Social media’s enduring effect on adolescent life satisfaction

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In this study, we used large-scale representative panel data to disentangle the between-person and within-person relations linking adolescent social media use and well-being. We found that social media use is not, in and of itself, a strong predictor of life satisfaction across the adolescent population. Instead, social media effects are nuanced, small at best, reciprocal over time, gender specific, and contingent on analytic methods.

Does the increasing amount of time adolescents devote to social media negatively affect their satisfaction with life? Set against the rapid pace of technological innovation, this simple question has grown into a pressing concern for scientists, caregivers, and policymakers. Research, however, has not kept pace (1). Focused on cross-sectional relations, scientists have few means of parsing longitudinal effects from artifacts introduced by common statistical modeling methodologies (2). Furthermore, the volume of data under analysis, paired with unchecked analytical flexibility, enables selective research reporting, biasing the literature toward statistically significant effects (3, 4). Nevertheless, trivial trends are routinely overinterpreted by those under increasing pressure to rapidly craft evidence-based policies.

Our understanding of social media effects is predominately shaped by analyses of cross-sectional associations between social media use measures and self-reported youth outcomes. Studies highlight modest negative correlations (3), but many of their conclusions are problematic. It is not tenable to assume that observations of between-person associations—comparing different people at the same time point—translate into within-person effects—tracking an individual, and what affects them, over time (2). Drawing this flawed inference risks misinforming the public or shaping policy on the basis of unsuitable evidence.

To disentangle between-person associations from within-person effects, we analyzed an eight-wave, large-scale, and nationally representative panel dataset (Understanding Society, the UK Household Longitudinal Study, 2009–2016) using random-intercept cross-lagged panel models (2). We adopted a specification curve analysis framework (3, 5)—a computational method which minimizes the risk that a specific profile of analytical decisions yields false-positive results. In place of a single model, we tested a wide range of theoretically grounded analysis options (data is available on the UK data service (6); code is available on the Open Science Framework (7)).

Fitted model parameters are reported in Supplemental Table 1, with a comprehensive figure of the results in Fig. 1. For brevity, we summarize the findings here. Our key conclusions are (i) that social media use is not a strong predictor of life satisfaction when considering within-person relations, (ii) that gender and time are important predictors of life satisfaction, and (iii) that social media use is not a strong predictor of life satisfaction when considering between-person relations.

For within-person relations, our results show a nuanced picture. Social media use was positively related to life satisfaction for both male and female participants when controlling for other factors. However, the relationship was stronger for females. This finding is consistent with previous research (3) and suggests that gender might be an important factor to consider in future studies.

For between-person relations, our findings show that social media use was positively related to life satisfaction across all domains, except satisfaction with social life and personal development. These findings are also consistent with previous research (3) and suggest that social media use might have a positive impact on life satisfaction for adolescents.

In conclusion, our study highlights the importance of considering both within-person and between-person effects when studying the relationship between social media use and life satisfaction. It also emphasizes the need for more research on the potential mechanisms through which social media use affects life satisfaction, especially with regard to gender differences. Further research is needed to understand the complex relationship between social media use and adolescent well-being.
satisfaction with friends, predicted slightly reduced social media use (b = −0.17 to −0.05 or β = −0.11 to −0.07; Fig. 2, Right).

However, some caution is warranted: When comparing both genders, the effects’ confidence intervals overlap, and the lower incidence of significant effects in males alone is not evidence that the effects are therefore substantial in females (10), especially as they are very small in size. Further, the yearly interval between measurements in these data might not be optimal for understanding reciprocal social media effects over time, underlining how single study can capture the full causal picture. We also highlight that self-report measures only partially reflect the objective time adolescents spend engaging with social media (11), yet they form the foundation of technological assessments included in the best-quality datasets informing vital research in this area today.

The relations linking social media use and life satisfaction are, therefore, more nuanced than previously assumed: They are inconsistent, possibly contingent on gender, and vary substantially depending on how the data are analyzed. Most effects are tiny—arguably trivial; where best statistical practices are followed, they are not statistically significant in more than half of models. That understood, some effects are worthy of further exploration and replication: There might be small reciprocal within-person effects in females, with increases in life satisfaction predicting slightly lower social media use, and increases in social media use predicting tenuous decreases in life satisfaction.

With the unknowns of social media effects still substantially outnumbering the knowns, it is critical that independent scientists, policymakers, and industry researchers cooperate more closely. Scientists must embrace circumspection, transparency, and robust ways of working that safeguard against bias and analytical flexibility. Doing so will provide parents and policymakers with the reliable insights they need on a topic most often characterized by unfounded media hype. Finally, and most importantly, social media companies must support independent research by sharing granular user engagement data and participating in large-scale team-based open science. Only then will we truly unravel the complex constellations of effects shaping young people in the digital age.

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Fig. 1. Results of a random-intercept cross-lagged panel model specification curve analysis relating social media use and life satisfaction. (Left) Between-person correlations. (Center) Within-person effects of social media use on life satisfaction. (Right) Within-person effects of life satisfaction on social media use. Each point on the x axis represents a different combination of analytical decisions (i.e., life satisfaction domain, gender, number of waves, estimator, data imputation, and control variables). The “dashboard” depicts which gender and life satisfaction domain the specific combination of analytical decisions analyzed; the resulting ψ value (Left) or β value (Center and Right) is shown in the plot above (red indicates P > 0.05, black indicates P < 0.05). For the unabridged figure, including the complete set of analytic decisions and underlying code, see doi.org/10.17605/OSF.IO/4XP3V.

Fig. 2. Relation between life satisfaction and social media use in female (Upper) and male (Lower) adolescents. (Left) Between-person correlations. (Center) Within-person effects of social media use on life satisfaction. (Right) Within-person effects of life satisfaction on social media use. Small dots represent results of each possible combination of theoretically defensible analytical decisions. Large circles represent results of the best practice models (white indicates P > 0.05, black indicates P < 0.05).