A prospective examination of relationships between social media use and body dissatisfaction in a representative sample of adults

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Abstract

This study examined the temporal sequence of the relationship between social media use and body dissatisfaction in adults. A representative sample of adults (19–92 years old; $M = 52.83$, $SD = 13.43$; 62.02% women, 37.98% men) completed measures of social media use, body dissatisfaction, age, gender, BMI, and demographic variables in 2015, 2016, 2017, 2018 and 2019 ($N = 6,258$) in the New Zealand Attitudes and Values Study. In the full sample, higher social media use was significantly associated with higher body dissatisfaction one year later, as was higher body dissatisfaction with higher social media use one year later after controlling for body dissatisfaction/social media use (T-1), gender, age, BMI, ethnicity, relationships status, and SES. Effects were small. The prospective pathway from social media use to body dissatisfaction was significant in all age groups but the reverse relationship was only significant in the middle aged and older groups. Both pathway directions were significant in women but only the pathway from body dissatisfaction to social media use was significant in men. The research has limitations and replication is required. However, findings suggest raising awareness about how to use social media positively across the broad community, not merely in adolescents, may be worthwhile.

Keywords: body dissatisfaction, social media use, adult, men and women, longitudinal

Highlights

Higher social media use significantly predicted body dissatisfaction one year later

Body dissatisfaction significantly predicted social media use one year later

Significant bidirectional relationships were present in women, but not men

These small effects were found in a large nationally representative adult sample

Implications for supporting broader community use of social media are discussed

1. Introduction

Social media is a social environment which combines both peer and media aspects. It is a highly engaging, visual, and interactive environment (Perloff, 2014) in which young people spend increasing amounts of time (Auxier & Anderson, 2021). Young adults spend an average of three hours per day on social media (Mingoia et al., 2019), although less time is reported with increasing age (Hayes et al., 2015). Benefits of social media engagement include opportunities for self-expression, strengthening friendships and social support, and pursuing interests (Weinstein, 2018). However, there is growing cross-sectional (Kelly et al., 2018) and mixed longitudinal (Booker et al., 2018; Coyne et al., 2020; Orben et al., 2019; Viner et al., 2019) evidence that elevated levels of social media use are associated with poorer mental health in adolescents, although few studies have been conducted in adult samples. One area of well-being that has received particular attention in this regard is body dissatisfaction.

Body dissatisfaction refers to negative thoughts, feelings and perception of one's body (Grogan, 2008) and is frequently assessed as general dissatisfaction with one's appearance or body parts, or weight and shape concerns (Saiphoo & Vahedi, 2019). Body dissatisfaction is not only a negative immediate experience associated with distress and impaired physical and psychosocial quality of life (Griffiths et al., 2016), but also a risk factor for the development of depressive and anxiety symptoms, health risk behaviors (Bornioli et al., 2019; Paxton, Neumark-Sztainer, et al., 2006), and importantly, disordered eating and clinical eating disorders (Stice et al., 2017). Consequently, understanding risk factors for the development of body dissatisfaction has been a focus of research, one potential risk factor being elevated social media use.

1.1 Social media use as a risk factor for body dissatisfaction

Research into risk factors for body dissatisfaction has been guided by a number of theoretical models, including sociocultural perspectives, of which the dominant one is the tripartite influence model (Thompson et al., 1999). This model emphasizes sociocultural risk factors, particularly pressures to conform to societal appearance norms from social environments including appearance-focused family, peer, and media environments. It is proposed that exposure to these environments contributes to internalization of appearance ideals which increases the likelihood of making upward social comparisons with the appearance of others, resulting in a negative appraisal of one's own appearance and body dissatisfaction (Rodgers et al., 2015). Of appearance-focused environments, recent research has examined the potential risk factor of elevated levels of exposure to social media.

Exposure to social media has been proposed to be a risk factor for the development of body dissatisfaction for a number of reasons (Perloff, 2014). Although social media platforms vary in emphasis, many focus on the posting of idealized appearance images (Rodgers, 2016). It is proposed that social media images create unrealistic appearance standards that are, for most people, impossible to attain. Comparison with these images results in negative evaluation of one's own body and subsequent body dissatisfaction (Fardouly & Holland, 2018; Tamplin et al., 2018). These images are often of socially relevant peers which may strengthen the negative impact of social appearance comparison on body image among young people (Fardouly & Vartanian, 2015). In addition, the highly interactive nature of social media is likely to add to the intensity of engagement with the images and appearance comparisons, thereby increasing their negative impact (Perloff, 2014; Rodgers, 2016).

Empirical research provides support for a relationship between greater social media exposure and greater body dissatisfaction. A meta-analysis of cross-sectional relationships found a significant but small, positive association between social media use and body dissatisfaction (predominantly assessed with measures of general, evaluative body

satisfaction), and this was especially the case with appearance-focused social media use (Saiphoo & Vahedi, 2019). Cross-sectional modelling also supports the proposed roles of internalization of appearance ideals and appearance comparison in mediating the effect of social media use on body dissatisfaction, assessed as weight and shape concerns, in adolescence (Rodgers, Slater, et al., 2020). In addition, experimental studies comparing the effects of exposure to idealized social media appearance images and non-appearance images find exposure to idealized images have a short-term negative impact on state body satisfaction in men and women (Holland & Tiggemann, 2016; Tamplin et al., 2018).

Prospective studies provide information about longer-term temporal relationships between social media use and body dissatisfaction in adolescents. De Vries and colleagues (2016) found that in adolescent girls and boys, higher social media use predicted general body dissatisfaction up to 18-months later. In an adolescent sample, Rousseau et al. (2017) did not observe a direct cross-lagged relationship between Time 1 passive Facebook use and Time 2 general body dissatisfaction 6 months later, but their analyses suggest the possibility that this relationship exists in indirect form. Ferguson et al. (2014) found no direct effect of social media exposure on body esteem at 6-month follow-up in a small sample of adolescent girls. Similarly, Tiggemann and Slater (2017) found no relationship between time spent on Facebook and body image variables two years later in adolescent girls. A major limitation of research in this area is the lack of longitudinal data in adult samples that would allow examination of the temporal relationships between social media use and body image. The present research will address this limitations.

1.2 Body dissatisfaction as a predictor of greater social media use

Although it may be proposed that elevated social media use will increase risk of future body dissatisfaction, consistent with the tripartite influence model, correlational studies

cannot confirm the direction of effects (Saiphoo & Vahedi, 2019). However, experimental

studies demonstrating greater body dissatisfaction following exposure to idealized social

media appearance images compared to non-appearance controls do indicate that one causal

pathway is from social media exposure to body dissatisfaction (Fardouly & Holland, 2018;

Holland & Tiggemann, 2016; Tamplin et al., 2018). In contrast, it has been suggested that it

is also plausible that pre-existing body dissatisfaction may cause individuals to use social

media at a higher frequency (Rousseau et al., 2017; Saiphoo & Vahedi, 2019). This pathway

is consistent with uses and gratification theory, which proposes that users of media actively

select the type, amount and nature of media they use (Blumler & Katz, 1974). When applied

to relationships between traditional media use and body image, Tiggemann (2003) suggested

that individuals choose to view media to gain information about appearance standards.

This theory has also been applied to understanding social media use (Raacke &

Bonds-Raacke, 2008; Rodgers, 2016), such that it is proposed that users are motivated to

engage with social media to satisfy different needs and, in so doing, will select particular

content and the level of their involvement to meet these needs. Rodgers (2016) suggested that

in the context of body image concerns "this may translate to the Internet being appealing

through control of self-presentation, the availability of appearance, diet, and weight and

shape-related content, and the capacity for social interaction" (p.12). In addition, different

patterns of social media use may be associated with user characteristics, such as pre-existing

body dissatisfaction (Rodgers, 2016).

Rousseau et al. (2017) extend this theory by proposing a psychological need of

adolescents with body dissatisfaction that may be met by viewing social media, specifically,

engaging in comparisons on social media. They suggest that the pursuit of self-improvement

inspires adolescents with body dissatisfaction to engage in comparisons, which are readily

available through social media platforms, as a source of information on how to improve

appearance (Rousseau et al., 2017). In this manner, body dissatisfaction provides motivation for elevated viewing. Alternatively, Rousseau and Eggermont (2018) propose that pre-existing body dissatisfaction may contribute to lower social media use as a means of providing protection against the negative impact of comparison with idealized images, that is self-preservation.

Of the limited research examining potential reciprocal effects between social media use and general body dissatisfaction, Rousseau et al. (2017) found no direct cross-lagged relationship between Time 1 body dissatisfaction and passive Facebook use at Time 2 (6-months later), but only an indirect relationship. This suggested that Time 1 body dissatisfaction predicted greater comparisons with Facebook at Time 2, which was associated with greater passive Facebook use at Time 2, which could be interpreted as being consistent with a self-improvement argument. However, although Time 1 body dissatisfaction was positively associated with Time 1 comparisons, greater Time 1 comparisons predicted lower passive Facebook use at Time 2 suggesting a self-preservation effect. Both the self-improvement and self-preservation perspectives indicate the relevance of uses and gratifications theory, in that different types of motivations may direct different levels of engagement with social media. Notably, we are not aware of any research examining reciprocal relationships between social media use and body dissatisfaction in adult samples.

With these two opposing theoretical positions in mind (i.e., that social media use contributes to body dissatisfaction or that body dissatisfaction contributes to social media use), we propose that dual pathways may exist over time, one from higher social media use to higher body dissatisfaction, and another from higher body dissatisfaction to higher social media use. These pathways will be explored in the present research.

1.3 Possible age and gender differences in relationships between social media use and body dissatisfaction

Research has explored longitudinal relationships between social media use and body dissatisfaction in adolescents as described earlier (de Vries et al., 2016; Ferguson et al., 2014). However, there are a number of reasons to examine these relationships in adults in general, and also to examine these relationships in different age groups across adulthood. Research, especially in women, demonstrates that body image concerns, especially weight concerns, tend to continue into adulthood rather than diminish across the lifespan (Kilpela et al., 2015). For example, 60% of women aged 60-70 years report general dissatisfaction with their appearance (Kilpela et al., 2015; Mangweth-Matzek et al., 2006). Importantly, body dissatisfaction in adult years continues to predict elevated disordered eating symptoms and eating disorders (Slevec & Tiggemann, 2011). In a population study, at least weekly episodes of bingeing, purging, and strict dieting or fasting have been reported in 18.5%, 21.2%, and 17.1%, respectively in 35- to 44-year old adults, and 17.4%, 28.6%, and 21.4% respectively in 45- to 54-year-old adults (Hay et al., 2008). Further, adult women with body size dissatisfaction are more likely to experience depressive symptoms (Jackson et al., 2014). Thus, it is clearly important to understand predictors of body image across the lifespan.

In addition, there are numerous age-related changes that occur across adulthood that may affect body image and thus warrant examining predictors of body dissatisfaction at different life phases. In particular, age related physical changes including changes in shape, increases in weight, wrinkles, thinning hair, and loss of musculature, frequently take both men and women further and further from the youthful societal appearance ideal (Becker et al., 2013; Kilpela et al., 2015; McLean et al., 2010). Despite this being a natural process, adults report experiencing pressure from media as they age to meet youthful appearance ideals and resist the ageing process (Hofmeier et al., 2017; Jankowski et al., 2016; Rodgers et

al., 2016). However, to date, the specific relationship of social media and body dissatisfaction in different life phases has received little research attention. One study of Facebook use across a large age range of adults, found younger (18-29 years) compared to older (50-70 years) adults were more likely to report body dissatisfaction when looking at images of themselves on the platform (Hayes et al., 2015). Further, in their meta-analysis, Saiphoo and Vahedi (2019) found age to be a significant moderator of the effect between social media use and body dissatisfaction such that the relationship weakened as the mean age of the sample increased.

A further reason to examine relationships between social media and body dissatisfaction in different life phases, is that there is research to suggest that the nature of social media use varies at different ages. Motivations to use social media will likely vary by age or life phase. For example, older adults (52-92 years) primarily use social media to keep in contact with family (Bell et al., 2013), whereas younger users seek recognition (15-35 years; Leung, 2013). In addition, age has been found to predict the size and composition of Facebook networks, whereby older adults value the quality of online friendships over the quantity whereas younger users may have a greater number of online friends with weaker social ties (Chang et al., 2015). These distinct motivations and values likely contribute to different types of usage according to age group. Research suggests that younger individuals (18-29 years) spend more time on social media including chatting to existing and new friends, middle-aged adults (30-49 years) typically post more text-based content, and older adults (50-70 years) use social media more passively (Hayes et al., 2015). Further, younger adults engage more extensively in photo-based platforms and activities which may present more idealized appearances (Hayes et al., 2015). Exposure to this type of content may increase the likelihood of comparisons, resulting in poor body image (Rodgers et al., 2015). Appearance ideals shown in social media present youthful individuals who some may

consider less socially relevant for older adults. However, these ideals may still induce internalization and comparison due to their attractive nature. In line with this, research suggests that older adults (50-70 years) also experience body dissatisfaction from social media, perhaps because they are further from the ideal themselves (Hayes et al., 2015). Given the unique impacts of body image and uses of social media among younger, middle-aged and older adults, it is likely that these will be distinct from findings among adolescents. Therefore, it is important that research explores the relationships between social media use and body image among different age groups.

Previous research is not clear-cut regarding gender differences in relationships between social media use and body dissatisfaction. However, two systematic reviews have not found gender to influence the strength of cross-sectional relationships between social media use and body image and disordered eating (Holland & Tiggemann, 2016; Saiphoo & Vahedi, 2019). It has been suggested that this finding may be because social media, unlike traditional media, does not specifically target women and both girls and boys and young adult men and women are frequent users of social media and post idealized appearance content on social media (Saiphoo & Vahedi, 2019).

Finally, ethnicity, socioeconomic status (SES), and relationship status have been observed in some research to have an impact on the development of body dissatisfaction (Laus et al., 2018; Paxton, Eisenberg, et al., 2006). Specifically, African American ethnicity has been found to be a protective factor for body dissatisfaction, while lower SES and those not in an intimate relationship report higher body dissatisfaction. Given that factors such as cultural norms and personal circumstances appear to contribute to body image, these variables (ethnicity, SES, and relationship status) will be controlled in analyses.

1.4 The present research and hypotheses

Despite body dissatisfaction continuing through adult life (McLean et al., 2010), we are not aware of any longitudinal studies which have examined relationships between social media and body dissatisfaction in adults. In the present research, we overcome this limitation by examining data from wave 7 (2015; T1), wave 8 (2016; T2), wave 9 (2017; T3), wave 10 (2018; T4), and wave 11 (2019; T5) of a large longitudinal study of a representative sample of adults, the New Zealand Attitudes and Values Study (NZAVS; Sibley, 2020) in which a measure of general evaluative body satisfaction and frequency of social media use were collected. Although prospective relationships from both social media use to body dissatisfaction and body dissatisfaction to social media use are plausible, previous data do not exist to guide predictions as to the relative strength of these relationships. Therefore, we hypothesized that higher social media use at T-1 (Time 1, 2, 3, 4) would predict higher body dissatisfaction at T (Time 2, 3, 4, 5), but also that higher body dissatisfaction at T-1 (Time 1, 2, 3, 4) would predict higher social media use at T (Time 2, 3, 4, 5), after controlling for body dissatisfaction and social media use in the earlier wave, gender, age, BMI, ethnicity, relationships status, and SES. No predictions were made as to the relative strength of the pathways.

We also examined the roles of age and gender on the prospective relationships. As a previous meta-analysis of correlational studies of the relationship between social media use and body dissatisfaction in adolescents and youth found age to moderate the relationship this relationship, we proposed that age may also be a factor in older adults (Saiphoo & Vahedi, 2019). We predicted that the longitudinal relationship from social media use to body dissatisfaction would be stronger in younger (i.e., <35 years) than older adults (i.e., ≥50 years). In view of little previous research to give guidance, we made no prediction about age differences in in the pathway from body dissatisfaction to social media use. In relation to gender, in line with findings from the majority of experimental studies (Holland &

Tiggemann, 2016; Saiphoo & Vahedi, 2019), we hypothesized that prospective relationships between social media and body dissatisfaction would be similar in women and men.

2. Material and methods

2.1 Participants and procedure

Data for this study are from the NZAVS, a nationally representative, longitudinal study of personality, social attitudes, and health outcomes among New Zealand adults. Data reported here were sampled in the 2015 (T1), 2016 (T2), 2017 (T3), 2018 (T4), and 2019 (T5) waves of a national probability longitudinal study of adults who were randomly recruited in 2009 (1st wave). These are all available waves of data with the variables of interest. Booster samples to increase the size and diversity of the sample have been conducted by randomly sampling the electoral roll. Participants responded to a mail-out survey or completed the survey online. Sample, response rate, and retention information for these five waves are reported in Supplementary Table 1. Additional information about the procedure and demographics of participants are available on the NZAVS website (https://nzavs.auckland.ac.nz/).

Participants retained across all timepoints in our sample ($N = 6,258$; 62.02% women, 37.98% men) were aged between 19 and 92 years ($M = 52.83$, $SD = 13.43$). The University of Auckland Human Participants Ethics Committee approved all procedures, and participants gave informed consent.

2.2 Materials

2.2.1 Social media use. Participants estimated the number of hours spent on social media (e.g., Facebook) in the previous week. Studies suggest that self-reported media exposure is moderately reliable and highly stable (Scharkow, 2019). In support of the stability of this item, in the present study across the 5 assessment points, the average wave-to-

wave correlation for social media use was high ($\dot{r}$ = .60, p < .001). Single-item measures of self-reported time spent on social media are widely used in epidemiological research (e.g., Booker et al., 2018; Kelly et al., 2018) and have demonstrated good convergent validity with other measures of social media use such as reported frequency of social media use in adolescent boys and girls (r = .53; Rodgers, Slater, et al., 2020) and in young adult women (r = .57; Fardouly & Vartanian, 2015).

2.2.2 Body dissatisfaction. Participants were asked to rate their level of body dissatisfaction on a single item, 'I am satisfied with the appearance, size and shape of my body' using a 7-point scale (1 = *Very Inaccurate*; 7 = *Very accurate*; Stronge et al., 2015). Scores were reversed, so that high scores indicated greater body dissatisfaction. In support of the stability of this item, in the present study across the 5 assessment points, the average wave-to-wave correlation for body dissatisfaction was high ($\dot{r}$ = .68, p < .001). Single item measures of body dissatisfaction have been shown to be valid and reliable in adolescent samples (Shisslak et al., 1999) and to have good convergent validity with a range of validated multi-item body dissatisfaction scales (Rhondali et al., 2015). Specifically, a single-item measure assessing overall appearance satisfaction was found to have sensitivity of .70, specificity of .71, and positive predictive value to detect cut-off scores on a multi-item measure of body satisfaction indicating clinical body dissatisfaction (Rhondali et al., 2015). Furthermore, single-item measures of body dissatisfaction have been found to be significantly and highly correlated with other dimensions of body image in adolescent boys and girls (Mitchison et al., 2017) and have been used in adult and adolescent samples (Rodgers, Campagna, et al., 2020; Sonneville et al., 2012; Stronge et al., 2015).

2.2.3 Demographic information. Participants provided information on age, gender, partner status (current partner, no current partner), and ethnicity (NZ European, other), among other variables in an omnibus survey. Socio-economic status (SES) as determined by

the New Zealand Socio-economic Index (Fahy et al., 2017), is based on occupational status (10 = low, 90 = high). Self-report height and weight were also provided from which BMI was derived (World Health Organization, 2000).

2.3 Data analysis

To investigate our hypotheses in the total sample, we used a series of stationary cross-lagged panel models (CLPM) to examine prospective relationships between body dissatisfaction and social media use across five adjacent time-points (2015, 2016, 2017, 2018 and 2019) using Mplus version 8.0 (Muthén & Muthén, 2017). We constrained the auto-regressive and cross-lagged associations between body dissatisfaction and social media use to be the same at each measurement point because we were more interested in the overall and comparative effects of body dissatisfaction and social media use on each other, rather than whether these effects change during the interval measured. We also covaried all initial predictors with each other and on each auto-regressive and cross-lagged path. Unstandardized estimates are reported as these are useful for comparing the strengths of paths in stationary models with more than two time-points. We used a more stringent threshold of $p < .01$ to indicate significance of findings given the number of models and tests, and describe the magnitude of effects using Cohen's d (Cohen, 1992).

All models were run with maximum likelihood estimation with robust standard errors (Yuan & Bentler, 2000). Full information maximum likelihood (FIML) was used to impute missing data given the inevitability of missing data in longitudinal research. This approach to handle missing data has several strengths. Firstly, FIML neither imputes missing values nor requires data to be missing completely at random (Enders, 2001). Secondly, FIML is an efficient way to utilize all available data without discarding responses, as would be the case in list-wise or case-wise deletion, and outperforms both of these methods in producing unbiased and efficient parameter estimates while managing Type 1 errors (Enders &

Bandalos, 2001). We also estimated bias-corrected (BC) 99% Confidence Intervals (CIs) using 1,000 bootstrapped resamples (with replacement). Our predictions controlled for gender, age, BMI, socioeconomic status, ethnicity, and partner status.

To further explore whether the effects of body dissatisfaction on social media use varied across age and gender, we used an approach consistent with our pre-registration. We conducted multigroup models, one grouped by age (3 groups: <35 years; ≥35<50 years; ≥50 years), and one by gender (2 groups: women; men), to examine whether the strengths in the bidirectional relationships between body dissatisfaction and social media use were different across these pre-defined categories. In relation to the age groups, the cutoff for the youngest age group was selected to approximately represent adults who could be considered digital natives having grown up with different kinds of social media and therefore are thought to be particularly familiar with social media (Kontos et al., 2014). The second cutoff of 50 years was selected as being to capture the transition to menopause for the majority of New Zealand women (Lawton et al., 2008), frequently a time of age-related changes in body size and shape (away from social appearance ideals; Kilpela et al., 2015). To match this, we used the same age for men. Syntax used is available on the NZAVS website.

In each model, autoregressive relationships between outcome variables (body dissatisfaction (T-1) to body dissatisfaction (T) and social media use (T-1) to social media use (T)) were examined, and, as typically observed, there was high stability across time. These relationships were significant and large in all models. However, as these were not the focus of the present research, details of these relationships are provided in tables or Supplementary Materials. Descriptive statistics and zero-order correlations between variables for each analysis are also provided in the manuscript tables or as part of the Supplementary Materials.

2.4 Pre-registration

Minor variations from our pre-registration (http://tiny.cc/bdsmu) were made, by including BMI as a covariate in all models due to an omission in the pre-registration. Following initial peer-review we opted to remove exploratory analyses related to BMI multigroups. Further, we omitted planned moderation analyses and focused on multigroup analyses, given that we expanded our timeframe to include all available data with the variables of interest in the NZAVS and could no longer run planned moderation analyses that could only be specified over two timepoints.

3. Results

3.1 Attrition analyses

We conducted a Poisson regression using the Time 1 measures of age, gender, SES, partner status, ethnicity, and BMI to predict the number of subsequent timepoints participants responded to. These analyses revealed that being younger ($B = 0.003$, $p < .001$; CI_{99}= 0.002,0.004), lower SES ($B = 0.002$, $p < .001$; CI_{99}= 0.002,0.003), and being from a New Zealand European background ($B = 0.143$, $p < .001$; CI_{99}= 0.100,0.186) were associated with completing fewer additional timepoints. Gender ($B = -0.015$, $p = .098$; CI_{99}= -0.039,0.008), partner status ($B = -0.001$, $p = .934$; CI_{99}= -0.025,0.024) and BMI ($B = -0.001$, $p = .368$; CI_{99}= -0.002,0.001) were not associated with number of subsequent timepoints completed. For additional information about the predictors of sample attrition see Satherley et al. (2015).

3.2 Descriptive characteristics

Tables 1 and 2 present descriptive statistics and correlations between variables across all five time points. Social media hours ($r = .49$, $p < .001$) and body dissatisfaction ($r = .62$, $p < .001$) showed high levels of rank-order stability over four years (i.e., between the annual assessments at the first and last time-point). Transformations to Fisher z-scores, and subsequent transformations back to Pearson correlation coefficients, indicated that the

average wave-to-wave correlations for social media use ($\bar{r}$ = .56, p < .001) and body

dissatisfaction ($\bar{r}$ = .68, p < .001) were also high. Average year-to-year intercorrelations

between body dissatisfaction and social media were small ($\bar{r}$ = .12, p < .001).

On average the sample was below the mid-point on the body dissatisfaction item, and

social media use hours were reported as around four hours per week. Both higher body

dissatisfaction and social media use were significantly associated with being younger, female,

having higher BMI, without a current partner, and lower SES. Those from NZ European,

compared to other ethnic backgrounds, were significantly more likely to report lower social

media use and higher body dissatisfaction.

[INSERT TABLE 1 APPROX. HERE]

3.3 Cross-lagged paths between body dissatisfaction and social media use over time

The cross-lagged model of body dissatisfaction (T-1) and social media use (T-1) to

body dissatisfaction (T) and social media use (T) in the total sample is presented in Figure 1

(all estimates including covariates are presented in Table 2). The specified model was a good

fit with the data, χ^2 = 1447.94, df = 39, p < .001, comparative fit index [CFI] = .89. Given our

sample size was large, obtaining a non-significant chi-square would be very unlikely.

However, indices less influenced by complexity suggested an adequate fit of the model to the

observed covariance matrix (i.e., RMSEA $\leq$ .06, SRMR $\leq$ .08), $RMSEA$ = .05, $SRMR$ = .07.

In support for our hypothesis predicting bidirectional relationships between body

dissatisfaction and social media use, there was a significant, small, positive bidirectional

association from social media use (T-1) to body dissatisfaction (T) and from body

dissatisfaction (T-1) to social media use (T).

The cross-lagged path from social media use (T-1) to body dissatisfaction (T) (B =

0.006, p < .001, BC CI$_{99}$ [0.003,0.008]) was significantly stronger than from body

dissatisfaction (T-1) to social media use (T) ($B = 0.102$, $p < .001$, BC CI_{95} [0.047,0.157]),

$\chi^2(1) = 20.84$, $p < .0001$.

[INSERT FIGURE 1 APPROX. HERE]

[INSERT TABLE 2 APPROX. HERE]

3.4 Multigroup analyses

3.4.1 Age. We next conducted multigroup analyses to examine whether the strengths

in the bidirectional relationships between body dissatisfaction and social media use were

different across three pre-specified age groups. The chi-square test and fit indices affected by

model complexity for the traditional CLPM, suggested a null hypothesis that this model fits

perfectly in the population could be rejected, χ^2 ($df = 147$; $N = 12,310) = 2840.54$, $p < .001$,

$CFI = .81$. However, indices less influenced by complexity suggested an adequate fit of the

model to the observed covariance matrix (i.e., RMSEA $\leq .06$, SRMR $\leq .08$), $SRMR = .08$,

$RMSEA = .07$ ($CI_{90} = .06,.07$). For younger (<35; $M_{age} = 28.19$ [$SD = 4.15$], $n = 1,688$),

middle aged ($\geq 35 < 50$; $M_{age} = 43.37$ [$SD = 4.26$], $n = 3,596$), and older (>50; $M_{age} = 61.15$ [SD

$= 8.07$], $n = 7,026$) groups, cross-lagged paths from social media use (T-1) to body

dissatisfaction (T) were significant (younger: $B = 0.006$, $p = .001$, BC CI_{99} [0.001,0.010];

middle aged: $B = 0.008$, $p = .002$, BC CI_{99} [0.003,0.013]; older aged: $B = 0.006$, $p < .001$, BC

CI_{99} [0.002,0.010]); however, cross-lagged paths from body dissatisfaction (T-1) to social

media (T) were only significant for middle aged ($B = 0.114$, $p = .003$, BC CI_{99} [0.015,0.214])

and older individuals ($B = 0.101$, $p < .001$, BC CI_{99} [0.041,0.161]), but not for younger

individuals ($B = 0.180$, $p = .037$, BC CI_{99} [-0.042,0.402]). There were no differences in

strength between any age groups for the associations between social media use and body

dissatisfaction (younger vs. middle aged $\chi^2[1] = .709$, $p = .400$; younger vs. older aged $\chi^2[1] =$

0.014, $p = .904$; middle vs. older aged $\chi^2[1] = 0.608$, $p = .436$) or between age groups for

body dissatisfaction and social media (younger vs. middle aged $\chi^2[1] = 0.478$, $p = .489$; younger vs. older aged $\chi^2[1] = 0.771$, $p = .380$; middle vs. older aged $\chi^2[1] = 0.084$, $p = .772$).

3.4.2 Gender. We next conducted an analysis examining the strength of relationships grouped by gender. The model fit was acceptable, χ^2 ($df = 78$; $N = 12,310) = 1904.06$, $p < .001$, $CFI = .85$, $SRMR = .07$, $RMSEA = .06$ (CI$_{90}$ = .06,.06). As shown in Figures 2a and 2b, the cross-lagged paths suggested a different pattern of results by gender. For women, the path from social media use (T-1) to body dissatisfaction (T) was significant ($B = 0.006$, $p < .001$, BC CI$_{99}$ [0.003,0.009]), as was the association from body dissatisfaction (T-1) to social media use (T) ($B = 0.112$, $p < .001$, BC CI$_{99}$ [0.035,0.190]). For men, the cross-lagged path from social media use (T-1) to body dissatisfaction (T) ($B = 0.002$, $p = .011$, BC CI$_{99}$ [0.001,0.011]) was non-significant ($p < .01$), however, the association from body dissatisfaction (T-1) to social media use (T) ($B = 0.072$, $p = .005$, BC CI$_{99}$ [0.005,0.139]) was significant. These findings suggest the presence of a bidirectional relationship between social media use (T-1) and body dissatisfaction (T) for women but not men. However, when considering the associations across gender there were no differences in strength between women and men for the cross-lagged paths between social media use and body dissatisfaction ($\chi^2[1] = 0.120$, $p = .729$) or between body dissatisfaction and social media ($\chi^2[1] = 1.032$, $p = .310$).

[INSERT FIGURE 2 APPROX. HERE]

4. Discussion

This study is the first to examine prospective bidirectional relationships between social media use and body dissatisfaction in a large representative sample of adult women and men over a one-year period. Although correlational and experimental research suggests higher levels of exposure to social media contributes to higher levels of body dissatisfaction,

few studies have examined long-term temporal relationships between these variables in

longitudinal designs, and none have done so in adult samples. In support of our first

hypothesis, we found that higher social media use (T-1) significantly predicted higher body

dissatisfaction (T) and higher body dissatisfaction (T-1) significantly predicted higher social

media use (T) after controlling for time one body dissatisfaction/social media use, gender,

age, BMI, ethnicity, relationships status, and SES. Effects were small. In addition, in the full

sample, the social media use to body dissatisfaction pathway was significantly stronger than

the reverse direction.

There was some support for our hypotheses addressing strengths of relationships by

age and gender. We hypothesized that the association from social media use to body

dissatisfaction would be stronger in younger than older adults, and also that the associations

between social media use and body dissatisfaction would be similar between women and

men. Multigroup analyses with specified age groups and gender groups showed that some

patterns of association differed according to age and gender group, but overall there were no

significant differences in the strengths of these relationships across age and gender. Although

in all age groups higher social media use (T-1) significantly predicted higher body

dissatisfaction (T), contrary to our hypothesis, the strength of this relationship did not vary

between age groups. However, whilst higher body dissatisfaction (T-1) significantly

predicted higher social media use (T) in the middle aged (≥35<50 years) and older (>50

years) sample, it was not significant in the younger age group. In relation to gender, we found

support of our hypothesis that there would be no difference in strength of relationships

between women and men. Specifically, we found that while the cross-lagged relationship

from social media (T-1) to body dissatisfaction (T) was significant in women but not men,

and the relationship from body dissatisfaction (T-1) to social media use (T) was significant in

both women and men, the strength of these relationships between social media and body dissatisfaction were not different between women and men.

4.1 Theoretical implications of findings

Our finding of a significant prospective pathway from social media use (T-1) to body dissatisfaction (T) is consistent with the tripartite influence model, although the model proposes that this relationship is mediated by internalization of appearance ideals and appearance comparisons which we were not able to be examine with the present data (Thompson et al., 1999). This finding is also consistent with a growing body of correlational and experimental research (Fardouly & Holland, 2018; Holland & Tiggemann, 2016; Saiphoo & Vahedi, 2019) and a longitudinal study in adolescents (de Vries et al., 2016). Although significant, the effect was small. However, the fact that it was observed in a large probabilistic and nationally representative adult sample over a 4-year period suggests that despite being small, it is a robust finding. In addition, the fact that we found a significant relationship even though we employed a very general measure of social media use rather than one that assessed specific use of appearance-focused social media is of interest, as correlational research has demonstrated stronger relationships between exposure to appearance focused social media and involvement in photo-based activities on social media than general social media use (Holland & Tiggemann, 2016; Saiphoo & Vahedi, 2019). It is possible that if a measure of appearance-focused social media use or photo-based activities on social media had been used, the effect may have been stronger. In addition, although the effect of social media use was small from year to year, the consistent nature of this effect over the 4 years of data collection suggests that the cumulative effect may be greater. The relationship was also observed despite our sample reporting relatively low time spent on social media, at four hours per week, which was unsurprising given the mean age of our sample was much higher than most previous research (51 years).[i]

Consistent with predictions based on the uses and gratifications theory of media use (Rodgers, 2016; Rousseau et al., 2017), cross-lagged relationships from body dissatisfaction (T-1) to social media use (T) were observed in the total sample, for men and women, as well as middle aged and older adults in multigroup analyses. Thus, it appears that in these groups body dissatisfaction may contribute to an increase in frequency of social media use. It is interesting that body dissatisfaction does not appear to deter social media use, for example, as a way of avoiding confrontation with challenging appearance ideals. However, it may be the case, consistent with uses and gratifications theory, that some individuals seek information or inspiration from social media to achieve body changes as a means of self-improvement (Rousseau et al., 2017).

4.2 Differences in relationships across age

In contrast to our hypothesis that the cross-lagged relationship from social media use (T-1) to body dissatisfaction (T) would be stronger in younger than older adults, this relationship was significant in all age groups, and the strength of this relationship did not differ significantly between groups. Although the nature of pressures from social media may vary across adult years, the end result of greater body dissatisfaction may occur in equal measure. For example, whilst adolescents and young adults may spend more time on photo-based social media platforms and be more vulnerable to body dissatisfaction as a result, social media use by older adults may expose them to idealized appearance images that are youthful and slim in the case of women and muscular in the case of men, which are ideals that are likely to be increasingly difficult to achieve with increasing age (Hayes et al., 2015). Thus, comparisons with many images could result in negative self-evaluations (Fardouly & Vartanian, 2015).

Interestingly, the pathway from body dissatisfaction (T-1) to social media use (T) was only significant in the ≥35<50 and >50-year old age groups. Uses and gratifications theory would suggest that, in these age groups, when body dissatisfaction is higher there is a psychological need being met by higher social media use, but it is unclear why this is especially pertinent in these older groups. Self-improvement information in relation to appearance concerns such as information on cosmetic procedures may be readily accessible to this age group on social media. But it is also possible that greater social contact through social media may provide reassurance to those with higher body dissatisfaction that they are socially connected and socially acceptable despite their aging appearance.

4.3 Differences in relationships across gender

Contrary to our hypothesis based on previous cross-sectional (Saiphoo & Vahedi, 2019) and experimental (Holland & Tiggemann, 2016) research in adolescents and youth, only women, not men, demonstrated a significant cross-lagged prospective relationship from social media use (T-1) to body dissatisfaction (T) (see Figure 2). Reasons proposed for similarity in relationship across gender in younger samples include social media being targeted at both men and women and that both genders post and view idealized appearance content on social media (Saiphoo & Vahedi, 2019). However, in adult years the nature of social media to which women and men are exposed or the reaction to exposure may change. For example, whilst social media to which women are exposed may continue to be largely idealized images and appearance-based, men may use social media to exchange views. Alternately, whilst women continue to make appearance comparisons with social media images, men may be more likely to make comparisons related to other dimensions (e.g., career success). Further research is required to explore these possibilities. Both women and men displayed significant pathways from body dissatisfaction (T-1) to social media use (T). Thus, it appears that higher social media use is meeting needs for adult men and women,

although further research is needed to identify whether the needs being met are similar or distinct in both genders.

4.4 Practical Implications of findings

Recognition that higher levels of social media exposure may have a negative impact on body image across adulthood has a number of practical implications. To date, increasing social media literacy skills has been proposed as a means of providing adolescents with strategies that enable them to analyze idealized images, to identify them as unrealistic, and then to reject them as appropriate targets for appearance comparisons, thereby reducing the likelihood of negative appearance self-evaluations (Gordon et al., 2020). Our data suggest that building social media literacy skills within the community more widely may be a valuable intervention to reduce body dissatisfaction in adults. It is likely to also have positive flow-on effects as adults may be able to build the social media literacy skills of their children. However, our data do not identify with what kind of social media use adults engage (e.g., appearance-focused or information-focused), so the appropriate nature of social media literacy may differ for adults compared to adolescents. Before the practical implications of the pathway from body dissatisfaction to social media use can be considered, the reasons for this relationship in the older group especially need to be identified.

4.5 Strengths and limitations of research

Strengths of this research include the large representative adult sample, the longitudinal design, and the fact that a wide number of factors were controlled, most notably BMI. However, the study has several limitations. Although a representative New Zealand sample, in other parts of the world the ethnic and socio-economic make-up will vary, thus, limiting the generalizability of findings. In addition, we used self-reported single-item measures of social media use and body dissatisfaction, and these may not be as sensitive as

objective data of social media hours or widely used multi-item measures, the use of which would also have enabled direct comparison with other studies. Further, as mentioned above, our measure of social media use was not specific to appearance-based social media, such as Instagram, a factor which may have had an impact on the effect sizes of relationships we identified.

4.6 Future research directions

Future research directions are indicated by our findings. First, further research is required to replicate these findings as the effects observed in this research were small and, as noted above, there were a range of methodological limitations. From a theoretical perspective, a full test of the tripartite influence model which includes an examination of potential mediators of the relationship is required. Similarly, potential mediators of the relationship from body dissatisfaction to social media use is needed to understand mechanisms involved. As the potential for negative impact of social media use on body dissatisfaction may continue through the lifespan, more research with adult samples with longer time frames is required. The current research has focused on body dissatisfaction, but a growing literature has identified prospective relationships between higher social media use and poorer well-being (Booker et al., 2018) and higher depressive symptoms (Kelly et al., 2018) in adolescents. Research with adults may reveal similar relationships. As research in adolescents and youth have shown that stronger relationships between photo-based social media use and body image outcomes compared to general ones, it would be valuable to conduct research with adult samples with more specific measures of these activities. Finally, it is possible that a circular relationship exists such that greater social media use is related to greater body dissatisfaction, which is in turn related to greater (e.g., to gain appearance information) or less (to avoid painful comparisons) social media use. Research across numerous time points would help clarify possible circular relationships.

4.7 Conclusions

In conclusion, in this first longitudinal study of relationships between social media use and body dissatisfaction conducted in a large representative community sample of adults, we found bidirectional relationships between social media use and body dissatisfaction 12 months later, over a 4 year timespan, after controlling for body dissatisfaction/social media assessed at time one, gender, age, BMI, ethnicity, relationships status, and SES. There were significant associations from social media use to body dissatisfaction in all age groups with only the reverse relationship significant in middle aged and older groups. Both pathway directions were significant in women but only the pathway from body dissatisfaction to social media use was significant in men. However, no age and gender group differences were observed in relation to the relative strength of these pathways. In light of the fact that effect sizes were small and there were limitations in the measures used, further replication is clearly required. However, our findings suggest the importance of extending prospective research into relationships between social media use and body dissatisfaction into adult years. They also point to the importance of raising awareness broadly in the community about how to best use social media in positive ways so as to protect against its potentially negative consequences.

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Table 1. Summary of Intercorrelations, Means, and Standard Deviations for Cross Lagged Panel Model for Times 1, 2, 3, 4, and 5 of Body Dissatisfaction and Social Media Use for the Total Sample

	M	(SD)	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. SMU T1	3.296	(6.173)	12,350	-														
2. SMU T2	3.654	(6.893)	11,126	.541	-													
3. SMU T3	3.591	(6.359)	9,458	.560	.617	-												
4. SMU T4	3.459	(6.561)	9,785	.498	.490	.554	-											
5. SMU T5	3.846	(6.592)	8,568	.487	.484	.521	.529	-										
6. BD T1	3.705	(1.635)	12,350	.126	.110	.130	.114	.125	-									
7. BD T2	3.738	(1.624)	11,315	.129	.117	.136	.118	.121	.683	-								
8. BD T3	3.714	(1.628)	9,589	.129	.116	.133	.107	.123	.660	.692	-							
9. BD T4	3.720	(1.630)	9,929	.133	.127	.137	.117	.129	.620	.651	.680	-						
10. BD T5	3.720	(1.640)	8,608	.134	.125	.146	.127	.133	.621	.637	.659	.674	-					
11. Ethnicity	.909	-	12,350	-.076	-.079	-.080	-.074	-.082	.008	.015	.012	-.002	-.014	-				
12. SES T1	54.886	(15.927)	12,350	-.015	-.003	-.003	-.024	-.029	-.022	-.015	-.013	-.015	-.071	.038	-			
13. Partner T1	.755	-	12,350	-.067	-.058	-.054	-.043	-.064	-.052	-.066	-.058	-.067	-.132	.061	.077	-		
14. Gender	.374	-	12,310	-.124	-.116	-.13	-.122	-.130	-.115	-.120	-.123	-.113	-.133	-.024	-.074	.076	-	
15. Age T1	51.358	(13.754)	12,350	-.237	-.232	-.239	-.217	-.240	-.095	-.108	-.111	-.120	.345	.075	-.079	.053	.120	-
16. BMI T1	27.387	(5.874)	12,350	.089	.090	.095	.085	.097	.405	.388	.369	.351	.621	-.096	-.093	-.043	.041	.060

Notes. N = 12,350.
p<.01 where *r*≥.024.
SMU=Social Media Use in hours. BD=Body Dissatisfaction. BMI=Body Mass Index. Gender is coded as 0=Women, 1=Men. Race is coded as 1=NZ European, 0=other. Partner status is coded as 1=yes, 0=no. SES=Socio Economic Status.

Table 2. Unstandardized Estimates of Cross Lagged Panel Model for Times 1, 2, 3, 4, and 5 of Body Dissatisfaction and Social Media Use for the Total Sample

Predictors	Outcome					
T-1	SMU T			BD T		
	B	*p*	99% CI	*B*	*p*	99% CI
SMU	0.543	<.001	(0.532,0.554)	0.006	<.001	(0.003,0.008)
BD	0.102	<.001	(0.054,0.149)	0.629	<.001	(0.619,0.639)
Ethnicity	-0.752	<.001	(-1.258,-0.247)	0.161	<.001	(0.062,0.26)
SES	-0.001	.817	(-0.010,0.008)	0.001	.391	(-0.001,0.002)
Partner	-0.197	.126	(-0.529,0.135)	-0.086	.001	(-0.152,-0.021)
Gender	-0.611	<.001	(-0.907,-0.315)	-0.143	<.001	(-0.201,-0.084)
Age	-0.057	<.001	(-0.067,-0.046)	-0.005	<.001	(-0.008,-0.003)
BMI	0.051	<.001	(0.026,0.076)	0.038	<.001	(0.033,0.043)
SMU T5 WITH BD T5				0.087	-0.099	(-0.049,0.222)

Notes. n= 12,350.
SMU=Social Media Use in hours. BD=Body Dissatisfaction. BMI=Body Mass Index. Ethnicity is coded as 1= NZ European, 0=other. SES=Socio Economic Status. Partner status is coded as 1=yes, 0=no. Gender is coded as 0=Women, 1=Men.
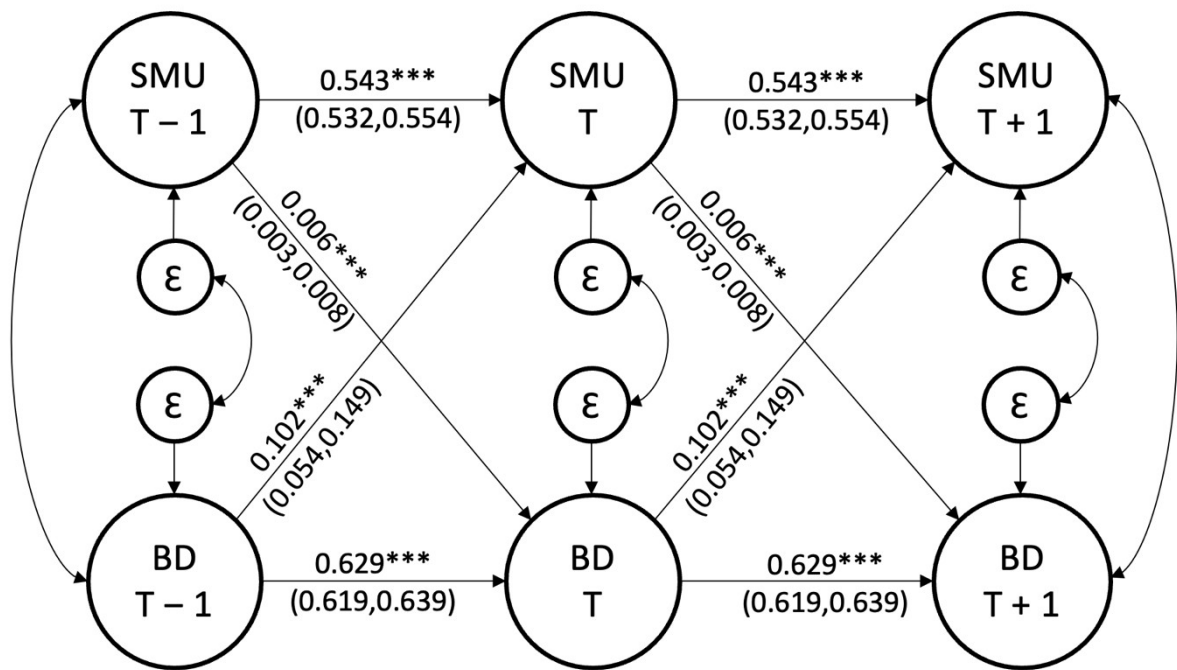
Fig. 1. Stationary Cross Lagged Panel Model across Five Timepoints of Body Dissatisfaction and Social Media Use for the Total Sample.

Notes. N = 12,350. SMU = Social Media Use hours, BD = Body Dissatisfaction. For clarity, covariances between predictors are not illustrated in the figure but are included in Table 2. Coefficients are unstandardized (with bias corrected 99% confidence intervals). ***p<.001.
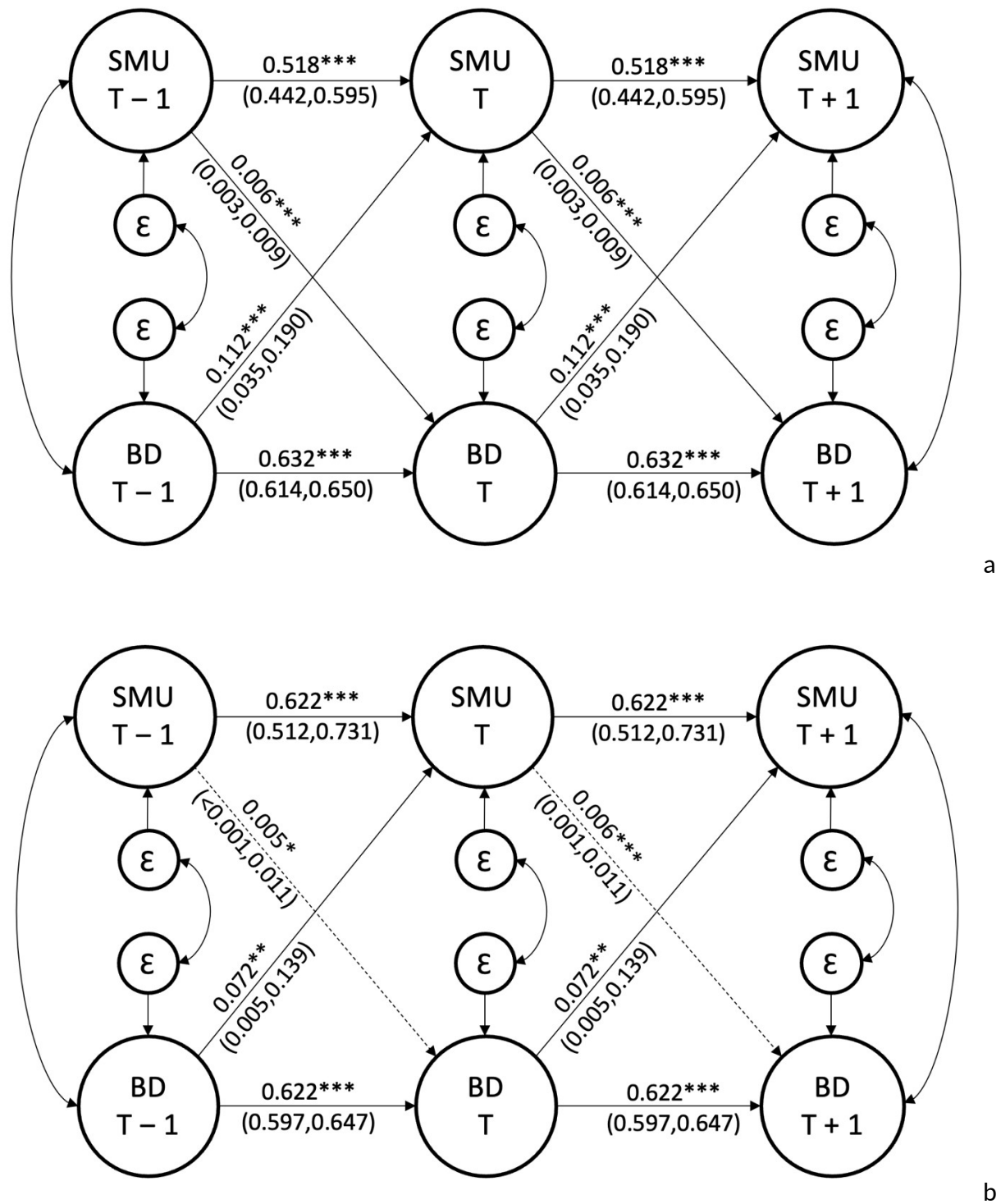
Fig. 2. Multigroup Stationary Cross Lagged Panel Model across Five Timepoints of Body Dissatisfaction and Social Media Use for Women (a) and Men (b).

Notes. N_{Women}=7,703. N_{Men}=4,607. SMU = Social Media Use hours, BD = Body Dissatisfaction. For clarity, covariates are not illustrated in the figure but are included in Supplementary Tables S3b and S3c. Coefficients are standardized (with bias corrected 99% confidence intervals). Grey dashed lines reflect non-significant paths. *p<.05; **p<.01; ***p<.001.

[i] Average social media use breakdown by age, as well as additional descriptive and inferential statistics can be found in supplementary materials. In general, younger adults averaged ~7 hours per week, middle aged adults ~4 hours per week, and older aged adults <3 hours per week.