCOFF: Solmi, Hatch, Hotopf, Treasure, & Micali, 2015) and SM use in young-adults (Sidani, Shensa, Hoffman, Hanmer, & Primack, 2016) where a significant positive relationship was found between amount of SM use and eating concerns. Taken collectively, there is some evidence of a relationship between DE and SM usage in young-adult women. Thus the primary aim of this research was to explore rates of DE (cognition and behaviors), SM usage (Facebook, Instagram, Snapchat, and Tumblr), and the relationship between these variables in young-adolescent girls and boys. Given this was an exploratory study with younger participants than previous studies, it was decided to keep measurement of SM use to fundamental features (e.g., whether the user had an account, time spent on it, types of pictures posted) than the more nuanced features that have been measured with young-adult samples (e.g., types of accounts followed such as fitspiration or thinspiration accounts, whether the participant uses airbrushing techniques prior to posting an image on their account).

2 | METHODS

2.1 | Participants

Participants were 996 Grade 7 and Grade 8 girls (n = 534; 53.6%) and boys (n = 462) from classes across five schools in two Australian states (South Australia n = 710; Western Australia n = 286: M age = 13.08 years; SD = .60). All five schools were private schools, where four were coeducational (n = 894; 89.7%) and one was girls-only (n = 102; 10.3%). Socioeconomic status of participating schools was obtained from the Australian government's Index of Community Socio-Educational Advantage (ICSEA) whereby 1,000 represents the mean, with a standard deviation of 100 (Australian Curriculum, Assessment and Reporting Authority, 2011). The mean ICSEA rating was 1,153 (range = 1,106–1,177), indicating above average socioeconomic advantage. Mean BMI data were around the 50th percentile (Onis et al., 2007) expected for age for both girls (M = 18.94, SD = 3.44) and boys (M = 19.37, SD = 3.34). Data regarding participant ethnicity

was not collected but the participants were primarily Caucasian. School recruitment and measure completion occurred between February and May 2018.

2.2 | Procedure

Measure completion occurred in the context of baseline data collection for an eating disorder risk reduction randomized-controlled trial. Following parental consent for assessment completion, students completed questionnaires online in class time under the supervision of usual class teacher and a research assistant. Approval for this research was received from the Flinders University Social and Behavioural Research Ethics Committee and Principals of participating schools.

2.3 | Measures

2.3.1 | DE–Cognitions

The EDE-Q was used to provide a continuous measure of DE cognitions. This self-report version of the EDE interview is widely used in both risk factor and intervention research in the field (Bentley et al., 2015; Mond et al., 2014; Wilksch et al., 2015; Wilksch & Wade, 2009). The 22 items that form four subscales (Shape Concern, Weight Concern, Restraint, and Eating Concern) and a total Global score were used. Mean item scores on these items range from 0 to 6, with higher scores indicating higher levels of DE. The internal consistency of the global EDE-Q in this sample was α = .96 and α = .94 for girls and boys, respectively, consistent with reliability findings in other Australian adolescent samples (Mond et al., 2014). The validity of the EDE-Q with adolescent girls and boys has been confirmed, though less differentiation between the Shape Concern and Weight Concern subscales was found than in adult samples (White, Haycraft, Goodwin, & Meyer, 2014). It was decided to not measure the behavioral items given findings that the validity of behavioral items is lower for the questionnaire than interview formats and the young-adolescent age of the sample (Berg, Peterson, Frazier, & Crow, 2012).

2.3.2 | DE–Behaviors

The Project EAT (Eating Among Teens) questionnaire was used to measure DE behaviors (Haines et al., 2006). Participants were asked to respond with No (0) or Yes (1) to the stem question: "Have you done any of the following things in the last 12 months in order to lose weight or keep from gaining weight?" with respect to the following behaviors: *skipped meals; ate very little food; a strict eating plan; made myself vomit (throw up)*; and, *a strict exercise program*. Frequency of behaviors was not assessed. An additional item measured binge eating "In the past year, have you ever eaten so much food in a short period of time that you would be embarrassed if others saw you (binge-eating)?" where a response of yes resulted in an additional question addressing loss of control ("During the times when you ate this way, did you feel you couldn't stop eating or control what or how much you were eating?"). To be counted as a case with binge eating, both questions required a *Yes* response. This measure has been used in numerous longitudinal risk factor studies and has been found to be valid and reliable in young-adolescent samples (Neumark-Sztainer et al., 2002). It was developed through focus group discussions with youth, social cognitive theory as a theoretical framework, in-depth literature review of similar measures, input from various pediatric mental health experts, leading to extensive pilot testing, further revisions and the final measure (Ackard, Neumark-Sztainer, Story, & Perry, 2003; Neumark-Sztainer et al., 2002). It has also been used previously in school-based eating disorder risk reduction trials (Wilksch et al., 2015, 2017).

Given that three DE behaviors were of a food restriction nature we examined each of these three behaviors in a simultaneous linear regression with EDE-Q Global as the dependent variable. For both girls (ate very little food β = .28, meal skipping β = .29, and strict meal plan β = .29) and boys (ate very little food β = .19, meal skipping β = .29, and strict meal plan β = .27), each of the three items predicted unique variance in EDE-Q Global scores (p < .001) and were therefore retained separately in subsequent analyses.

An additional item of DE was assessed by requiring (a) the presence of at least one DE behavior (i.e., Project EAT items) and (b) an over-evaluation of shape or weight score in the clinical range (≥4) on the two relevant items from EDE-Q (*Has your weight/shape influenced how you think about [judge] yourself as a person?*). Over-evaluation of shape and weight is suggestive of current or future DE (Gowers & Shore, 2001; Wilksch & Wade, 2010). The use of this combined item was to provide an indicator of clinical significance where the combined presence of both DE cognitions and behavior, has been used as an indicator of DE in risk factor and intervention research (Wade, Wilksch, & Lee, 2012).

2.3.3 | SM use

SM use was assessed using items from previous body image research in adolescents (Slater et al., 2017; Tiggemann & Slater, 2013). Items included No (0) or Yes (1) responses to the following questions "Please indicate which of the following accounts you have?" (Facebook; Instagram; Snapchat; Tumblr); "Do you have a parent who is one of your friends/followers for this online account?"(No, Yes), "Is your profile set to a public mode on this account?" (No, Yes) and "How much time do you spend on this account on a typical day?" (0 = no time; 1 = 30 min; 2 = 1 hr; 3 = 2 hr; 4 = 3 hr; 5 = 4 hr; 6 = 5 hr; 7 = 6+ hr daily). Participants were then asked a series of questions about photo posting: "What do your posted pictures mainly consist of?" with No (0) or Yes (1) responses for types of photos including: "Selfies; Pictures of yourself or friends taken by someone else; Food; Possessions/items; Scenery and places; Animals; Other people (family, friends, celebrities), and Memes/quotes." Twitter use was not measured, as image-based SM platform use is more common in

TABLE 1 Disordered eating by girls and boys

	Girls	Boys	Group difference
	(*n* = 532)	(*n* = 461)	OR (95% CI)
EDE-Q scores	*M* (*SD*)	*M* (*SD*)	
Weight concerns (0–6)	1.79 (1.56)	1.22 (1.19)	**0.60 (0.53–0.70)**
Shape concern (0–6)	2.06 (1.66)	1.31 (1.33)	**0.59 (0.52–0.68)**
Eating concern (0–6)	0.94 (1.20)	0.65 (0.98)	**0.78 (0.66–0.87)**
Restraint (0–6)	0.86 (1.20)	0.63 (1.04)	**0.80 (0.71–0.92)**
EDE-Q Global (0–6)	1.52 (1.30)	1.00 (1.02)	**0.62 (0.54–0.72)**
Project EAT behaviors	N (%)	N (%)	OR (95% CI)
Skipped meals	162 (30.6)	83 (18.1)	**1.99 (1.47–2.69)**
Ate very little food	137 (25.8)	63 (13.7)	**2.19 (1.58–3.05)**
Strict meal plan	91 (17.2)	63 (13.7)	1.31 (0.92–1.86)
Vomit	13 (2.5)	17 (3.7)	0.66 (0.32–1.36)
Strict exercise	172 (32.5)	144 (31.4)	1.05 (0.80–1.37)
Binge eating (LOC)	67 (12.6)	27 (5.9)	**2.32 (1.46–3.70)**
OE SW ≥ 4 + DE behavior	75 (14.0)	24 (5.2)	**2.99 (1.86–4.83)**

Abbreviations: CI, confidence intervals; *M*, mean; OE SW ≥ 4 + DE behavior, over-evaluation of shape and weight mean item score of 4 or above and the presence of at least one disordered eating behavior; OR, odds ratios for logistic regressions with a significant difference are bolded; *SD*, standard deviation.

adolescents with one Australian study finding 84.4% of Grade 7 and 8 girls and boys never having used Twitter (Paxton, 2019).

2.4 | Statistical analyses

SPSS (version 25) was used to conduct analyses. EDE-Q Global and subscale scores were standardized and compared between girls and boys using logistic regressions. Logistic regressions were used to compare girls and boys on their frequency of individual DE behaviors and also to compare girls and boys on SM account usage including: having an account; if it was publicly viewable; if a parent was a follower; time spent using the account; whether pictures were posted and if so, what type of pictures were posted. For each of the above analyses, gender was the predictor variable.

All subsequent analyses were conducted separately by gender. Logistic regressions were used to examine if standardized EDE-Q global scores were related to each type of SM account (predictor variable). ANOVAs were used to investigate whether a cumulative relationship was found between total number of SM accounts (0, 1, 2, 3–4) and mean EDE-Q Global scores (including Bonferroni-adjusted post-hoc testing), while logistic regressions were used to explore this relationship between number of SM accounts (predictor variable) and DE behaviors. Logistic regressions were used to investigate the relationship between SM account type (predictor variable) and individual DE behaviors. Linear regressions explored the relationship between time spent using SM (with time scored in line with the distribution of responses: 0 = 0–30 min; 1 = 1 hr; 2 = 2+ hr) and DE cognitions (EDE-Q Global), while logistic regressions were used for the relationship between time spent using SM (predictor variable) and DE behaviors. Finally, types of images posted were simultaneously entered to explore their relationship with Global EDE-Q (linear regression) and DE behaviors (logistic regressions).

3 | RESULTS

3.1 | DE cognitions and behaviors

Table 1 reports mean scores for girls and boys for the respective EDE-Q scales and frequencies of DE behaviors. Girls scored significantly higher on each EDE-Q scale. Of the DE behaviors, skipping meals, eating very little food, and binge eating were reported by significantly more girls than boys. Over half of girls (51.7%) reported at least one DE behavior compared to 45.0% of boys. The presence of a DE behavior and over-evaluation of shape and weight in the clinical range was three times more common in girls (14.0%) than boys (5.2%).

3.2 | SM use

SM use data is reported in Table 2. A significantly higher proportion of girls than boys reported having Instagram and Tumblr accounts, while more boys than girls reported having Facebook. Of those with an account, boys were significantly more likely to have it set to Public for Instagram and Snapchat. Over half of both girls and boys did not have a parent as a follower on Snapchat. A significantly higher proportion of boys than girls did not have a parent follower for Facebook, Instagram, and Snapchat. Girls reported being more likely to post pictures of themselves or friends on both Instagram and Snapchat, and pictures of other people (e.g., family, celebrities) on both Instagram and Snapchat. Girls were also much more likely than boys to post

TABLE 2 Frequencies of social media accounts, details of account settings, and types of photos posted

Account type *N* (%)		Account details (*N* %)				Types of photos *N* (%)							
Have account		Public	No parent	Time using	Post pictures	Selfies	Self by others	Friends, celebs	Foods	Animals	Scenery	Memes	Possessions
Facebook													
Girls	**61 (12.1)**	7 (11.7)	**9 (15.0)**	0.82 (1.05)	27 (30.0)	4 (14.8)	16 (59.3)	12 (44.4)	6 (22.2)	12 (44.4)	16 (59.3)	9 (33.3)	4 (14.8)
Boys	**105 (24.1)**	5 (22.1)	**33 (32.4)**	0.98 (1.09)	46 (44.7)	4 (9.1)	26 (59.1)	21 (47.7)	9 (20.0)	15 (33.3)	26 (56.5)	16 (36.5)	11 (25.0)
OR (95% CI)	0.43 (0.31–0.61)		0.37 (0.16–0.84)										
Instagram													
Girls	**348 (68.1)**	**23 (6.6)**	**92 (26.6)**	2.02 (1.24)	**325 (93.9)**	68 (21.1)	**270 (83.1)**	**191 (59.1)**	73 (22.6)	151 (46.7)	237 (73.1)	**44 (13.6)**	**54 (16.7)**
Boys	**274 (61.7)**	**35 (12.8)**	**109 (40.1)**	1.89 (1.45)	**224 (82.1)**	33 (14.9)	**138 (62.2)**	**95 (42.8)**	40 (17.9)	94 (42.2)	149 (67.1)	**71 (31.8)**	**85 (38.3)**
OR (95% CI)	1.33 (1.01–1.73)	2.07 (1.19–3.59)	0.54 (0.39–0.76)		3.39 (1.98–5.80)		2.99 (2.01–4.45)	1.93 (1.37–2.73)				0.34 (0.22–0.52)	0.32 (0.22–0.48)
Snapchat													
Girls	301 (58.9)	**17 (5.7)**	**158 (52.7)**	2.47 (1.63)	271 (90.3)	144 (53.5)	**167 (62.1)**	**179 (66.3)**	**169 (62.8)**	**189 (70.8)**	**218 (81.0)**	**63 (23.6)**	120 (44.9)
Boys	242 (54.4)	**45 (18.9)**	**160 (67.2)**	2.22 (1.72)	211 (88.7)	98 (46.7)	**98 (46.7)**	**99 (47.1)**	**63 (30.0)**	**104 (49.5)**	**122 (58.4)**	**77 (36.7)**	97 (46.2)
OR (95% CI)		3.88 (2.16–6.98)	0.54 (0.38–0.77)				1.87 (1.30–2.70)	2.21 (1.52–3.19)	3.94 (2.68–5.80)	2.47 (1.69–3.60)	3.05 (2.02–4.60)	0.53 (0.36–0.79)	
Tumblr													
Girls	**42 (8.3)**	13 (31.0)	36 (85.7)	0.81 (1.35)	9 (21.4)	1 (11.1)	2 (22.2)	4 (44.4)	1 (11.1)	4 (44.4)	3 (33.3)	7 (77.8)	4 (44.4)
Boys	**16 (3.7)**	5 (33.3)	13 (86.7)	1.00 (.41)	4 (26.7)	2 (50.0)	2 (50.0)	1 (25.0)	2 (50.0)	1 (25.0)	2 (50.0)	3 (75.0)	1 (25.0)
OR (95% CI)	2.36 (1.31–4.27)												

Abbreviations: CI, confidence intervals; OR, odds ratios for logistic regressions with a significant difference between girls and boys are reported; Between-group comparisons that are significantly different are bolded ($p < .05$).

TABLE 3 Disordered eating cognitions by social media account type and disordered eating cognitions and behaviors by total social media accounts for girls and boys

	Girls					Boys				
	No	Yes	Group difference			No	Yes	Group difference		
	M (*SD*)	*M* (*SD*)	OR (95% CI)			*M* (*SD*)	*M* (*SD*)	OR (95% CI)		
Global EDE-Q										
Facebook	1.50 (1.30)	1.77 (1.26)	1.21 (0.94–1.56)			0.91 (0.92)	1.35 (1.25)	**1.40 (1.28–1.82)**		
Instagram	1.43 (1.28)	1.58 (1.31)	1.12 (0.93–1.36)			0.86 (0.80)	1.09 (1.12)	**1.28 (1.04–1.58)**		
Snapchat	1.29 (1.23)	1.70 (1.33)	**1.39 (1.15–1.68)**			0.89 (0.88)	1.11 (1.14)	**1.24 (1.02–1.50)**		
Tumblr	1.49 (1.27)	2.02 (1.48)	**1.43 (1.08–1.90)**			1.00 (1.02)	1.57 (1.15)	**1.53 (1.02–2.27)**		
Total accounts	0 *n* = 123	1 *n* = 99	2 *n* = 213	3–4 *n* = 67	Sig group contrasts	0 *n* = 129	1 *n* = 90	2 *n* = 123	3–4 *n* = 87	Sig group contrasts
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	ES (*d*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	ES (*d*)
Global EDE-Q	1.22 (1.15)	1.49 (1.38)	1.65 (1.31)	1.80 (1.31)	**0 < 2 (−0.35)** **0 < 3–4 (−0.49)**	0.84 (0.78)	0.93 (0.97)	0.99 (1.03)	1.40 (1.29)	**0 < 3–4 (−0.76)** **1 < 3–4 (−0.58)** **2 < 3–4 (−0.41)**
	N (%)	*N* (%)	*N* (%)	*N* (%)	OR (95% CI)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	OR (95% CI)
DE behavior	50 (40.3)	46 (46.9)	120 (56.3)	49 (73.1)	**0 < 2** **3.20 (1.45–7.14)** **0 < 3–4** **3.14 (1.21–8.11)**	51 (39.5)	40 (44.9)	55 (44.7)	42 (48.3)	**0 < 3–4** **5.00 (1.56–16.07)**

Abbreviations: CI, confidence intervals; EDE-Q, Eating Disorder Examination–Questionnaire; ES, effect size for significant between-group contrasts between number of social media accounts ($p < .05$); *M*, mean; OR, odds ratios for logistic regressions with a significant difference between girls and boys; *SD*, standard deviation.

pictures of food on Snapchat. Conversely, boys were more likely to post pictures of Memes (Instagram and Snapchat) and possessions (Instagram) than girls.

The modal number of followers was 0–50 for each account other than Instagram, where 100–500 was the modal number for both girls and boys. Girls had the following numbers of accounts: 0 = 24.7%; 1 = 19.7%; 2 = 42.3%; 3 = 11.7%; and, 4 = 1.6%. The commensurate numbers for boys were: 0 = 30.2%; 1 = 20.9%; 2 = 28.5%; 3 = 18.6%; and, 4 = 1.9%.

3.3 | Relationship between SM accounts and DE cognitions

Table 3 presents DE cognitions (Global EDE-Q) by SM account type. Snapchat and Tumblr were associated with significantly higher levels of DE for girls, while all SM accounts were associated with higher DE for boys. Bonferroni-adjusted post-hoc analyses were conducted to explore if EDE-Q subscales (Shape & Weight concern, Eating Concern, Dietary Restraint) uniquely contributed to this relationship. The only significant predictor was Shape and Weight Concern scores as a predictor of Snapchat use by girls (OR = 1.66, 95% CI [1.26–2.18]).

The relationship between total number of SM accounts and DE was investigated using one-way ANOVA (see Table 3). DE increased as did the number of SM accounts participants had for both girls ($F[3,498] = 4.01$, $p < .001$) and boys ($F[3,426] = 5.77$, $p < .001$). For girls, those with no SM had significantly lower DE than those with 2 or 3–4 accounts. For boys, those with 3–4 SM accounts had significantly higher DE scores than those with zero through to two accounts.

3.4 | Relationship between SM accounts and DE behaviors

Table 4 presents the proportion of participants engaging in DE behaviors based on SM account type. For girls, Snapchat use was associated with increased likelihood of eating little food, meal skipping, and following a strict meal plan. All SM platforms were associated with increased likelihood of strict exercise in girls. Tumblr was the only platform associated with increased risk of binge eating, with this found for both girls and boys. For boys, all platforms were associated with increased risk of meal skipping, while Tumblr use was also associated with eating little food. Girls with Snapchat or Tumblr accounts, and boys with Facebook, Instagram, or Snapchat accounts were significantly more likely to have both a DE behavior and presence of overevaluation of shape and weight in the clinical range.

The relationship between total number of SM accounts and DE behaviors was investigated using logistic regressions (see Table 3). Frequency of DE behaviors increased as did the number of SM accounts participants had for both girls and boys. For girls, those with no SM had significantly lower likelihood of DE behaviors than those with 2 or 3–4 accounts. For boys, those with 3–4 SM accounts had significantly higher likelihood of DE scores than those with no SM accounts.

3.5 | Relationship between time spent using SM and DE

Additional usage analyses were completed for Instagram and Snapchat only given that these account types were reported far more commonly

TABLE 4 Disordered eating behaviors and clinical levels of over-evaluation of shape and weight by social media account type for girls and boys

	Girls			Boys		
	No *N* (%)	Yes *N* (%)	OR (95% CI)	No *N* (%)	Yes *N* (%)	OR (95% CI)
Skipped meals						
Facebook	131/443 (29.6)	27/61 (44.3)	**0.53 (0.31—0.91)**	49/330 (14.8)	25/104 (24.0)	**0.55 (0.32–0.95)**
Instagram	34/162 (21.0)	125/347 (36.0)	**0.47 (0.31–0.73)**	20/169 (11.8)	58/272 (21.3)	**0.50 (0.29–0.86)**
Snapchat	43/210 (20.5)	116/299 (38.8)	**0.41 (0.27–0.61)**	25/202 (12.4)	52/240 (21.7)	**0.51 (0.30–0.86)**
Tumblr	141/460 (30.7)	16/42 (38.1)	0.72 (0.37–1.38)	68/414 (16.4)	6/15 (40.0)	**0.30 (0.10–0.86)**
Ate little food						
Facebook	109/334 (24.6)	22/61 (36.1)	0.58 (0.33–1.02)	41/330 (12.4)	18/104 (17.3)	0.68 (0.37–1.24)
Instagram	37/162 (22.8)	96/347 (27.7)	0.77 (0.50–1.20)	17/169 (10.1)	43/272 (15.8)	0.60 (0.33–1.08)
Snapchat	40/210 (19.0)	92/299 (30.8)	**0.53 (0.35–0.81)**	25/202 (12.4)	35/240 (14.6)	0.83 (0.48–1.44)
Tumblr	119/460 (25.9)	11/42 (26.2)	0.98 (0.48–2.02)	53/414 (12.8)	6/15 (40.0)	**0.22 (0.08–0.64)**
Strict meal plan						
Facebook	74/443 (16.7)	13/60 (21.7)	0.73 (0.37—1.40)	44/330 (13.3)	14/104 (13.5)	0.99 (0.52–1.89)
Instagram	29/162 (17.9)	60/346 (17.3)	1.04 (0.64–1.69)	17/169 (10.1)	43/273 (15.8)	0.60 (0.33–1.09)
Snapchat	27/210 (12.9)	61/298 (20.5)	**0.57 (0.35–0.94)**	22/202 (10.9)	38/241 (15.8)	0.65 (0.37–1.15)
Tumblr	78/460 (17.0)	9/42 (21.4)	0.75 (0.34–1.63)	53/414 (12.8)	4/15 (26.7)	0.40 (0.12–1.31)
Vomit						
Facebook	11/442 (2.5)	2/60 (3.3)	0.74 (0.16–3.42)	11/330 (3.3)	5/104 (4.8)	0.68 (0.23–2.01)
Instagram	3/162 (1.9)	10/345 (2.9)	0.63 (0.17–2.33)	7/169 (4.1)	9/272 (3.3)	1.26 (0.46–3.46)
Snapchat	5/210 (2.4)	8/297 (2.7)	0.88 (0.28–2.73)	9/202 (4.5)	7/240 (2.9)	1.55 (0.57–4.25)
Tumblr	12/460 (2.6)	1/41 (2.4)	1.07 (0.14–8.45)	15/414 (3.6)	1/16 (6.7)	0.53 (0.07–4.27)
Strict exercise						
Facebook	135/443 (30.5)	28/60 (46.7)	**0.50 (0.29–0.87)**	95/329 (28.9)	38/104 (36.5)	0.70 (0.44–1.122)
Instagram	40/162 (24.7)	126/346 (36.4)	**0.57 (0.38–0.87)**	51/169 (30.2)	85/272 (62.5)	0.95 (0.63–1.44)
Snapchat	43/210 (20.5)	122/298 (40.9)	**0.37 (0.25–0.56)**	62/201 (30.8)	75/241 (31.1)	0.98 (0.66–1.48)
Tumblr	142/460 (30.9)	21/42 (50.0)	**0.45 (0.24–0.84)**	128/413 (31.0)	3/15 (20.0)	1.80 (0.50–6.48)
Binge eating (LOC)						
Facebook	54/443 (12.2)	11/61 (18.0)	0.63 (0.31—1.29)	16/330 (4.8)	8/104 (7.7)	0.61 (0.25–1.47)
Instagram	20/162 (12.3)	47/348 (13.5)	0.90 (0.52–1.58)	6/170 (3.5)	20/272 (7.4)	0.46 (0.18–0.17)
Snapchat	26/209 (12.4)	40/301 (13.3)	0.93 (0.55–1.57)	11/202 (5.4)	15/241 (6.2)	0.87 (0.39–1.93)
Tumblr	55/460 (12.0)	10/42 (23.8)	**0.44 (0.20–0.93)**	21/414 (5.1)	3/15 (20.0)	**0.21 (0.06–0.82)**
OE SW ≥ 4 + DE behavior						
Facebook	63/442 (14.3)	11/61 (18.0)	0.76 (0.37–1.53)	12/329 (3.6)	12/101 (3.5)	**0.29 (0.13–0.67)**
Instagram	17/161 (10.6)	57/347 (16.4)	0.60 (0.34–1.07)	4/169 (2.4)	20/272 (7.4)	**0.31 (0.10–0.91)**
Snapchat	20/209 (9.6)	54/299 (18.1)	**0.48 (0.28–.83)**	5/201 (2.5)	19/241 (7.9)	**0.30 (0.11–0.81)**
Tumblr	62/459 (13.5)	11/42 (26.2)	**0.44 (0.21–0.92)**	22/413 (5.3)	2/15 (13.3)	0.37 (0.08–1.72)

Abbreviations: CI, confidence intervals; Between-group comparisons that are significantly different are bolded ($p < .05$); EDE-Q, Eating Disorder Examination-Questionnaire; *M*, mean; OR, odds ratios; LOC, loss of control; OE SW ≥ 4 + DE behavior, over-evaluation of shape and weight mean item score of 4 or above and the presence of at least one disordered eating behaviors; *SD*, standard deviation.

than Facebook or Tumblr. Linear regressions investigated if there was a relationship between time spent using SM accounts and DE cognitions (EDE-Q Global). A significant relationship was found for Instagram for girls where Figure 1 shows those spending more time on Instagram had higher DE scores (OR = 0.11 95% CI [0.01–0.34). This relationship was not found for boys or time spent using Snapchat for either girls or boys. Regarding DE behaviors, Figure 2 shows girls spending more time using Instagram (OR = 1.56 95% CI [1.20–2.03) or Snapchat (OR = 1.33 95% CI [1.02–1.73) had a higher likelihood of reporting a DE behavior. No significant relationship was found for boys.

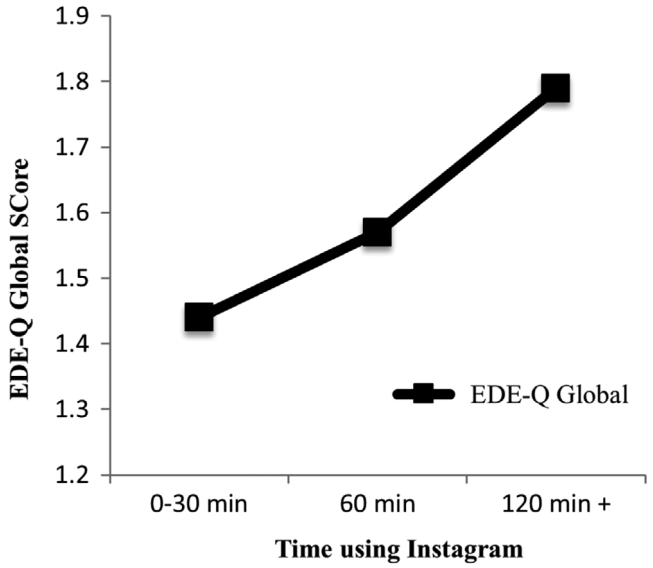

FIGURE 1 Disordered eating cognitions (Global EDE-Q) by daily time spent using Instagram for girls

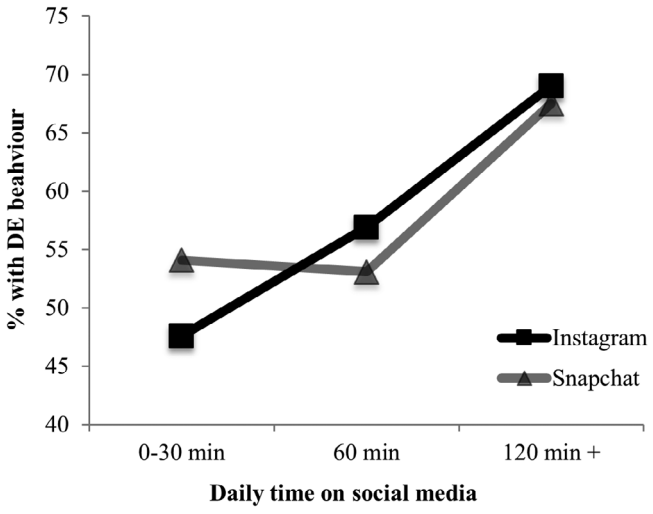

FIGURE 2 Disordered eating behaviors (Project EAT) by daily time spent using Instagram and Snapchat for girls

3.6 | Relationship between image type posted on SM and DE

The relationship between image type posted and EDE-Q Global was investigated using multivariate linear regressions. For girls on Instagram, posting pictures of oneself or friends taken by others was associated with higher EDE-Q Global scores (*M* = 1.63, *SD* = 1.35) than those who did not (*M* = 1.35, *SD* = 1.31: OR = 0.12 95% CI [0.01–0.83). For girls on Snapchat, posting Memes/Quotes was associated with higher EDE-Q Global scores (*M* = 2.11, *SD* = 1.54) than those who did not (*M* = 1.57, *SD* = 1.20: OR = 0.12 95% CI [0.05–0.84). For boys on Instagram, posting pictures of possessions was associated with higher EDE-Q Global scores (*M* = 1.44, *SD* = 1.25) than those who did not (*M* = 0.87, *SD* = 0.99: OR = 0.15 95% CI [0.03–0.68). For boys on Snapchat, posting selfies was associated with higher EDE-Q Global scores (*M* = 1.31, *SD* = 1.13) than those who did not (*M* = 0.94, *SD* = 1.16: OR = 0.23 95% CI [0.18–0.90]). These respective image types were then investigated for their relationship with DE behaviors. The only significant finding was for boys posting pictures of friends/self-taken by someone else on Instagram where those who posted such images (*N* = 73, 69.5%) had a higher likelihood of reporting a DE behavior than those who did not (N = 32, 30.5%; OR = 2.15 95% CI [1.15–4.01]).

4 | DISCUSSION

This exploratory report found that both DE and SM usage were common and significantly associated in young-adolescent girls and boys. Rates of DE cognitions and behaviors were higher than comparably-aged samples in recent Australian studies, though these studies used other measures of DE behaviors (Sparti et al., 2019). Boys in the current study had mean EDE-Q Global scores double those found by Bentley et al. (2015) and girls were nearly a third higher. The number of young people using any DE behavior was also more frequent than previously assessed in the Australian context. Sparti et al. (2019) found 25.3% of 13 year olds and 35.4% of 14 year olds were engaging in such behaviors compared to 51.7% girls and 45.0% of boys in the current study. These rates also highlight the increased occurrence of DE behaviors in Australian adolescent boys where a 1997 report found just 12% of boys reporting such behaviors (Patton et al., 1997). Previous research using the Project EAT measure found 56.9% girls and were 32.6% of boys had reported at least one DE behavior over the past 12 months (*N* = 4,746; *M* age = 14.9 years: Neumark-Sztainer et al., 2002).

The data suggests that SM usage is already common in girls and boys aged 12 to 13, particularly the use of Instagram and Snapchat. While girls were significantly more likely to have Instagram and Tumblr accounts than boys, there was relatively low usage of Facebook for both girls and boys. This highlights a challenge facing researchers; the seemingly high rate of variability in popularity of different SM platforms over short periods of time. Boys were less likely than girls to have a parent as a follower and more likely to have their SM account set to Public. However, over 50% of both girls and boys did not have a parent follower on Snapchat.

It was notable that girls were more likely to post pictures of people than boys on Instagram and Snapchat. This did not apply to selfies, but to pictures taken by others of the participant, as well as pictures of friends and celebrities. Girls were also twice as likely as boys to post pictures of food (Snapchat). These respective findings suggest that girls have a greater focus on appearance and food than boys and fits conceptually with girls having increased DE risk. They were also consistent with previous findings that elevated appearance-focused activity on SM (e.g., commenting on photos, posting photos) was associated with higher levels of thin-ideal internalization, drive for thinness and weight dissatisfaction in high school females (Meier & Gray, 2014).

Having SM accounts was associated with increased DE cognitions and behaviors. Global EDE-Q scores were significantly higher for both girls and boys with each type of SM account than for those without, with Instagram and Facebook for girls the only exception. Some evidence of a dose–response relationship emerged between the number of SM accounts and level of DE cognitions and behaviors. For example, girls without any SM accounts had significantly lower EDE-Q Global scores and were less likely to report any DE behaviors compared to those with 2 or 3–4 accounts.

Regarding DE behaviors, girls with Snapchat had significantly higher likelihood than girls without Snapchat of: eating little food; skipping meals; following a strict meal plan, strict exercise, and the combined presence of clinical levels of over-evaluation of shape and weight with a DE behavior. Girls with Instagram accounts had significantly elevated levels of strict exercise and meal skipping. Facebook use was associated with strict exercise and meal skipping. Tumblr use was the only SM account for both girls and boys that was associated with binge eating, while for girls it also correlated with higher likelihood of clinical levels of over-evaluation in the presence of a DE behavior. Given that Instagram and Snapchat were clearly the two most popular SM platforms, it could be speculated that more distal symptoms in DE models (e.g., binge eating, the combined presence of a DE behaviors and clinical over-evaluation) were only reported in girls with Tumblr use as these girls might have more SM accounts and therefore greater exposure to potentially unhelpful content. Evidence of a relationship between DE cognitions and behaviors and level of exposure to SM (i.e., daily time spent using) was found for girls using Instagram, and DE behaviors only and daily time using Snapchat for girls.

For boys, Facebook, Instagram and Snapchat were all associated with the combined presence of over-evaluation with a DE behavior. For boys, meal skipping was associated with all four account types, while eating little food was also associated with Tumblr use. Further, boys posting pictures on Instagram of oneself or peers taken by others was the only multivariate predictor of posted image type significantly associated with DE behaviors. In addition, boys posting selfies on Snapchat was a multivariate predictor of higher Global EDE-Q scores. Thus a range of associations were found between DE (cognitions and behaviors) and SM account usage in both girls and boys, with our study confirming that these associations occur at younger-age than previously investigated. Our findings are consistent with suggestions that Instagram and Snapchat are even more image-based forms of SM than Facebook and that these account types are particularly popular with younger users (Fardouly & Vartanian, 2016).

The current study was cross sectional and exploratory in nature, thus preventing conclusions about causation. Few longitudinal studies exist. A Dutch study found SM use amongst high school aged females and males predicted elevated body dissatisfaction 18 months later (N = 604; M age 14.7 years: de Vries, Peter, de Graaf, & Nikken, 2016). However, elevated body dissatisfaction at baseline did not predict greater SM use 18 months later, suggesting that SM usage leads to elevated body dissatisfaction rather than those with body image concerns seeking increased SM use. This needs to be tested in younger adolescent samples. Such research needs to adequately differentiate types of SM use as evidence suggests some forms can be helpful. For example, young-adult women observing parody versions of celebrity Instagram posts experienced improved mood and increased body satisfaction (Slater, Cole, & Fardouly, 2019). Further, there are challenges in the measurement of SM use including: the field lacking an agreed upon SM use measure which limits the comparability of studies; the tendency for the popularity of specific SM platforms to change quickly (Fardouly & Vartanian, 2016); and the challenges of measuring and identifying the key processes in SM use that are associated with increased DE risk. It is acknowledged that despite being based on previous research (Slater et al., 2017; Tiggemann & Slater, 2013) the SM use measure was somewhat narrow in focus and it was a limitation that more nuanced features were not measured such as: the posting of fitness-related images; the types of accounts followed by the participants (e.g., fitspiration, thinspiration), and the content of written posts. A final limitation is that this sample was comprised of private school children where socioeconomic diversity could be expected to be lower than if schools across the public and private sectors were included. This needs to be addressed in future research.

The current study suggests that SM, particularly platforms with a strong focus on image posting and viewing, is associated with elevated DE cognitions and behaviors in young adolescents. While prospective studies are needed to identify the temporal relationship between the variables and which components of SM use might convey DE risk in this demographic, it is likely that a range of strategies need to be considered in how to mitigate any such risks for young people. Parents have an important role to play in their child's early use of SM where one study has found parental control over time spent on SM in preadolescents is associated with greater life satisfaction in these girls and boys (Fardouly, Magson, Johnco, Oar, & Rapee, 2018). While it is acknowledged that this strategy becomes less feasible and effective beyond the late childhood years, it might go some way to reducing possible harm when the child is still young and vulnerable, similar to how television viewing has been traditionally managed by parents. More broadly, however, it is of critical importance that young people develop their own skill set for their use of all forms of media. Media literacy offers a potent approach here where participants are encouraged to consider (Wilksch et al., 2015; Wilksch & Wade, 2009): how helpful/unhelpful is it to make comparisons between oneself and images seen in the media; how likely is it that the image has been manipulated in some way; to what extent the participant wishes to internalize such messages; how the producer of that media might want others to feel; and, to engage in activism as the participant sees fit (e.g., choose to no longer follow unhelpful accounts). While such an approach seems a natural fit for SM, the learning strategies require nuance in how they are developed and taught since SM is usually regarded as highly important to young people. As ever in media literacy, the key task is for the program to help young people make up their own mind on what relationship they want to have with SM and how this form of media fits with their personal values. The current study suggests this work needs to be prioritized.

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CONFLICT OF INTEREST

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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