When Adolescents' Self-Worth Depends on Their Social Media Feedback: A Longitudinal Investigation With Depressive Symptoms

Peer-reviewed author version

This is an Accepted Manuscript (post print version) of an article published by Sage in Communication Research available online: https://doi.org/10.1177/00936502241233787

When Adolescents' Self-Worth Depends on Their Social Media Feedback: A Longitudinal Investigation With Depressive Symptoms

Lara Schreurs (PhD)[1,2,3], Angela Y. Lee[4], Xun "Sunny" Liu (PhD)[4] and Jeffrey Hancock (PhD)[4]

Affiliations: [1] School for Mass Communication Research, Faculty of Social Sciences, KU Leuven, Belgium; [2] School of Social Sciences, Hasselt University, Belgium; [3] Research Foundation - Flanders (FWO-Vlaanderen), Belgium; 4 Department of Communication, Stanford University, Stanford, USA

Email addresses: lara.schreurs@kuleuven.be; angela8@stanford.edu; sunnyxliu@stanford.edu; hancockj@stanford.edu

Please cite as follows: Schreurs, L., Lee; Y. A., Liu, X. S., & Hancock, J. (2024). When adolescents' self-worth depends on their social media feedback: A longitudinal investigation with depressive symptoms. *Communication Research*. https://doi.org/10.1177/00936502241233787

Correspondence concerning this article should be addressed to Lara Schreurs, School for Mass Communication Research, KU Leuven, Parkstraat 45, B-3000 Leuven, Belgium, lara.schreurs@kuleuven.be

Conflict of Interest: The authors declare that they have no conflict of interest.

This work was supported by the Research Foundation Flanders (FWO-Vlaanderen) under Grant 11D3119N and Grant V400122N. Angela Y. Lee is supported by the Stanford Interdisciplinary Graduate Fellowship

Abstract

While social media is assumed to exacerbate adolescents' depressive symptoms, research findings are ambiguous. One way to move the field forward is by looking beyond time spent on social media and considering subjective experiences. The current three-wave longitudinal panel study examines the within- and between-person relations between adolescents' self-worth dependency on social media feedback and depressive symptoms. 1,607 adolescents participated in two of the three waves, yet a third had to be excluded due to failing an attention check. Among the analytical sample of 1032 adolescents, we found that adolescents who derived more of their self-worth from social media feedback were also more depressed, as indicated by a positive correlation at the between-person level. No support was found for within-person associations over time. These results highlight the need to examine effects of subjective experiences with social media by separating within- and between-person dynamics to reach more precise conclusions.

Key words: social media, self-worth dependency on social media feedback, depressive symptoms, adolescents, panel study

When adolescents' self-worth depends on their social media feedback: A longitudinal investigation with depressive symptoms

Introduction

Concerns about the impact of social media on adolescent psychological well-being are widespread and urgent. Catalyzed by recent decreases in reports of youth well-being over the last decade (Geiger & Davis, 2019), many have argued that the rise of social media platforms are to blame (Twenge, 2020). Indeed, policy conversations about the youth well-being crisis often invariably mention the potential harms of social media. For example, President Biden called for scholars and policymakers to interrogate the role of social media use on adolescent well-being in his 2022 State of the Union (White House, 2022), a call that was shared in recent statements from the American Surgeon General (Murthy, 2021) and the UNICEF Director (Fore, 2021) to protect youth well-being in our increasingly digital world.

In this context, there is particular concern about the relationship between adolescents' social media use and depression, a mood disorder that causes persistent feelings of sadness and loss of interest in activities that people once enjoyed (Beck & Alford, 2009). In response, a new wave of research has investigated how the dynamics of youth social media use relate to *depressive symptoms* (i.e., the set of affective, cognitive, and behavioral experiences associated with depression but do not necessarily indicate the presence of a severe mental illness) by examining how engagement with social media relates to symptoms like feelings of worthlessness, fatigue, and guilt (Ayuso-Mateos, 2010).

However, these efforts have produced mixed findings, sparking an ongoing debate about the nature of social media's potential effect on depressive symptoms. Results from a series of meta-analytic reviews and large-scale, representative studies have challenged whether the empirical evidence supports the often causal claims that social media use increases depressive symptoms among young people (Cunningham et al., 2021; Odgers & Jensen, 2020).

A recent longitudinal study following 500 American adolescents over eight years found that spending more time on social media was not associated with increased symptoms of depression or anxiety, even if they used social media more as they got older (Coyne et al., 2020). These findings are part of a growing body of research indicating that time spent on social media use does not consistently explain variation in youth well-being (Orben et al., 2019). Indeed, meta-analyses of hundreds of studies have found ambiguous effects across the field at large (Hancock et al., 2022; Odgers & Jensen, 2020), with recent literature showing that frequency of social media use is linked to higher levels of well-being for some people and decreased well-being in others (Beyens et al., 2020).

While scholars vary in how they interpret the strength, significance, and implications of identified associations between social media use and psychological well-being (Odgers & Jensen, 2020), several approaches have been proposed to help explicate the small, mixed effects that have been observed. Some have argued that we should go beyond considerations of the amount of time that youth spend with social media and consider the specific aspects of social media use that may affect their well-being (Hancock et al., 2022; Lee & Hancock, 2023). After all, people vary in the platforms they use, the content they see, and the people they connect with - among other differences - that may differentially affect how they feel (Bayer et al., 2020). However, even two adolescents who use the same platform in the same way (i.e., posting a selfie to Instagram) can interpret their social media use in meaningfully different ways that may inform their well-being. Research on individuals' subjective perceptions of their own social media use reveals that the beliefs, or mindsets, people hold about their own social media use can be consequential to depressive symptoms (Lee & Hancock, 2023). People who viewed themselves as dependent on social media often tended to experience more depressive symptoms than those viewed social media as a tool they can use to pursue meaningful goals (Lee & Hancock, 2023).

In this vein, an adolescent whose self-worth is dependent on social media may be particularly susceptible to its adverse effects on depressive symptoms. Maintaining a sense of self-integrity – a feeling of agency and independence – is essential to well-being, particularly among adolescents who may already be facing questions of self-esteem as part of their coming-of-age (Walton & Wilson, 2018). An adolescent who sees themselves as needing validation from social media may not only hold less agentic views about their social media use, but also more negative views about themselves that may in turn manifest in worse depressive symptoms. For instance, a cross-sectional study conducted by Sabik et al. (2020) found that college women experienced more depressive symptoms when they staked more of their self-worth on their social media interactions, such as the number of likes they received on their posts.

While the existing literature suggests that there may be a between-person association between self-worth dependency on social media feedback and depressive symptoms, these insights do not allow us to draw conclusions on the *effects* of social media on well-being, as media effects are theorized to take place within individuals (Beyens et al., 2020). Scholars should therefore consider both *within-person and between-person* processes to be able to draw accurate conclusions on how social media use and subjective perceptions of social media use affects well-being (Valkenburg et al., 2022b).

Building on these approaches, this study will examine how adolescents' self-worth dependency on social media affects depressive symptoms with a three-wave longitudinal panel study (N=1,032). This study will add to the literature by investigating for the first time within-person associations in addition to between-person associations, and thus test whether an increase in self-worth dependency on social media feedback is followed by an increase in depressive symptoms over time, and vice versa. We discuss our findings in the context of growing research proposing closer examination of within- and between-person dynamics

(Valkenburg et al., 2022b), subjective perceptions of social media (Lee & Hancock, 2023), and the need to clarify the potential for causal connections between social media use and well-being.

Social media use and depressive symptoms among adolescents

Initial inquiries into social media effects presumed that young people who used social media for longer would experience more symptoms of depression, which include changes in affect (i.e., feeling persistently sad or emotionless), cognition (i.e., difficulty making decisions), physiology (i.e., disturbances in sleep and appetite), and behavior (i.e., social withdrawal) (American Psychiatric Association, Fifth Edition, 2013). While it was initially theorized that these negative effects would take place because spending time on social media would displace opportunities for richer or more meaningful interactions in face-to-face context, examinations of large youth panels found little support for this displacement hypothesis (e.g., in the ABCD cohort, Lees et al., 2020). Indeed, one of the strongest points of evidence against the theorized causal connection between social media use and depressive symptoms comes from an 8-year longitudinal study of a large cohort of adolescents. Coyne et al. (2020) found that within-person changes in social media use had no effect on within-person changes in depressive symptoms, indicating that time spent on social media did not exert effects. However, the significant correlations between social media use and depressive symptoms at the between-person level (Coyne et al., 2020) signal that there may be other facets of experiences with social media that are consequential for adolescent well-being.

Notably, several meta-analyses have found that the subjective perceptions people have about their social media use are stronger determinants of depressive symptoms than examinations of the amount or frequency of their use alone (Cunningham et al., 2021; Hancock et al., 2020). Specifically, orientations to social media that frame the user as *dependent* on social media appear to be linked to depressive symptoms. For example, people who use social

media more intensely not only feel a greater sense of emotional attachment to the platforms they use, but also tend to view social media use as an important, integral part of their lives (Ellison et al., 2007), a pattern that tends to be associated with increased depressive symptoms (Roberts et al., 2022), particularly when they stop using it. Furthermore, when a person perceives their own social media use to be more "problematic" or indicative of an underlying addictive tendency than usual, this person may consistently experience more depressive symptoms. Indeed, Cunningham et al. (2021) found perceptions of problematic social media use to explain the most variance in adolescent depressive symptoms. Together, these findings speak to the importance of considering how beliefs about social media use influence individuals' sense of agency over their lives and actions (Lee & Hancock, 2023): viewing the self as being dependent on social media may undermine well-being by reducing a sense of self-efficacy (Muris, 2002). Given these findings, it is important to complement measures of time spent on social media with additional measures of their subjective experiences with social media, which may inform how adolescents appraise their social media use and relate to their psychological well-being.

Self-worth dependency on social media feedback and depressive symptoms

One important subjective experience is the extent to which adolescents derive their self-worth from the feedback they receive on their social media posts (Sabik et al., 2020). They are often highly motivated to use social media to connect with peers, stay up to date on their lives, and craft positive self-presentations of themselves through curation of their online profiles and images (Nesi & Prinstein, 2015). Because social media platforms are designed to facilitate social feedback by receiving likes and comments on their posts (Trekels, 2018), they can render reigning peer norms highly visible by providing metrics of social approval (Bayer et al., 2020; Trekels, 2018). When adolescents are exposed to posts which appear to be rewarded by likes and positive comments, they may perceive the content displayed in these posts as ideal and

socially endorsed by their peer group (Sherman et al., 2016; Trekels, 2018). Furthermore, the likes and comments they receive from peers on their own posts can be interpreted as a signal of their social status, or whether they fit into their peer group (Sherman et al., 2016). In general, adolescents are sensitive to peer feedback because a main task during this developmental phase is to establish close relationships, and thus feel accepted by their peer group (Brechwald & Prinstein, 2011). As such, adolescents may attach substantial importance to the feedback of peers on social media (Martinez-Pecino & Garcia-Gavila, 2019).

The theory of self-worth contingencies predicts that, individuals' self-esteem, defined as the positive and relatively stable evaluation of the self (Valkenburg et al., 2021), depends on their performance in the specific domains on which they have staked their self-esteem (Crocker & Wolfe, 2001). For instance, people may struggle with their self-esteem when their sense of self-worth is based on others' approval. This approach is problematic because gaining approval from a broad spectrum of people is often challenging, and the absence or ambiguity of feedback can easily be misconstrued as disapproval (Burwell & Shirk, 2006; Crocker & Wolfe, 2001).

An adolescent who values being perceived as socially competent may therefore struggle with self-esteem if they interpret the absence of positive validation as an indicator of their poor social skills, particularly as perceptions of social rejection may undermine psychological well-being (Burwell & Shirk, 2006). It is thus not the objective experience of events (e.g., receiving social feedback), but rather a person's interpretation of the event in relation to their self-worth contingencies (e.g., deeply caring about the feedback) that shapes self-esteem (Crocker & Wolfe, 2001).

The extent to which an adolescent derived their self-worth from social media may thus affect their experience of depressive symptoms. First, when an adolescent's self-evaluation relies on peer responses to their social media self-presentation, they may experience a short-lived boost in self-esteem when they receive positive feedback in the form of likes and

comments on posts about themselves (Meeus et al., 2019). However, self-related posts do not always elicit positive peer feedback. The curation of social media feeds by algorithms means that users ultimately do not have control over if, or when, they will receive feedback from peers on their posts (Steers, 2016). As a result, they may experience a decrease in self-esteem until the next time they receive positive feedback. The self-esteem of an adolescent who is dependent on social media feedback for validation is thus unstable, making them vulnerable to developing symptoms of depression (Crocker & Wolfe, 2001). Indeed, a daily diary study found that adolescents whose self-worth was dependent on friends' approval had more fluctuations in their self-esteem, which in turn, predicted depressive symptoms (Cambron et al., 2010).

Second, in an effort to receive more peer approval (Gioia et al., 2021), an adolescent whose self-worth depends on social media feedback may be strategic in how they create and post content to try to leave a positive impression on others (Yau & Reich, 2019). They may strive to convey aspirational lifestyles that emphasize their positive qualities, such as their achievements, social activities, and appearance (Casares & Binkley, 2022; Gioia et al., 2021). The act of presenting the best version of oneself to others is not unique to social media (Goffman, 1959); in both online and offline settings, people strategically convey information about the self to control how others perceive them (Goffman, 1959; Schlenker, 1980). However, social media affords individuals greater control over their self-image (e.g., filtering, posting strategically) and may therefore provoke more intense strategic impression management processes to come across as desirable as possible, relative to offline contexts (Verduyn et al., 2020).

Such positively biased self-presentations may undermine well-being through the promotion of inauthentic self-portrayals (Bailey et al., 2020). Indeed, depressive symptoms are often higher among youth who put more effort into curating their image on social media, but lower among those who chose to present themselves more authentically (Wang et al., 2019).

This may be because an adolescent whose self-worth depends strongly on social media feedback, may engage more in inauthentic self-presentation practices to elicit positive peer feedback. They believe that positively biased content is the norm, and that such content is therefore more likely to get validated by their peers (Yau & Reich, 2019). However, issues arise when such positively biased content no longer represents their true selves, leading to an inauthentic portrayal of their life, which can result in increased depressive symptoms (Wang et al., 2019). That is because the posting of inauthentic yet positively biased content may result in an identity discrepancy, making the adolescent aware of the absence of certain positive qualities they may wish to embody, but do not feel they have (Higgins, 1987). In contrast, an adolescent with a strong sense of their own worth outside of peer social media feedback is likely to engage in more authentic self-presentations, which may have positive implications for well-being.

Taken together, an increase in self-worth dependency on social media feedback may predict an increase in depressive symptoms. This occurs firstly through the experience of stronger fluctuations in self-esteem because they attach more importance to an unstable, external source of validation (i.e., peer feedback). Second, it reflects through an increase in posting inauthentic content that highlights the difference between their ideal self, and their actual self. While Sabik et al. (2020) find that female college students with a greater self-worth dependency on social media feedback tend to experience more depressive symptoms in general, the cross-sectional design in their study limited their conclusions at the between-person level (e.g., Sabik et al., 2020). This reveals an association, but does not allow us to examine causal processes regarding the *effects* of investing more of one's self-worth into social media feedback. Given that media effects are conventionally theorized as taking place within individuals (Beyens et al., 2020; Valkenburg et al., 2022b), additional research is essential to investigate whether a rise in an adolescent's reliance on social media feedback for self-worth

is subsequently followed by an increase in depressive symptoms, focusing on the within-person level (Coyne et al., 2020). Therefore, the current study will be the first to examine the within-person association between self-worth dependency on social media feedback and depressive symptoms. We hypothesized:

H1: Adolescents' self-worth dependence on social media feedback at one point in time positively predicts depressive symptoms at a later point in time while controlling for initial levels of depressive symptoms at the within-person level.

Moreover, in addition to this within-person hypothesis, it will be explored whether higher trait-levels of self-worth dependency on social media feedback relate to higher trait-levels of depressive symptoms, which is the between-person association between these two variables.

A bi-directional relationship

As outlined above, an increase in self-worth dependency on social media feedback may predict an increase in depressive symptoms among an adolescent over time, yet this within-person association has not been tested in research. However, it is also plausible that an adolescent who feels more depressed than usual will subsequently derive more of their self-worth from social media feedback. Media selection theories such as the selective self-and-affect-management model (SESAM, Knobloch-Westerwick, 2015) suggest that social media experiences may be shaped by personal vulnerabilities, such as depressive symptoms (Vidal et al., 2020). Specifically, a person may select media content to regulate emotions that arise due to salient self-beliefs, such as whether they are comparatively better or worse than those around them (Knobloch-Westerwick, 2015; Luong et al., 2021).

The SESAM model theorizes that when a person experiences an increase in depressive symptoms, this person may then subsequently pay more attention than they normally does to signals of social approval or rejection from social media. That is in an effort to manage the

change in their own self-evaluation. More specifically, by eliciting and attaching importance to peer feedback on social media, an adolescent can satisfy their need to obtain more information about themselves, which may either reinforce or change the way they see themselves (Luong et al., 2021). An adolescent that feels more depressed than they normally do, may be more likely to focus later on more on the social feedback they obtain on their posts and to derive more of their self-worth from this feedback, in an effort to manage a poor self-image and the experience of negative affect (Luong et al., 2021).

Longitudinal research with two data waves found that depressive symptoms predicted Instagram posting among adolescents over time (Frison & Eggermont, 2017). The authors suggested that adolescents with higher symptoms of depression may not only post more frequently later in time to promote a positive self-image to their peers, but also in an effort to elicit signals of social support through positive peer feedback in the form of likes and positive comments. These findings align with work that broadly conceptualizes feedback-seeking as a characteristic of adolescents with depressive symptoms (Nesi & Prinstein, 2015). Yet, even though the temporal order between social media use and depressive symptoms can be better fleshed out with a two-wave longitudinal design, this design only allows to infer insights at the between-person level (Mulder & Hamaker, 2021). There is thus some evidence that depressive symptoms may precede self-worth dependency on social media feedback (Frison & Eggermont, 2017). Yet, whether an increase in depressive symptoms is also followed by an increase in self-worth dependency (i.e., the within-person level) remains to be tested. Therefore, the following within-person hypothesis will be investigated in addition to the between-person association between depressive symptoms and self-worth dependency on social media feedback.

H2: Adolescents' depressive symptoms at one point in time positively predicts self-worth dependence on social media feedback at a later point in time while controlling for initial levels of self-worth dependency on social media feedback at the within-person level.

Considering gender differences as a source of heterogeneous social media effects

Gender is essential when examining the relationship between adolescent social media use and depressive symptoms. The distinct patterns of socialization of young girls and boys, particularly about their image and appearance, may influence how they each uniquely respond to social media feedback (Afifi, 2007; Bakker et al. 2010). Research revealed that adolescent girls experience more psychological well-being problems related to their social media use than boys (Twenge et al., 2022). This is consistent with the broader gender gap where adolescent girls are at heightened risk for developing depressive symptoms, compared to adolescent boys (McCrae et al., 2017).

More specifically, gender has been shown to moderate the relationship between social media use and depressive symptoms in several studies. For instance, Neira & Barber (2014) found that adolescent girls who used social media tended to have a more depressed mood than adolescent boys, particularly if they invested more of their time and energy into their social media use. In a similar vein, Nesi & Prinstein (2015) found that adolescent girls who sought out more feedback from social media also tended to experience more depressive symptoms. In addition, Heffer et al. (2019) found that depressive symptoms preceded social media use among adolescent girls, and not among boys. Most research thus looked at gender differences in between-person associations in social media use and depressive symptoms. Yet, we examined the moderating role of gender in within-person relations between self-worth dependency on social media feedback and depressive symptoms:

H3: The positive within-person relation between adolescents' self-worth dependence on social media feedback at one point in time and depressive symptoms at a later point in time controlled for initial levels of depressive symptoms will be stronger for girls than for boys.

H4: The positive within-person relation between adolescents' depressive symptoms at one point in time and self-worth dependence on social media feedback at a later point in time controlled for initial levels of self-worth dependency on social media feedback will be stronger for girls than for boys.

The present study

While scholars have theorized that there might exist within-person associations between self-worth dependency on social media feedback and depressive symptoms, only one study by Sabik et al. (2020) has explicitly looked at these concepts and examined the between-person association between social media feedback as a self-worth contingency domain and depressive symptoms. Their findings indicated that reliance on social media feedback is linked to a more depressed mood among female college students.

The present study builds on prior work by examining this relationship over time, with respect to within-person processes in addition to between-person differences, among an adolescent population including both boys and girls. In addition, we investigate how this specific, subjective experience with social media (i.e., self-worth dependency on social media feedback) relates to depressive symptoms relative to conventional assessments of the amount of time an adolescent spends on social media. We conducted a large-scale, three-wave study of adolescents, which allowed us to disentangle the mechanisms underlying potential causal effects of social media experience on depressive symptoms.

Should we find that self-worth dependency drives depressive symptoms at the within-person level (H1) but depressive symptoms do not influence self-worth dependency (H2), we can understand this as a *media effect only process* where an adolescent who experiences an

increase in relying on social media for their self-worth, also experiences an increase in depressive symptoms over time, yet not the other way around.

However, if we find that depressive symptoms drive self-worth dependency at the within-person level (H2), but no evidence for the reverse relationship (H1), we can interpret this as evidence of a *media selection only process* wherein an adolescent with an increase in depressive symptoms, attaches more of their self-worth to social media feedback over time in an effort to manage their experiences.

Evidence for a reciprocal relationship between self-worth dependency and depressive symptoms at the within-person level would signal a *recursive reinforcement process*, where subjective experiences and mental health problems covary over time, *indicating* that media effects and media selection processes co-exist. Finally, in line with prior work indicating *minimal effects* of social media use on well-being (Coyne et al., 2020; Orben et al., 2019), it may be possible that these variables are not (reciprocally) related at the within-person level over time.

Method

Sample and procedure

Through 24 schools in Flanders, the Dutch speaking region in Belgium, we recruited 1,895 adolescents to participate in a three-wave panel study about their social media use and daily life experiences. The first, second, and third waves of the study took place in September-October 2019, January-February 2020, and May-June 2020 respectively. There were approximately four months between each measurement occasion, at each school.[1] This time interval was chosen as it was considered during the study design to be the most appropriate

[1] Data were collected as part of a larger project that examined social media use and daily life experiences among adolescents. Other papers are based on the same dataset (e.g., Devos et al., 2023; Schreurs et al., 2022; Schreurs & Vandenbosch, 2022a; Schreurs & Vandenbosch, 2022b) but explore different research questions than those presented in the current paper. Please contact the first author for more information and see https://osf.io/kgf3z/ for the project website.

interval for investigating intermediate, long-term effects of social media use on adolescent well-being (Course-Choi & Hammond, 2021). Also practical reasons informed this choice, as it allowed us to collect data within one schooling year.

Passive parental consent and active adolescent assent were obtained from all participants. For the first two waves, adolescents completed an online questionnaire during school hours while a researcher was present. Upon completion, they could participate in a lottery for €50 reward cards. For the third wave, adolescents filled in an online questionnaire at home due to the COVID-19 pandemic. All received a €5 reward card for completing the survey on their own time. Ethical approval for this study was obtained from the ethical committee of the KU Leuven (SMEC Review Board) under approval number G-2018 03 1187.

There were 1,895 adolescent respondents who participated in Wave 1 [W1], 1,677 in Wave 2 [W2] and 966 in Wave 3 [W3]. Adolescents were retained in the analyses if they participated in at least two of the three waves, which was the case for 1,607 respondents. Moreover, respondents were excluded if they missed or failed an attention check which was an explicitly instructed response item that had only one correct answer. This resulted in a final analytical sample of 1,032 adolescents (42.2% boys, *M*age=14.55, *SD*=1.65). Please see Schreurs et al (2023) for more information on the study procedures and more descriptive information regarding the analytical sample.

We explored differences in baseline scores [W1] between adolescents included and excluded (but passed the attention check of the wave in which they participated) from our final analytical sample. A MANOVA analysis demonstrated significant differences between these groups (Wilks' Λ=.979, $F(4,853)=4.512$, $p<.01$, $\eta p^2=.021$). Adolescents with higher scores on depressive symptoms ($F(1,856)=5.792$, $p<.05$) and older adolescents ($F(1, 856)=12.896$, $p<.001$) were more likely to have participated in only one of the three waves. Moreover, boys were more likely to have participated in one wave only ($\chi^2(1)=8.949$, $p<.01$), which has also

been reported in previous work (Schreurs et al., 2023; Schreurs & Vandenbosch, 2022a; Schreurs & Vandenbosch, 2022b).

Data missingness was explored with Little MCAR's test. Results showed that data were not missing completely at random ($\chi 2$=287.902, *df*=127, *p*<.001). To check whether the missing data could be considered missing at random, logistic regression analyses were performed to examine whether the missing data were dependent on known demographics, such as age and gender (Gelman & Hill, 2007). Results (Table 1) showed that older adolescents were more likely to have reported on the self-worth dependency variables at W1 and W2 than younger adolescents. This may be because these questions were positioned near the end of the survey and younger participants may not have completed the items within the scheduled hour. We also found that girls and younger adolescents were more likely to have completed all questions at W3, which may be due to the W3 questionnaire being completed at home instead of at school, which meant girls and younger adolescents were more likely to complete the questionnaire in their free time. To handle these missing data patterns, we used the full information maximum likelihood [FIML] estimator in Mplus.

[Table 1 here]

Measures

Demographic information. Gender was measured such that boys were coded as 1 and girls as 2. Age was calculated by subtracting birth-year from the year in which W1 took place (2019).

Self-worth dependency on social media feedback. The self-worth dependency on social media scale (Sabik et al., 2020) was used to assess the extent to which adolescents derived their self-worth from feedback from their friends and followers on social media. The following 5 items were rated on a 7-point Likert scale ranging from strongly disagree (=1) to strongly agree (=7): 1) My self-esteem depends on how attractive others think pictures of

myself are on social media, 2) My self-esteem depends on how others respond to my social media posts, 3) My self-esteem depends on how attractive I think pictures of myself are on social media, 4) I don't care whether other people respond to my social media posts and 5) Whether others respond to my social media posts has no effect on what I think about myself.

We explored the factor structure of this scale among an adolescent population with exploratory factor analysis (EFA). Principal axis factoring (PAF) analysis demonstrated a two-factor structure for this scale at W1 (explained variance = 59.984%). Items 1, 2 and 3 form the first factor, the perception that one's self-worth *depends* on social media feedback (initial eigenvalue=2.370, explained variance=40.217). Item 4 and 5 loaded on a different factor (initial eigenvalue=1.415, explained variance=19.767, r=.562, p<.001). Yet, as both item 4 and 5 are negatively-worded, the emergence of this second factor may stem from a methodological artifact rather than a meaningful conceptual difference (van Sonderen et al., 2013). As such, we chose to remove these items from the scale. The remaining items proved to form a reliable scale across waves (ωW1=.818, ωW2=.865, ωW3=.823).

Depressive symptoms. A 12-item version of the Center for Epidemiologic Studies - Depression scale - was used to assess depressive symptoms in the past week, such as low energy (e.g., "I felt like I was too tired to do things"), negative affect (e.g. "I had crying spells"), and pessimism about the future (e.g., "I don't feel hopeful about the future") on a 4-point Likert scale ranging from never/rarely (=1) to always (=4). This scale has been found to be valid and reliable in community samples of adolescents (Poulin et al., 2005). A confirmatory factor analysis (CFA), in which error terms of the same items across the three waves were correlated, confirmed this one-factor structure (χ^2(555)=1869.116, p=.000, CFI=.903, RMSEA=.048, 90%CI=[.046/.050], SRMR=.050, χ^2/df=3.368). The scale demonstrated good reliability across waves (ωW1=.861, ωW2=.870, ωW3=.878).

Time spent on social media. We also assessed individuals' time spent on social media for exploratory analyses. Time spent on Facebook, Instagram, TikTok and Snapchat was measured on a 6-point Likert scale (1=I do not use, 2=I use it rarely, 3=I use it every few weeks, 4=I use this several times a week, 5=I use this almost every day, 6=I use this multiple times a day). Overall time spent on social media was calculated by averaging reported scores across the four different platforms. These four social media platforms were selected because they were the most commonly used by adolescents, our population of interest, at the time of setting up the study (i.e., 2019), (Rideout et al., 2021, Vogels & Gelles-Watnick, 2023), and align with theoretical definitions of social media platforms as having an audience-facing profile, a network of connections, the ability to message others, and a stream of content (Bayer et al, 2020).

Analysis plan

The hypotheses and analysis plan were pre-registered (https://osf.io/k46x3) (see OSF (https://osf.io/ftwmz/ for data and syntax). Means, standard deviations, zero-order correlations and intra-class correlations [ICC] were calculated. One random intercept cross-lagged panel model [RI-CLPM] (Mulder & Hamaker, 2021) was analyzed with self-worth dependency on social media feedback at W1, W2, W3 and depressive symptoms at W1, W2, W3 as variables in the model.

Mean scores were entered in the model as manifest variables. All manifest variables were regressed on a corresponding latent variable with loadings constrained at 1. Autoregressive, cross-lagged and concurrent paths were calculated between these latent variables, which represent the within-person part of the model. Random intercept [RI] factors were estimated with the manifest variables at the three time points as indicators, loadings constrained at 1. Then, the error-variances of the manifest variables were constrained at 0 and age was controlled for by modeling predictive pathways to the manifest variables. Afterwards,

we checked whether the means of the within-person latent variables could be constrained over time to obtain a more parsimonious model. We also investigated whether the variances of the random intercepts significantly differed from 0, indicating stable between-person differences, which makes the RI-CLPM an appropriate analysis technique for our data.

Finally, the moderating role of gender was investigated by conducting a multiple group model. More specifically, the within-person cross-lagged paths and the between-person correlation between the RI's were constrained to be identical across gender, and this constrained model was compared to an unconstrained model with a $\chi 2$ difference test. Model fit was evaluated with the following indices: $\chi 2/df < 3.00$, CFI>=0.90, RMSEA<=0.08, 90 %CI for RMSEA upper limit<=0.10, and SRMR<=0.09 (Kline, 2005, Little, 2013). We also explored a RI-CLPM with time spent on social media at W1, W2, W3 and depressive symptoms at W1, W2, W3 and looked at the moderating role of gender in this model. Deviations from the pre-registered analysis plan can also be found on OSF and mainly comprise a change in the formulation of the hypotheses, the exploration of the between-person correlation, the multiple group analyses for examining the moderating role of gender, the used measure for time spent and explorative COVID-19 analyses.

Results

Descriptive statistics

Table 2 shows the means, standard deviations and zero-order correlations. The mean scores on depressive symptoms are at the three waves close to 2, meaning that adolescents on average *sometimes* felt depressed. For self-worth dependency on social media feedback, the average mean score centers around 3 at the three waves, thus adolescents were on average *slightly disagreeing* that their self-worth depends on social media feedback. Self-worth dependency on social media feedback correlated positively with depressive symptoms at all waves. Gender correlated with self-worth dependency on social media feedback and depressive

symptoms at all waves, in that girls scored higher on these variables. Age correlated negatively with self-worth dependency on social media feedback only at W1, and positively with depressive symptoms at W1 and W3.

Then, we examined the proportions of variance that could be explained by within- and between-person differences with intraclass correlations [ICC]. The ICC was .613 for self-worth dependency on social media feedback, indicating that 61.3% of the variance in perceptions of self-worth being dependent on peer social media feedback were from between-person differences whereas the remaining variance can be attributed to within-person differences and error variance. The ICC for depression was .683.

[Table 2 here]

Differences in main variables before and after COVID-19 initiation

Exploratory repeated measures ANOVA's were conducted to examine differences in the main variables before (W1 and W2) and after (W3) the initiation of the COVID-19 pandemic, only including adolescents who have data on the variables at all three waves in the analyses. For depressive symptoms, the Huynh-Feldt test showed that there were significant differences across the measurement points (F(1.948,1057.724)=7.273, p<.001). A Bonferroni post-hoc test showed that depressive symptoms at W3 (M=1.856) were significantly lower than at W1 (M=1.899) and W2 (M=1.924). There was no significant difference between W1 and W2. For self-worth dependency on social media feedback, the Huynh-Feldt test showed that there were no significant differences across the measurement points (F(1.965,707.481)=.395, p>.05). For time spent on social media, the Huynh-Feldt test showed that there were significant differences across the measurement points (F(1.874, 1017.651)=113.922, p<.001). A Bonferroni post-hoc test showed that time spent on social media was significantly higher at W3 (M=4.225) (after the pandemic outbreak) than at W1 (M=3.816) and W2 (M=4.042) (before the pandemic outbreak). Also time spent at W1 and W2 significantly differed from each other.

Random intercept cross-lagged panel models

The model had an excellent model fit ($\chi^2(1)=1.211$, $p=.271$, CFI=1.00, RMSEA=.014, 90%CI=[.000/.086], SRMR=.007, $\chi^2/df=1.211$). Results from χ^2 difference tests showed that means could not be constrained over time (χ^2 unconstrained model=1.211, df=1, χ^2 constrained model=13.097, df=5, $\Delta\chi^2(4)=11.886$, $p=.018$).

Between-person results. We found a significant positive correlation between the random intercepts of the variable for self-worth dependency on social media feedback and depressive symptoms (Table 3). Thus, people who were more dependent on social media feedback for their self-worth at a trait-level also had higher levels of depressive symptoms.

Within-person results. We next examined parameter estimates of the within-person paths (Table 3). First, all autoregressive paths were significant indicating that there is within-person carry over effect. If an adolescent experiences an increase in self-worth dependency on social media feedback/depressive symptoms at a certain point in time, these levels seem to further increase at a subsequent time point (Mulder & Hamaker, 2021).

None of the cross-lagged paths were significant. This means that when an adolescent became more dependent on social media for their self-worth, this adolescent did not also become more depressed as a result, rejecting H1. There was also no evidence for the reverse effect: when an adolescent experienced an increase in depressive symptoms, the self-worth dependency on social media feedback of this adolescent did not then also increase over time, rejecting H2. Moreover, the concurrent path between self-worth dependency on social media feedback and depressive symptoms at W1 was not significant. Please see the appendix for a visual representation of the model results.

[Table 3 here]

Gender moderation. To test H3 and H4 regarding the role of gender in these dynamics, we compared a model that constrained the relations to be the same across gender against an

unconstrained model. The results of a $\chi 2$ difference test showed that the model with the within-person cross-lagged paths and the between-person correlation between the RI's constrained across gender ($\chi^2(7)=16.404$, $p=.022$, CFI=.994, RMSEA=.051, 90%CI=[.018/.084], SRMR=.034, $\chi^2/df=2.343$) had a significantly worse fit than an unconstrained model ($\chi^2(2)=3.907$, $p=.142$, CFI=.999, RMSEA=.043, 90%CI=[.000/.107], SRMR=.012, $\chi^2/df=1.954$, $\Delta\chi^2(5)=2.497$, $p=.029$). Imposing constraints thus did not seem tenable. Using a path-by-path analysis, we calculated difference scores to explore differences between gender groups but did not observe significant results. Therefore, potential gender differences in the model are negligible. H3 and H4 are rejected.

Exploratory analysis of time spent on social media and depressive symptoms

We conducted an exploratory investigation using a RI-CLPM with time spent on social media at W1, W2, W3 and depressive symptoms at W1, W2, W3 as variables. The model showed an excellent model fit ($\chi^2(5)=6.466$, $p=.263$, CFI=1.00, RMSEA=.017, 90%CI=[.000/.049], SRMR=.009, $\chi^2/df=1.293$) and the χ^2 difference test showed that means were allowed to be constrained over time (χ^2 unconstrained model=.327, df=1, χ^2 constrained model=6.466, df=5, $\Delta\chi^2(4)=6.139$, $p=.189$).

At the between-person level, a significant positive correlation was found between the random intercepts of time spent and depressive symptoms (Table 3). Adolescents who spent more time on Facebook, Instagram, Snapchat and TikTok also reported more depressive symptoms. However, none of the cross-lagged paths at the within-person level between time spent and depressive symptoms were significant, nor the concurrent path at W1 (Table 3), and we did not observe a moderating role of gender (constrained model: $\chi^2(11)=13.738$, $p=.248$, CFI=.999, RMSEA=.022, 90%CI=[.000/.054], SRMR=.019, $\chi^2/df=1.249$; unconstrained model: $\chi^2(6)=.9.713$, $p=.137$, CFI=.999, RMSEA=.035, 90%CI=[.000/.073], SRMR=.014, $\chi^2/df=1.619$, $\Delta\chi^2(5)=4.025$, $p=.546$).

Discussion

The current study investigated the between and within-person associations between self-worth dependency on social media feedback and depressive symptoms among adolescents. A strong correlation was found at the between-person level, indicating that adolescents who perceive their self-worth to be more dependent on social media feedback also have higher trait like symptoms of depression. However, there was no evidence for within-person relations. Our research contributes to the ongoing discussion regarding the relationship between social media use and psychological well-being. It specifically addresses the question of how subjective perceptions of social media use impact depressive symptoms among adolescents while differentiating within- from between-person processes. We discuss these results and their implications for research on the relationship between social media use and adolescents' well-being in more detail below.

Between-person results

We found a positive correlation between self-worth dependency on social media feedback and depressive symptoms at the between-person level. Individuals who derived more of their self-worth from how others perceived them on social media also tended to experience more depressive symptoms. This finding resonates with previous research that found similar relationships yet among young women (Sabik et al. 2020) and research that cross-sectionally linked general social media use, as well as specific efforts to seek feedback through social media, to the experience of depressive symptoms (e.g., Nesi & Prinstein, 2015; Tsitsika et al., 2014). Though these between-person results do not speak to the possible effects of social media use, it is informative as it indicates that adolescents differ in the extent to which they derive their self-worth dependency from social media feedback as well as in depressive symptoms, and that these differences are correlated (Valkenburg et al., 2022a).

As there were no effects at the within-person level, third variables likely account for this between-person association (Coyne et al., 2020). For instance, adolescents who experience more depressive symptoms and derive more of their self-worth from social media feedback may have higher trait-levels of depression or lower trait-levels of self-esteem, which both undermine their well-being and cause them to seek social validation from online sources. They may also differ in their desire to be liked or to feel a sense of belonging. People have an intrinsic need to maintain strong, stable interpersonal relationships and to feel accepted by others (Baumeister & Leary, 1995). Walton & Wilson (2018) argue that the *need to belong* and to feel seen, respected, and valued by others in their lives is a driving psychological need that informs individuals' thinking, feeling, and behavior. Generally, adolescents who struggle to fulfill these needs may have more depressive symptoms (Steers, 2016).

Also, adolescents can differ in their need for popularity, an internal drive to achieve and sustain a favorable social status, which for some adolescents may be more pivotal than simply being liked (Beyens et al., 2016; Garandeau & Lansu, 2019; Santor et al., 2000). Self-determination theory (Ryan & Deci, 2000) suggests that adolescents may turn to social media to gratify their need to be liked, to belong, and to be popular by looking for positive social feedback from their friends and peers online (Beyens et al., 2016; Steers, 2016). Thus, these unmet social needs could explain why some adolescents experience both more depressive symptoms and are more dependent on social media to determine their self-worth. Crucially, we note that there are many other third variables such as loneliness, internalizing problems and peer attachment that may explain this relationship and future research is needed to further identify these.

Within-person results

At the within-person level, part of the variance is explained by within-person carry over effects as the autoregressive paths for the self-worth dependency on social media feedback

components as well as for the depressive symptoms components were significant. Yet, none of the cross-lagged paths between self-worth dependency on social media feedback and depressive symptoms later in time, nor the reverse paths between depressive symptoms and self-worth dependency later in time, were significant, rejecting H1 and H2.

The lack of evidence for within-person effects of self-worth dependency on depressive symptoms may result from self-worth dependency representing a narrow set of subjective experiences. Even though adolescents who have a stronger dependency on social media feedback for their self-worth experience in general more depressive symptoms (i.e., between-person), experiencing an increase in self-worth dependency at a certain moment in time may be too specific to truly cause change in depressive symptoms on its own (i.e., within-person). Yet, it may be influential to the extent that it is part of a larger orientation towards social media that is implicated in well-being. As Lee & Hancock (2023) find, having the mindset that one is in control of one's social media use is a crucial component to positive experiences with social media. While an increase in self-worth dependency alone may not necessarily increase depressive symptoms, it may influence well-being as part of a larger mindset that is fundamentally about the dynamics of power and control between the user and social media use. This remains to be tested though in future research.

Moreover, the overall null effects at the within-person level may speak to the need to observe these media effects at a more granular timescale. For instance, an adolescent who derives their self-worth from peer social media feedback may experience fluctuations in self-esteem over a short time-span (e.g., over the course of hours), as it theoretically follows daily negative and positive experiences with peer feedback (Cambron et al., 2010). As such, increases in depressive symptoms may immediately follow such daily fluctuations in self-esteem (Cambron et al., 2010), but may not be observable in longer term effects that manifest themselves four months later, as in this study (Valkenburg et al., 2022a).

Conversely, the effects of social media dependency on depressive symptoms may emerge when accumulated over the course of months or years (Schmuck et al., 2021). Depressive symptoms typically develop through a complex interplay of different biological, interpersonal, cognitive, and emotional processes, which all unfold over different timescales. The interaction between specific social media experiences and any combination of stressors may inform depressive symptoms years later (Coyne et al., 2020; Hankin, 2006). For instance, deriving one's self-worth from social media feedback may not be psychologically consequential after some months, but may erode mental health if maintained over several years - particularly during vulnerable periods of development like adolescence. Indeed, subclinical and clinical depression often develops over the course of years in adolescence and can even span over different developmental phases (Crockett et al., 2020).

Several longitudinal studies have examined the links between social media use and depressive symptoms over brief time-spans (e.g., an experience-sampling study with 7 daily reports for 14 consecutive days; Aalbers et al., 2019), as well as long time-spans (e.g., an eight year longitudinal study with yearly measurements; Coyne et al., 2020), but neither found consistent support for any form of social media effects. However, these studies may have been limited by their reliance on general measures of time spent and passive use instead of more specific social media experiences that are theoretically relevant to depressive symptoms. Therefore, future research is advised to work with measurement burst designs that integrate short and longer time-spans and to apply statistical continuous time modeling techniques (Keijsers & Van Roekel, 2019; Schmuck et al., 2021), as well as to investigate a broader range of experiences with social media. Moreover, as the intraclass correlation shows that some variance in depressive symptoms can be attributed to within-person fluctuations, other factors than social media experiences may account for these fluctuations at a four month time lag such as the experience of (subsequently occurring) negative life events which rises dramatically after

the age of 13 (Hankin, 2006). Future research can therefore look at which other factors explain within-person changes in depressive symptoms among adolescents at an intermediate time interval.

Gender differences

We did not find support for a moderating role of gender in the within-person associations between depressive symptoms and self-worth dependency, rejecting both H3 and H4. These null results align with the research of Coyne et al (2020) who did not find stronger within-person associations between time spent on social media and depressive symptoms for girls, relative to boys. It may be possible that no gender differences were found because the effects of self-worth dependency on social media feedback on depressive symptoms vary from person to person, and thus from boy to boy and from girl to girl (Beyens et al., 2020). The found estimates for the within-person effects are still average effects, and these average effects may not be representative for many of the adolescents in our sample (Masselink et al., 2018). This possible heterogeneity may also explain the overall null results at the within-person level (Beyens et al., 2020). Future research may consider designs that allow for person-specific analyses when investigating subjective experiences on social media use and well-being indicators.

Time spent on social media

Finally, we conducted an exploratory investigation into the between- and within-person associations between time spent and depressive symptoms. Here, a positive significant correlation was found at the between-person level, indicating that adolescents who spent more time on Instagram, Snapchat, TikTok and Facebook reported more depressive symptoms. However, as the within-person associations were not significant, there was no evidence for an effect of time spent on depressive symptoms, nor of depressive symptoms on time spent. This pattern of results aligns with several recent studies that advanced the social media and well-

being field by separating within- from between-person dynamics among adolescents when looking at time spent specifically (e.g., Coyne et al., 2020; Orben et al., 2019).

We note that the size of the standardized between-person correlation between time spent and depressive symptoms (.21) was smaller than that of self-worth dependency and depressive symptoms (.45). Yet for both measures, no support was found for within-person processes. It might still be advisable though to adopt measures of subjective experiences of social media use instead of frequency measures as subjective experiences can more reliably be estimated in self-reports. Frequency estimations through self-reports are constrained by inaccurate recall, especially by adolescent users, yet perceptions of use aspects can be reliably measured through self-reports (Verbeij et al., 2021). In studying the relations between social media and well-being indicators, perceived social media use may even be theoretically more interesting than actual frequency of use (Sewall et al., 2020; Verbeij et al., 2021). It thus seems needed to look further at other, more holistic experiences with social media (Lee & Hancock, 2023) to unpack its potential effects on our lives.

Limitations and future directions

Our study was limited in several ways that can be addressed through future research. First, we note that the adolescents in our sample were asked to self-report their depressive symptoms. Though this is a common approach to examining mental health indicators among adolescents (Coyne et al., 2020), it may be biased by adolescents being less likely to self-report symptoms of well-being that they consider socially undesirable. Particularly when investigating symptoms that may reach levels of clinical severity (e.g., depression), it may be valuable for future work to combine self-assessment surveys with informant data from adolescents' parents, teachers, or peers (Haroz et al., 2014).

Moreover, many adolescents were removed from the analytical sample due to a failed or missed attention check. Removing these adolescents increased the quality of the data

(Shamon & Berning, 2020), yet it also affected the power of the study. A post hoc power analysis in R showed that this study has a power of .5. This study's design is already an improvement over much of the other published studies in our field that address the links between social media use and well-being and thereby often uses small samples in cross-sectional or two-wave longitudinal designs among college students or US adolescents (e.g., Hancock et al., 2022; Vidal et al., 2020). We thus believe it is still valuable to report the estimates found in the view of science accumulation as they can serve as a basis for future research. Yet, the results should thus be interpreted with caution due to insufficient power. As the original sample would have resulted in a conventional power level, future research among adolescents in schools should find ways to motivate them better to fill in the questions seriously and with the needed attention.

Furthermore, older adolescents, boys and adolescents with higher levels of depressive symptoms were more likely to have participated in only one of the three waves. This is similar to drop-out patterns in other longitudinal studies among adolescent well-being (e.g., Masselink et al., 2018) and has implications for the generalizability of our findings to these groups of adolescents. Also, missing data patterns in our data were not c*ompletely missing at random*, but *missing at random* as these patterns were dependent on known characteristics such as age and gender (Gelman & Hill, 2007). We limited the potential distorting of estimates with the FIML estimator which can very well handle missing data patterns under the missing data at random assumption (Masselink et al., 2018).

Additionally, we note a relatively large attrition from W2 to W3 due to the COVID-19 pandemic. The data collection for Wave 3 took place in June 2020, which was immediately after the first nationally imposed lockdown period in [country]. The timing of this unavoidable event may have impacted the results, as time spent on social media was found in our exploratory analyses to be significantly higher during the third wave whereas depressive

symptoms were significantly lower. The latter finding is rather surprising, yet research indicates that adolescent depressive symptoms may particularly have elevated later in the pandemic and not at the beginning (i.e., W3 took place in June 2020, only three months after the initiation of pandemic) (Racine et al., 2021). The observed decrease may even suggest that other factors that are known to typically influence depressive symptoms such as perceived social support (Crockett et al., 2020) were more pronounced during the timing of W3, resulting in lower depressive symptoms than before. As with other longitudinal data impacted by COVID-19, additional research is needed to replicate findings in future work.

Conclusion

This longitudinal study investigated the relationship between adolescents' self-worth dependency on social media feedback and their depressive symptoms. We contributed to research on social media effects by complementing examinations of time spent on social media with more granular assessments of individuals' subjective perceptions of the role that social media plays in their lives, with respect to between- and within-person processes. Our results indicate that people who staked more of their self-worth on the feedback they obtained from their social media self-presentations also tended to be more depressed. While these between-person effects were significant, we did not observe evidence of within-person effects in our study - counter to conventional claims that social media use can exacerbate depressive symptoms. Our findings highlight the need to disentangle between- and within-person dynamics when considering subjective experiences in social media research as it will help to draw more accurate conclusions about the role of social media in adolescents' lives.

References

Aalbers, G., McNally, R. J., Heeren, A., de Wit, S., & Fried, E. I. (2019). Social media and depression symptoms: A network perspective. *Journal of Experimental Psychology: General, 148*(8). https://doi.org/10.1037/xge0000528

Afifi, M. (2007). Gender differences in mental health. *Singapore Medical Journal, 48*(5), 358-391.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Ayuso-Mateos, J. L., Nuevo, R., Verdes, E., Naidoo, N., & Chatterji, S. (2010). From depressive symptoms to depressive disorders: The relevance of thresholds. *The British Journal of Psychiatry, 196*(5), 365-371. https://doi.org/10.1192/bjp.bp.109.071191

Bailey, E. R., Matz, S. C., Youyou, W., & Iyengar, S. S. (2020). Authentic self-expression on social media is associated with greater subjective well-being. *Nature Communications, 11*(1), 1–9. https://doi.org/10.1038/s41467-020-18539-w

Bakker, M. P., Ormel, J., Verhulst, F. C., & Oldehinkel, A. J. (2010). Peer stressors and gender differences in adolescents' mental health: The TRAILS study. *Journal of Adolescent Health, 46*(5), 444-450. https://doi.org/10.1016/j.jadohealth.2009.10.002

Bayer, J. B., Triêu, P., & Ellison, N. B. (2020). Social media elements, ecologies, and effects. *Annual Review of Psychology, 71*, 471-497. https://doi.org/10.1146/annurev-psych-010419- 050944

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497

Beck, A. T., & Alford, B. A. (2009). *Depression: Causes and treatment*. University of Pennsylvania Press.

Beyens, I., Frison, E., & Eggermont, S. (2016). “I don’t want to miss a thing”: Adolescents’ fear of missing out and its relationship to adolescents’ social needs, Facebook use, and Facebook related stress. *Computers in Human Behavior, 64*, 1-8. https://doi.org/10.1016/j.chb.2016.05.083

Beyens, I., Pouwels, J. L., van Driel, I. I., Keijsers, L, & Valkenburg, P. M. (2020). The effect of social media on well-being differs from adolescent to adolescent. *Scientific Reports, 10*, 10763. https://doi.org/10.1038/s41598-020-67727-7

Brechwald, W. A., & Prinstein, M. J. (2011). Beyond homophily: A decade of advances in understanding peer influence processes. *Journal of Research on Adolescence, 21*(1), 166–179. https://doi.org/10.1111/j.1532-7795.2010.00721.x.

Burwell, R. A., & Shirk, S. R. (2006). Self processes in adolescent depression: The role of self-worth contingencies. *Journal of Research on Adolescence, 16*(3), 479–490. https://doi.org/10.1111/j.1532-7795.2006.00503.x

Cambron, M. J., Acitello, L. K., & Steinberg, L. (2010). When friends make you blue: The role of friendship contingent self-esteem in predicting self-esteem and depressive symptoms. *Personality and Social Psychology Bulletin*, *36*(3), 384–397. https://doi.org/10.1177/0146167209351593

Casares, D. R., & Binkley, E. E. (2022). An unfiltered look at idealized images: A social media intervention for adolescent girls. *Journal of Creativity in Mental Health, 17*(3), 313-331. https://doi.org/10.1080/15401383.2021.1892556

Course-Choi, J., & Hammond, L. (2021). Social media use and adolescent well-Being: A narrative review of longitudinal studies. C*yberpsychology, Behavior, and Social Networking, 24*(4), 223–236. https://doi.org/10.1089/cyber.2020.0020

Coyne, S. M., Rogers, A. A., Zurcher, J. D., Stockdale, L. & Booth, M. (2020). Does time spent using social media impact mental health? An eight year longitudinal study. *Computers in Human Behavior, 104*, 106160. https://doi.org/10.1016/j.chb.2019.106160

Crocker, J., & Wolfe, C. T. (2001). Contingencies of self-worth. *Psychological Review, 108*(3), 593–623. https://doi.org/10.1037/0033-295X.108.3.593

Crockett, M. A., Martínez, V., & Jiménez-Molina, Á. (2020). Subthreshold depression in adolescence: Gender differences in prevalence, clinical features, and associated factors. *Journal of Affective Disorders, 272*, 269–276. https://doi.org/10.1016/j.jad.2020.03.111

Cunningham, S., Hudson, C. C., & Harkness, K. (2021). Social media and depression symptoms: a meta-analysis. *Research on Child and Adolescent Psychopathology, 49*(2), 241-253. https://doi.org/10.1007/s10802-020-00715-7

Devos, S., Schreurs, L., Eggermont, S., & Vandenbosch, L. (2023). Go big or go home: Examining the longitudinal relations between exposure to successful portrayals on social media and adolescents' feelings of discrepancy. *New Media & Society*, 1-19. https://doi.org/10.1177/14614448231188935

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication, 12*(4), 1143-1168. https://doi.org/10.1111/j.1083-6101.2007.00367.x

Fore, H. (February 8, 2021). Growing concern for well-being of children and young people amid soaring screen time. *UNICEF*. Retrieved from https://www.unicef.org/press-releases/growing-concern-well-being-children-and-young-people-amid-soaring-screen-time

Frison, E., & Eggermont, S. (2017). Browsing, posting, and liking on Instagram: The reciprocal relationships between different types of Instagram use and adolescents' depressed mood. *Cyberpsychology, Behavior, and Social Networking, 20*(10), 603-609. https://doi.org/10.1089/cyber.2017.0156

Garandeau, C. F., & Lansu, T. A. M. (2019). Why does decreased likeability not deter adolescent bullying perpetrators? *Aggressive Behavior, 45*(3), 348–359. https://doi.org/10.1002/ab.21824

Geiger, A. W., & Davis, L. (2019, July 19). A growing number of American teenagers – particularly girls – are facing depression. *Pew Research Center*. Retrieved from: https://www.pewresearch.org/fact-tank/2019/07/12/a-growing-number-of-american-teenagers-particularly-girls-are-facing-depression/

Gelman, A., & Hill, J. (2007). *Data analysis using regression and multilevel/hierarchical models*. Cambridge University Press.

Gioia, F., McLean, S., Griffiths, M. D., & Boursier, V. (2021). Adolescents' selfie-taking and selfie-editing: A revision of the photo manipulation scale and a moderated mediation model. *Current Psychychology*. https://doi.org/10.1007/s12144-021-01702-x

Goffman, E. (1959). *The presentation of self in everyday life*. Anchor.

Hancock, J., Liu, S. X., Luo, M., & Mieczkowski, H. (2022, March 9). Psychological well-being and social media use: A meta-analysis of associations between social media use and depression, anxiety, loneliness, eudaimonic, hedonic and social well-being, *SSRN*. https://dx.doi.org/10.2139/ssrn.4053961

Hankin, B. L. (2006). Adolescent depression: Description, causes, and interventions. *Epilepsy and Behavior, 8*(1), 102–114. https://doi.org/10.1016/j.yebeh.2005.10.012

Haroz, E. E., Ybarra, M. L., & Eaton, W. W. (2014). Psychometric evaluation of a self-report scale to measure adolescent depression: The CESR-10 in two national adolescent

samples in the United States. *Journal of Affective Disorders, 158*, 154-160. https://doi.org/10.1016/j.jad.2014.02.009

Heffer, T., Good, M., Daly, O., MacDonell, E., & Willoughby, T. (2019). The longitudinal association between social-media use and depressive symptoms among adolescents and young adults: An empirical reply to Twenge et al. (2018). *Clinical Psychological Science, 7*(3), 462–470. https://doi.org/10.1177/2167702618812727

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*(3), 319-340. https://doi.org/10.1037/0033-295X.94.3.319

Keijsers, L. & Van Roekel, E. (2019). Longitudinal methods in adolescent psychology. Where could we go from here? And should we? In L. B. Hendry & M. Kloep (Eds.), *Reframing adolescent research* (pp. 56-77). Routledge.

Kline, R. B. (2005). *Principles and practice of structural equation modeling (2nd ed.)*. Guilford.

Knobloch-Westerwick, S. (2015). The selective exposure self-and affect management (SESAM) model: Applications in the realms of race, politics, and health. *Communication Research, 42*, 959–985. https://doi.org/10.1177/0093650214539173

Lee, A. Y., & Hancock, J. (2023). *Social media mindsets: A new approach to understanding social media use*. PsyRxiv.

Lees, B., Squeglia, L. M., Breslin, F. J., Thompson, W. K., Tapert, S. F., & Paulus, M. P. (2020). Screen media activity does not displace other recreational activities among 9–10 year-old youth: A cross-sectional ABCD study®. *BMC public health*, *20*(1), 1-11. https://doi.org/10.1186/s12889-020-09894-w

Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford.

Luong, K .T., Knobloch-Westerwick, S., Frampton, J. (2021). Temporal self impacts on media exposure & effects: A test of the selective exposure self- and affect-

management (SESAM) model. *Media Psychology, 24*(1), 48-78. https://doi.org/10.1080/15213269.2019.1657898

Martinez-Pecino, R., & Garcia-Gavilán, M. (2019). Likes and problematic instagram use: The moderating role of self-esteem. *Cyberpsychology, Behavior, and Social Networking, 22*(6), 412–416. https://doi.org/10.1089/cyber.2018.0701

Masselink, M., van Roekel, E., Hankin, B. L., Keijsers, L., Lodder, G. M. A., Vanhalst, J., Verhagen, M., Young, J. F., & Oldehinkel, A. J. (2018). The longitudinal association between self-esteem and depressive symptoms in adolescents: Separating between-person effects from within-person effects. *European Journal of Personality, 32*, 653-671. https://doi.org/10.1002/per.2179

McCrae, N., Gettings, S. & Purssell, E. (2017). Social media and depressive symptoms in childhood and adolescence: A systematic review. *Adolescent Research Review, 2*, 315–330. https://doi.org/10.1007/s40894-017-0053-4

Meeus, A., Beullens, K., & Eggermont, S. (2019). Like me (please?): Connecting online self-presentation to pre- and early adolescents' self-esteem. *New Media & Society, 21*(11-12), 2386-2403. https://doi.org/10.1177/1461444819847447

Mulder, J. D., & Hamaker, E. L. (2021). Three extensions of the random intercept cross-lagged panel model. *Structural Equation Modeling: A Multidisciplinary Journal, 28*(4), 638-648. https://doi.org/10.1080/10705511.2020.1784738

Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and individual differences, 32*(2), 337-348. https://doi.org/10.1016/S0191-8869(01)00027-7

Murthy, V. (December 7, 2021). U.S. surgeon general issues advisory on youth mental health crisis further exposed by COVID-19 pandemic. HHS Press Office. Retrieved from

https://www.hhs.gov/about/news/2021/12/07/us-surgeon-general-issues-advisory-on-youth-mental-health-crisis-further-exposed-by-covid-19-pandemic.html

Neira, C. J. B., & Barber, B. L. (2014) Social networking site use: Linked to adolescents' social self-concept, self-esteem, and depressed mood. *Australian Journal of Psychology, 66*(1), 56-64. https://doi/org/10.1111/ajpy.12034

Nesi, J., & Prinstein, M. J. (2015). Using social media for social comparison and feedback-seeking: Gender and popularity moderate associations with depressive symptoms. *Journal of Abnormal Child Psychology*, *43*(8). https://doi.org/10.1007/s10802-015-0020-0

Odgers, C. L., & Jensen, M. R. (2020). Annual research review: Adolescent mental health in the digital age: Facts, fears, and future directions. *Journal of Child Psychology and Psychiatry, 61*(3), 336-348. https://doi.org/10.1111/jcpp.13190

Orben, A., Dienlin, T., & Przybylski, A. K. (2019). Social media's enduring effect on adolescent life satisfaction. *PNAS, 116*(21), 10226-10228. https://doi.org/10.1073/pnas.1902058116

Poulin, C., Hand, D., & Boudreau, B. (2005). Validity of a 12-item version of the CES-D used in the national longitudinal study of children and youth. *Chronic Diseases in Canada, 26*(2- 3), 65-72. Accessed through https://elib.tcd.ie/login?url=https://www.proquest.com/scholarly-journals/validity-12-item-version-ces-d-centre/docview/216609654/se-2

Racine, N., McArthur, B. A., & Cooke, J. E. (2021). Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: A meta-analysis. *JAMA Pediatrics, 175*(11), 1142-1150. https://doi:10.1001/jamapediatrics.2021.2482

Rideout, V., Peebles, A., Mann, S., & Robb, M. B. (2022). *Common Sense census: Media use by tweens and teens, 2021*. San Francisco, CA. Common Sense.

Roberts, J. A., & David, M. E. (2022). On the outside looking in: Social media intensity, social connection, and user well-being: The moderating role of passive social media use. *Canadian Journal of Behavioural Science*. https://doi.org/10.1037/cbs0000323

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78. http://dx.doi.org/10.1037/0003-066X.55.1.68

Sabik, N., Falat, J., & Magagnos, J. (2020). When self-worth depends on social media feedback: Associations with psychological well-being. *Sex Roles, 82*, 411-421. https://doi.org/10.1007/s11199-019-01062-8

Santor, D. A., Messervey, D., & Kusumakar, V. (2000). Measuring peer pressure, popularity, and conformity in adolescent boys and girls: Predicting school performance, sexual attitudes, and substance abuse. *Journal of Youth and Adolescence, 29*(2), 163-182. https://doi.org/10.1023/A:1005152515264

Shamon, H., & Berning, C. (2020). Attention check items and instructions in online surveys with incentivized and non-incentivized samples: Boon or bane for data quality? *Survey Research Methods, 14*, 55-77. https://doi.org/10.18148/srm/2020.v14i1.7374

Schmuck, D., Stevic, A., Matthes, J., & Karsay, K. (2021). Out of control? How parents' perceived lack of control over children's smartphone use affects children's self-esteem over time. *New Media & Society*, 1-21. https://doi.org/10.1177/14614448211011452

Schlenker, B. R. (1980). *Impression management: The self-concept, social identity, and interpersonal relations*. Brooks/Cole Publishing Company.

Schreurs, L., Meier, A., & Vandenbosch, L. (2023). Exposure to the positivity bias and adolescents' differential longitudinal links with social comparison, inspiration and

envy depending on social media literacy. *Current Psychology*, *42*(32), 28221–28241. https://doi.org/10.1007/s12144-022-03893-3

Schreurs, L., & Vandenbosch, L. (2022a). Should I post my very best self? The within-person reciprocal associations between social media literacy, positivity-biased behaviors and adolescents' self-esteem. *Telematics and Informatics*, *73*, 101865. https://doi.org/10.1016/j.tele.2022.101865

Schreurs, L., & Vandenbosch, L. (2022b). Different interactions with appearance-focused social media content and adolescents' body dissatisfaction: a within-person perspective. *Computers in Human Behavior*, *135*, 107364. https://doi.org/10.1016/j.chb.2022.107364

Sewall, C. J. R., Bear, T. M. (2020). How psychosocial well-being and usage amount predict inaccuracies in retrospective estimates of digital technology use. *Mobile Media & Communication, 8*(3), 379-399. https://doi.org/10.1177/2050157920902830

Sherman, L. E., Payton, A. A., Hernandez, L. M., Greenfield, P. M., & Dapretto, M. (2016). The power of the like in adolescence: Effects of peer influence on neural and behavioral responses to social media. *Psychological Science, 27*(7), 1027-1035. https://doi.org/10.1177/0956797616645673

Steers, M. N. (2016). 'It's complicated': Facebook's relationship with the need to belong and depression. *Current Opinion in Psychology*, *9*, 22-26. https://doi.org/10.1016/j.copsyc.2015.10.007

The White House (March 1, 2022). Remarks of president Joe Biden – State of the union address as prepared for delivery. Retrieved from https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/03/01/remarks-of-president-joe-biden-state-of-the-union-address-as-delivered/

Trekels, J. (2018). *The ubiquity of beauty-is-good in media: Understanding the importance of appearance in adolescents' lives* [Unpublished doctoral dissertation]. KU Leuven, Belgium.

Tsitsika, A. K., Tzavela, E. C., Janikian, M., Ólafsson, K., Iordache, A., Schoenmakers, T. M., Tzavara, M., & Richardson, C. (2014). Online social networking in adolescence: Patterns of use in six European countries and links with psychosocial functioning. *Journal of Adolescent Health, 55*(1), 141-147. https://doi.org/10.1016/j.jadohealth.2013.11.010

Twenge, J. M. (2020). Why increases in adolescent depression may be linked to the technological environment. *Current Opinion in Psychology, 32,* 89-94. https://doi.org/10.1016/j.copsyc.2019.06.036

Twenge, J. M., Haidt, J., Lozano, J., & Cummins, K. M. (2022). Specification curve analysis shows that social media use is linked to poor mental health, especially among girls. *Acta psychologica, 224*, 103512. https://doi.org/10.1016/j.actpsy.2022.103512

Valkenburg, P. M., Beyens, I., Pouwels, J. L., van Driel, I. I., & Keijsers, L. (2021). Social media use and adolescents' self-esteem: Heading for a person-specific media effects paradigm. *Journal of Communication, 71*(1), 56–78. https://doi.org/10.1093/joc/jqaa039

Valkenburg, P. M., Beyens, I., Pouwels, J. L., van Driel, I. I., & Keijsers, L. (2022a). Social media browsing and adolescent well-being: Challenging the "passive social media use hypothesis". *Journal of Computer-Mediated Communication, 27*(1), 1-19. https://doi.org/10.1093/jcmc/zmab015

Valkenburg, P. M., Meier, A., & Beyens, I. (2022b). Social media use and its impact on adolescent mental health: An umbrella review of the evidence. *Current Opinion in Psychology, 44*, 58-68. https://doi.org/10.1016/j.copsyc.2021.08.017

van Sonderen E., Sanderman, R., & Coyne J. C. (2013) Ineffectiveness of reverse wording of questionnaire items: Let's learn from cows in the rain. *PLoS ONE, 8*(7), e68967. https://doi.org/10.1371/journal.pone.0068967

Verbeij, T., Pouwels, J. L., Beyens, I., & Valkenburg, P. M. (2021). The accuracy and validity of self-reported social media use measures among adolescents. *Computers in Human Behavior Reports, 3,* 100090. https://doi.org/10.1016/j.chbr.2021.100090

Verduyn, P., Gugushvili,, Massar, K., Täht, K., & Kross, E. (2020). Social comparison on social networking sites. *Current Opinion in Psychology, 36*, 32–37. https://doi.org/10.1016/j.copsyc.2020.04.002

Vidal, C., Lhaksampa, T., Miller, L., & Platt, R. (2020). Social media use and depression in adolescents: A scoping review. *International Review of Psychiatry, 32*(3), 235–253. https://doi.org/10.1080/09540261.2020.1720623

Vogels, E. A., Gelles-Watnick, (2023, April 24). Teens and social media: Key findings from Pew Research Center surveys.*Pew Research Center*. Retrieved from: https://www.pewresearch.org/short-reads/2023/04/24/teens-and-social-media-key-findings-from-pew-research-center-surveys/

Walton, G. M., & Wilson, T. D. (2018). Wise interventions: Psychological remedies for social and personal problems. *Psychological review, 125*(5), 617-655. https://doi.org/10.1037/rev0000115

Wang, P., Wang, X., Zhao, M., Wu, Y., Wang, Y., & Lei, L. (2019). Can social networking sites alleviate depression? The relation between authentic online self-presentation and adolescent depression: A mediation model of perceived social support and rumination. *Current Psychology, 38*(6), 1512–1521. https://doi.org/10.1007/s12144-017-9711-8

Yau, J. C., & Reich, S. M. (2019). "It's just a lot of work": Adolescents' self-presentation norms and practices on Facebook and Instagram. *Journal of Research on Adolescence, 29*(1), 196-209. https://doi.org/10.1111/jora.12376

Table 1. Logistic Regression Analyses To Explore Missing Data Patterns

		Gender	Age			Gender	Age
Self-worth (W1)	Beta	.164	.433***	**Depressive**	Beta	-.435	.115
	SE	.141	.049	**symptoms (W1)**	SE	.357	.107
	Exp(B)	1.178	1.542		Exp(B)	.647	1.122
Self-worth (W2)	Beta	.180	.276***	**Depressive**	Beta	-.487	-.075
	SE	.189	.064	**symptoms (W2)**	SE	.407	.112
	Exp(B)	1.197	1.318		Exp(B)	.614	.928
Self-worth (W3)	Beta	1.089***	-.230***	**Depressive**	Beta	1.105**	-.244***
				symptoms (W3)		*	
	SE	.134	.041		SE	.135	.041
	Exp(B)	2.972	.795		Exp(B)	3.018	.784
Time spent (W1)	Beta	-.435	.115				
	SE	.357	.107				
	Exp(B)	.647	1.122				
Time spent (W2)	Beta	-.487	-.075				
	SE	.407	.112				
	Exp(B)	.614	.928				
Time spent (W3)	Beta	1.105***	-.244***				
	SE	.135	.041				
	Exp(B)	3.018	.784				

Note. *** $p<.001$; ** $p<.01$; * $p<.05$. W1=Wave 1, W2=Wave 2, W3=Wave 3. Gender is a dichotomous variable and is coded: boy=1, girl=2. 'Boy' was chosen as the reference category. All dependent variables are dichotomous and are coded: 0=missing value on this variable, 1=not a missing value.

Table 2. Descriptive Statistics and Zero-Order Correlations

	M	*SD*											
			1	2	3	4	5	6	7	8	9	10	11
1. Self-worth (W1)	3.01	1.38	/										
2. Self-worth (W2)	3.06	1.44	.608**	/									
3. Self-worth (W3)	3.09	1.41	.534**	.600**	/								
4. DS (W1)	1.88	.50	.278**	.216**	.186**	/							
5. DS (W2)	1.91	.52	.297**	.300**	.259**	.710**	/						
6. DS (W3)	1.87	.51	.258**	.269**	.334**	.577**	.678**	/					
7. Time spent (W1)	3.77	1.09	.307**	.279**	.260**	.196**	.190**	.174**	/				
8. Time spent (W2)	4.00	1.13	.295**	.271**	.275**	.154**	.158**	.180**	.866**	/			
9. Time spent (W3)	4.22	1.13	.278**	.269**	.263**	.156**	.143**	.142**	.793**	.840**	/		
10. Gender (W1)	/	/	.230**	.260**	.316**	.259**	.248**	.217**	.336**	.336**	.366**	/	
11. Age (W1)	14.55	1.65	-.109**	-.055	.029	.088**	.046	.086*	.118**	.117**	.162**	.016	/

Note. ** p<.01; * p<.05. DS=depressive symptoms. The dichotomous variable gender is coded as follows: boy=1, girl=2. W1=Wave 1, W2=Wave 2, W3=Wave 3.

Table 3. Parameter Estimates

		Unstandardized Coeff.	*SE*	*Standardized Coeff.*	*95%CI Standardized Coeff.*
Model 1. Perception that *self-worth depends on social media use* and depressive symptoms					
Within	**Self-worth (W1)→Self-worth (W2)**	.262*	.122	.237*	[.017/.450]
Auto-regressive paths	**Self-worth (W2)→Self-worth (W3)**	.212*	.093	.222*	[.034/.412]
	DS (W1)→DS (W2)	.430***	.083	.403***	[.231/.551]
	DS (W2)→DS (W3)	.322**	.083	.330**	[.111/.500]
Within	Self-worth (W1)→DS (W2)	.038	.026	.098	[-.037/.236]
Cross-lagged paths	Self-worth (W2)→DS (W3)	.007	.024	.022	[-.102/.177]
	DS (W1)→Self-worth (W2)	-.072	.241	-.024	[-.190/.117]
	DS (W2)→Self-worth (W3)	.065	.221	.024	[-.127/.173]
Within	Self-worth (W1) with DS (W1)	.044	.031	.133	[-.034/.302]
Concurrent paths	Self-worth (W2) with DS (W2)	.053*	.022	.155*	[.029/.274]
	Self-worth (W3) with DS (W3)	.070**	.022	.209**	[.075/.324]
Between	**RI Self-worth with RI DS**	.157***	.032	.450***	[.273/.628]
Model 2. Time spent on social media and depressive symptoms					
Within	**Time spent (W1)→Time spent (W2)**	.562***	.137	.477***	[.173/.698]
Auto-regressive paths	**Time spent (W2)→Time spent (W3)**	.457***	.119	.451***	[.218/.675]
	DS (W1)→Depression (W2)	.425***	.097	.397***	[.190/.546]
	DS (W2)→Depression (W3)	.331**	.099	.337**	[.135/.502]
Within	Time spent (W1)→DS (W2)	.096	.074	.131	[-.065/.338]
Cross-lagged paths	Time spent (W2)→DS (W3)	.044	.408	.072	[-.102/.240]
	DS (W1)→Time spent (W2)	-.022	.111	-.013	[-.140/.117]
	DS (W2)→Time spent (W3)	-.126	.122	-.077	[-.215/.062]
Within	Time spent (W1) with DS (W1)	.031	.024	.176	[-.069/.392]
Concurrent paths	Time spent (W2) with DS (W2)	.002	.011	.009	[-.129/.140]
	Time spent (W3) with DS (W3)	-.006	.011	-.032	[-.156/.076]
Between	**RI Time spent with RI DS**	.070**	.026	.207*	[.042/.390]

Note. ***<.001; ** p<.01; * p<.05. DS=depressive symptoms. For clarity purposes, associations with control variables and correlations between error terms are not shown. Significant associations are displayed in bold. W1=Wave 1, W2=Wave 2, W3=Wave 3.