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## The interplay between Facebook use, social comparison, envy, and depression

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### Highlights

- Facebook use has recently been linked to depression and negative affectivity.
- Unflattering social comparison and envy are common experiences for Facebook users.
- Envy and social comparison mediate correlations between Facebook use and depression.
- Facebook research sheds new light on the relationship between envy and depression.
- Further experiments and experience sampling should corroborate causal links.

### Abstract

In their Facebook profiles, users communicate abundant social comparison information conveying mainly positive self-portrayals. Thereby, social networking sites like Facebook provide a fertile ground for envy. This has been proposed as a mechanism for the potential negative effects of Facebook use on well-being and depression. This article reviews research on this process. Studies show that (especially passive) Facebook use indeed predicts different measures of social comparison as well as envy. In several studies social comparison or envy mediate a positive association between Facebook use and undesirable affective outcomes such as depression. However, causal relationships have not yet been sufficiently established. Methodological and conceptual variety across studies limits their comparability, but reveals viable ideas for future research.

**Keywords:** Depression, self-esteem, social comparison, envy, jealousy, online social media, Facebook

### Introduction

The term ‘Facebook Depression’ has become a mass media headline [1] suggesting detrimental effects of social networking sites (SNSs). The available empirical evidence is equivocal however, sometimes suggesting a positive [2, 3, 4, 5], a non-existent [6], or even a negative [7, 8, 9] relationship between Facebook use and depression. Given that sites such as Facebook serve a diversity of purposes [10, 11], treating them as a one-dimensional construct is likely an oversimplification [4, 5] resulting in conceptual imprecision (for an overview, see [12\*\*]). Investigating the specific processes at work may disentangle these disparate findings. Recently, social comparison and envy have been suggested to be relevant in the association between Facebook and depressed mood. Here, we review the evidence, consider methodological issues, and discuss open questions.

### Comparison and envy in an SNS context

Social comparison is a fundamental psychological process governing how people think about themselves or others [13]. In SNSs, social comparison is ubiquitous because comparison information (e.g., friend count) is more salient than offline [14, 15]. SNS self-

presentation is frequently motivated by impression management [16] and the presented information is positively skewed [17, 18]. Consequently, the probability of unflattering social comparisons increases [12\*\*]. Negative social comparisons are at the core of envy [19], so the chance for envy to thrive is high [20\*]. Additionally, users mainly interact with friends and peers on Facebook [7, 21]. This implies both similarity to comparison standards and high personal relevance, two factors fueling social comparisons and envy alike [19]. Indeed, painful social comparison and envy are among the most often reported stressors [22] and sources of frustration on Facebook [23].

Most SNS-related studies conceptualize envy or negative social comparisons as causal factors of depression [24, 25\*, 26\*]. Indeed, envy and depression have been linked outside of Facebook research [27, 28, 29], but the causal relationship is far from clear [19]. Arguably, the lack of self-esteem [30] and the tendency to compare themselves negatively with others [31] might make depressed individuals also particularly prone to envy. This should be kept in mind when drawing conclusions from the studies reviewed below.

### Cross-sectional studies

Cross-sectional evidence demonstrates a positive correlation between the amount of Facebook use and the frequency of social comparisons on Facebook [15, 24, 32, 33\*]. A similar pattern emerges for the impression of being inferior [34] and ‘Facebook envy’ [20\*, 23]. Some of these studies [20\*, 23, 24, 32] have documented an association between social comparison or envy and negative affective outcomes. In three studies, envy and social comparison, respectively, mediated the relationship between Facebook use and depression-related outcomes [15, 20\*, 23].

Because of the cross-sectional designs, no claims can be made about causal relations. While it is tacitly assumed that SNS envy causes depressed mood, the reverse pathway of depression causing envy is equally plausible [26\*]. In addition, the assessment of both Facebook use and social comparison has mostly relied on unvalidated, retrospective self-report measures, sometimes based on only one item [24]. The fact that these measures do not differentiate between specific Facebook activities and are susceptible to recall biases calls them further into question (e.g. [2, 12\*\*]).

### Prospective studies

Prospective studies investigated the predictive value of SNS social comparison for depression. In a sample of high school students, the tendency to socially compare oneself in SNSs predicted changes in depressive symptomatology one year later [25\*]. Similarly, the tendency to compare oneself unfavorably to others on Facebook, but not the general habit to socially compare oneself, predicted depressive symptoms at three weeks follow-up in a study by Feinstein and colleagues [26\*]. In both studies, the reverse pathway was not investigated.

## Diary and experience sampling (ES) studies

Diary studies address several weaknesses associated with retrospective self-reports. For example, over a 2-week period Steers and colleagues [32] asked participants about their daily Facebook experiences. Any type of social comparison, including favorable comparison, mediated a positive correlation between frequent Facebook use and depressed mood. Depression, in contrast, did not predict Facebook use. However, analyses of correlations were not lagged. Thus, a causal influence of depression on negative Facebook comparison is still conceivable, as are other constellations.

In an ES study by Verduyn and colleagues [35\*\*], participants reported their Facebook use, envy, and well-being 5 times per day for 6 days. Lagged analyses revealed that passive (e.g., viewing others' profiles), but not active Facebook use (e.g., posting) predicted subsequent declines in well-being, which was fully mediated by envy. The results were not influenced by baseline depression or life-satisfaction and life-satisfaction was unrelated to Facebook-use. The finding that passive Facebook use predicted changes in well-being over time while the opposite pathway was not significant supports a causal chain from passive Facebook use through envy to depression. However, variables confounded with Facebook use might still have contributed to the effect. For example, people potentially log into Facebook more often when they are bored [36]. The findings demonstrate that depressiveness is associated with higher levels of envy, especially when comparison standards are high.

## Experimental studies

Causal relationships between Facebook use, social comparison, envy, and depression have also been established experimentally. For example, in a study about women's body image [37], women instructed to spend ten minutes looking at their Facebook page rated their mood lower than those looking at control websites. Furthermore, participants in the Facebook condition who had a strong tendency to compare their attractiveness to others were less satisfied with their physical appearance, providing indirect support for the role of social comparison processes.

Similar results were obtained by Vogel and colleagues [33\*]. Mood, self-esteem, and positive self-views of individuals with a strong social comparison orientation dropped significantly after briefly looking at a casual friend's Facebook profile compared to participants seeing their own profile or those visiting a non-social website. Mediation by social comparison was not tested.

Haferkamp and Krämer [14] found that constructed SNS profiles representing highly attractive comparison standards caused worse mood and less satisfaction with one's appearance compared to unattractive standards. Note that social comparison was not directly measured, yielding only indirect evidence for comparative processes. Moreover, personal relevance, a prerequisite for social comparison and envy [19], was likely limited because profiles were not realistic-looking and featured unfamiliar owners. Finally, the lack of a neutral control group makes it possible that low comparison standards led to better outcomes instead of high standards having a negative impact.

Focusing on self-esteem, Vogel and colleagues [15] presented constructed SNS profiles depicting comparison targets high or low in healthiness or popularity, respectively. The results suggested detrimental effects of being confronted with high standards, but were not clear-cut. On some measures, participants' self-

evaluation was lower after seeing the popular compared to the unpopular target, other measures were affected by the healthiness-manipulation.

Appel and colleagues [38\*] also used constructed, but realistic-looking and gender-matched Facebook profiles. Depressed and non-depressed participants saw one of two profiles conveying either a highly desirable or an undesirable life of the profile owner. Compared to unattractive profiles, attractive profiles caused participants to perceive themselves as inferior and to feel more envy, with inferiority predicting envy. Depressed participants felt more inferior and envious than controls, especially in the high standard condition.

Finally, Verduyn and colleagues [35\*\*] conducted an experiment explicitly investigating the complete causal chain of Facebook use on well-being mediated by social comparison. Participants who browsed their own Facebook feed passively for ten minutes reported lower well-being than those using it actively. To capture social comparison, participants also rated their quality of life in comparison to others but no effects were observed here.

## Summary of reviewed evidence

In summary, available evidence is largely consistent with the notion that Facebook use encourages unfavorable social comparisons and envy, which may in turn lead to depressed mood. However, although prospective and experience sampling studies as well as statistical modeling make this causal link plausible, these findings largely remain subject to the constraints of correlational data. Experiments have not yet shown the complete causal chain of Facebook use eliciting depressed mood mediated by unflattering comparison or envy. Therefore, taking this pathway as a given may be premature. Note that other mechanisms potentially responsible for negative mood effects of Facebook use have received empirical support, for example, the impression to waste one's time [3], or communication overload [39]. There is also some evidence suggesting that favorable social comparison on SNSs is used to repair negative mood [40\*], implying positive effects of Facebook comparisons.

## Methodological considerations

Some methodological suggestions can be derived from this review. Experimental control of SNS content grants internal but not external validity [40\*] given that real-life Facebook use is mainly about interacting with people one knows [7]. At least, profiles should look realistic and feature profile owners that participants can relate to [38\*]. When participants use their own Facebook page instead [35\*\*, 37], idiosyncratic Facebook behavior should be tracked [35\*\*] which allows coding certain aspects and controlling for them (e.g., cf. [33\*, 41, 42]).

One advantage of experimental exposure lies in the immediate experience of Facebook use and its affective consequences, thereby avoiding problems associated with retrospective self-reports [3]. However, some effects of Facebook use may not manifest immediately, but require repeated exposure [2, 15], especially when considering more far-reaching consequences. Here, experience sampling (ES) may add valuable insights by tracking effects over time. To minimize recall biases [43], ES studies should capture activities within a narrow time frame or encourage actual Facebook use ad-hoc.

## Open research questions and conclusions

Several open questions remain for future research. As for individual differences, most studies focused on college populations. However, younger individuals should be even more likely to engage in or be affected by SNS social comparisons, given their developing identities [44] and their heavy SNS use [45]. Similarly, gender differences concerning the links between Facebook usage, comparison, and well-being have been documented, but in opposite directions [25\*, 32]. Other studies did not find gender to moderate this relationship [32, 35\*\*]. Looking at psychopathology, the evidence for depressiveness predicting Facebook envy is mixed. Verduyn and colleagues [35\*\*] found that depression scores did not moderate the relationship between Facebook use and well-being. However, in the experiment by Appel and colleagues [38\*] depressed participants were more negatively affected by a high comparison target. Thus, the notion of depression predisposing individuals to envy needs to be further investigated because it may help identify a population that is especially vulnerable to the envy provoking potential of Facebook comparison.

Moreover, the large variety of operationalizations across studies raises questions. For example, differentiating between passive and active Facebook behavior is important in predicting envy and depression [23, 35\*\*]. Consequently, researchers should not limit observations to global Facebook use. Various measures have also been used to capture negative affect, ranging from mood shifts [14, 35\*\*, 37] to more drastic consequences like clinical depression [20\*, 24, 25\*]. In a similar vein, social comparison has been defined inconsistently, sometimes looking at the frequency of comparisons in general [33\*], other times concentrating on negative comparison and resulting inferiority [32]. This is problematic because inferiority may be associated with depressed mood by mere semantical overlap [26\*]. Note, however, that even flattering SNS comparison is correlated with depression [32]. Furthermore, different comparison dimensions may be more or less impactful [37]. Conflicting results have been found with regard to the importance of comparison domains (e.g., healthiness vs. popularity [15], or career success vs. attractiveness [14, 40\*]).

Other research may investigate the characteristics of people's social networks. For example, the total number of friends was either negatively [23, 34] or not related [20\*, 24, 35\*\*] to social comparison, envy, depressed mood, or their association, respectively. Desirable correlates of Facebook friend count have also been observed in other contexts [8]. However, a longer friend list usually entails a high proportion of strangers or distant acquaintances

[46], which predicts negative social comparison outcomes [34, 47], maybe because overly positive self-presentations are less easily disproved by real-life information [12\*\*].

Valuable insight may also be gained by investigating specific cognitive and affective processes. There is evidence to suggest that ruminating about negative Facebook experiences enhances its harmful effects [48, 49, 50]. One study demonstrated a mediating role of rumination with respect to Facebook social comparison [26\*]. Thus, rumination or worrying should be considered as relevant psychopathological mechanisms involved in social comparison and envy on Facebook [35\*\*].

Furthermore, recent evidence [51, 52] shows that unflattering social comparisons can elicit two distinct forms of envy. Malicious envy entails the motivation to harm the envied person and is associated with resentment, low personal control, and feelings of injustice. Even though equally frustrating, benign envy motivates to keep up with the superior person through effort and is associated with admiration, not hostility. Disentangling the two may shed light on the conflicting findings concerning SNS use. For example, given that lack of control is associated with malicious envy [51] and depression alike [53], depressed individuals may be particularly prone to malicious rather than benign envy when using SNSs. Social context may also shape envy on Facebook. For example, envy is modulated by how achievements are presented. Specifically, hubristic pride (attributing success to talent) results in malicious envy, whereas authentic pride (attributing success to effort) fosters benign envy [54]. Indeed, Facebook postings of narcissistic users, which can be assumed to convey hubristic pride [55], elicit less positive feedback [56], potentially reflecting malicious envy. The specific relationship to the comparison standard may also determine the kind of envy on Facebook. For example, stronger relational ties increase benign but not malicious envy in response to a friend's post [57].

A lot remains to be learned about the relationship between envy and depression in general and on Facebook in particular. Research should not focus on global affective changes depending on general Facebook use, but on which processes cause which effects in which populations (e.g. [58]). More rigorous scrutiny of causal relationships, the differentiation of constructs and their measurements, and the inclusion of personality and psychopathology moderators are called for to advance our understanding of social comparison, envy, and depression in an SNS environment.

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\* of special interest

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