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Social Media Use and Adolescent Depressive Symptoms: A Critical Review of Patterns, Mechanisms, and Individual Differences

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Abstract. Social media has become an important environment for teenagers to communicate, obtain information, and interact with peers, but its psychological impact is not the same for all teenagers. One of the main limitations of existing research is that it often relies on the total usage time, that is, the number of hours teenagers spend on the Internet every day. This measurement method regards highly different digital experiences as equivalent, so it may mask the psychological processes that affect individual outcomes. This critical review shifts the research focus from the simple "dose effect" to the "process effect" and examines how different social media usage patterns are experienced and psychologically processed. This article discusses active use and passive browsing, and then analyzes three core paths: social comparison, rumination, and online social support and sense of belonging. Next, this article emphasizes individual susceptibility to explain why the same digital experience may have different consequences for different teenagers. In particular, characteristics such as self-esteem, comparative tendencies and offline support may affect how teenagers interpret and respond to online experiences. In general, the existing evidence shows that social media itself is neither necessarily harmful nor necessarily beneficial. The psychological consequences depend on what teenagers experience on the Internet, how they interpret and process these experiences, and who these experiences are more important to them. Therefore, future research should give priority to empirical sampling, ecological instantaneous assessment, digital log data, longitudinal research design and individual-specific models to better understand these individual-level processes.

Keywords: Social Media Use, Adolescent depressive symptom, Social Comparison, Rumination, Individual Differences

1. Introduction

1.1. Research background, research gaps, and scope

Social media has become an important part of teenagers' social life. Teenagers use social platforms to communicate with friends, maintain relationships, share personal experiences, obtain information,

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and observe the lives of their peers. At the same time, the concern about adolescent depression has prompted researchers to investigate whether the use of high-frequency social media can lead to poor mental health. The existing systematic review and umbrella review generally show that there is a correlation between social media use and depression or poor happiness in adolescents, but this average correlation is relatively small and inconsistent [1, 2]. This finding challenges the simple assumption that "the more time you spend on social media, the worse the psychological results will be".

One reason for this inconsistency is that many studies have reduced social media exposure to a single indicator: the total daily usage time. Although the duration is easy to measure, it does not show what teenagers actually do during this time. Both teenagers may surf the Internet for two hours a day, but one of them may use this time to communicate privately with close friends and seek emotional support, while the other may spend most of the time browsing idealized peer content or publishing content for external recognition. These experiences involve different social environments, motivations, emotional responses, and different psychological risks or protection opportunities [3]. In addition, the self-report of the duration of use is easily affected by recall bias and measurement error [1, 2].

The second research gap involves the possible impact of social media on the psychological process of depression. Social comparison is not a new phenomenon created by social media. Teenagers will also compare their appearance, achievements, popularity and social status with others in the offline environment. The uniqueness of social media is that it changes the environment in which it happens. The platform allows teenagers to access a large number of carefully screened self-presentations, expands the scope of comparable objects, and makes social evaluation more visible through likes, followers, comments and other feedback signals. Therefore, the key question is not whether social comparison exists in the network, but how the digital environment strengthens or reshapes this existing psychological process.

Based on this research gap, this paper shifts the research focus from the "dose effect" of the duration of use to the "process effect" of digital experience and psychological processing. The core question is not only whether the use of social media is related to adolescent depressive symptoms, but why the same or similar digital experiences can have different psychological consequences for different teenagers. To answer this question, this article first examines active use and passive browsing as different digital experience modes. Then, this article analyzes the three psychological paths through which these experiences may affect happiness: social comparison and rumination as potential risk paths, and online social support and belonging as potential protection paths. Finally, this article explains which people may be stronger or weaker for these paths through individual susceptibility. Therefore, characteristics such as self-esteem, comparative tendencies and offline support are regarded as susceptibility factors or regulatory factors, rather than additional psychological mechanisms. Although cyberbullying, sleep problems, fear of missing out (FOMO) and problematic use are important topics in broader research, they are not within the core analysis scope of this article.

2. Social media usage patterns and psychological outcomes

2.1. Why usage duration alone is insufficient

Traditional research often assumes that more social media exposure means greater psychological risks. This method is similar to the dose-response model, and the number of hours of Internet access is regarded as the main predictor variable. However, the use of digital media is not a single behavior,

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but includes a variety of activities with different interpersonal and psychological characteristics. Private messages, public posting, likes, passive browsing and seeking support may occur in the same hour, but they may produce completely different experiences. Therefore, the total usage time may cover up the important differences in the quality and meaning of social media use.

Research on digital technology and adolescent happiness also shows that the relationship between overall technology use and happiness is relatively small, which further illustrates the need to go beyond broad exposure indicators [4]. Similarly, the broader review emphasizes that the average effect cannot explain that all teenagers respond to digital media in the same way [5, 2]. More important variables may include what content teenagers are exposed to, who they interact with, why they interact, and what kind of psychological reactions they have afterwards.

Measurement is also a problem. Teenagers may not be able to accurately recall how much time they spend on a platform, especially when the use is scattered into many short periods. Even if the duration can be measured accurately, it cannot reveal whether teenagers are actively communicating or passively consuming content. Therefore, compared with the measurement method that can capture specific digital experiences and instant emotional reactions, the predictive value of the duration of use may be relatively limited. Therefore, the process-oriented approach is not only to ask teenagers how long they have been online, but also to pay attention to what happens during this period and how teenagers explain these experiences.

2.2. Active use: the recognized paradox

Active use of social media includes posting content, liking, commenting and sending private messages. Because it involves direct social interaction, it is easy for people to classify active use as a beneficial behavior. However, in fact, the psychological consequences largely depend on the motivation and quality of the interaction. Private communication with close friends may enhance the relationship and provide emotional support. On the contrary, if the content is mainly published to get likes or positive comments, it may make an individual's self-evaluation more and more dependent on external feedback.

Research shows that there are different relationships between different forms of Instagram use and adolescent depression, which supports this distinction [6]. A recent meta-analysis covering 141 studies also shows that active use and passive use cannot simply be classified into universally positive or universally negative categories[3]. Therefore, active use can be understood as a situation that may cause social connection and psychological stress at the same time. The same behavior - such as posting a photo - may be a pleasant self-expression for one teenager, but for another teenager, it may be a pressured social recognition-seeking.

2.3. Passive use and inconsistent psychological outcomes

Passive use usually refers to browsing other people's homepages, checking dynamics, watching videos or observing social interactions without directly participating in them. The passive social media use hypothesis believes that this kind of browsing may be harmful because it increases the opportunity for individuals to contact others' seemingly successful or happy lives, but provides fewer meaningful opportunities for interaction. This explanation is reasonable to a certain extent, especially in the case of passive browsing that triggers upward social comparison.

However, evidence from a sample study of youth experience challenges the view that passive browsing is harmful to everyone. Beyens et al. [7] found that there are significant differences in the impact of social media among individuals, and only a few teenagers have a meaningful decline in

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happiness after experiencing specific social media experiences. Valkenburg, Beyens and others [8] also questioned the universal interpretation of the passive use hypothesis.

These findings show that rather than considering passive use itself as a psychological mechanism, it is better to understand it as a possible trigger or situation. What content is browsed, how it is interpreted, and the characteristics of the viewer himself may determine the final result.

3. Key psychological mechanisms

3.1. Social comparison and jealousy

Social comparison is one of the more mature theoretical paths to link social media experience with depressive symptoms. Festinger's social comparison theory [9] holds that individuals evaluate themselves by comparing their abilities, achievements and social status with others. Social media may reinforce this process, because users often show a highly positive side of their lives. Therefore, teenagers may continue to be exposed to the achievements, appearance, friendships and activities of their peers, but they do not see the less positive side of their lives.

This selective presentation may increase the opportunity for upward social comparison. When teenagers compare themselves with people who they think are more attractive, more successful, more popular or have stronger social connections than themselves, the perceived gap between themselves and the object of comparison may become psychologically significant. If this gap is interpreted negatively, it may cause jealousy, dissatisfaction or low self-esteem. In turn, these reactions may be further related to depressive symptoms. Nesi and Prinstein [10] found that social comparisons and feedback on social media were related to adolescent depression; Niu et al. [11] found a regulatory intermediary path containing negative social comparison, low self-esteem and depression among Chinese teenagers.

The important thing is that social comparison should not be regarded as necessarily harmful. The direction of comparison and individual interpretation of comparison are very important. In some cases, comparing with peers may provide motivation or useful information. The more important question is whether teenagers interpret this comparison as evidence of their own inadequacy, and whether the perceived gap becomes a source of continuous negative self-evaluation. Therefore, social media may be strengthening the existing comparison process, rather than creating a new psychological mechanism.

3.2. Rumination: a potentially persistent risk process

A negative social media experience may be short-lived, but its psychological impact may persist after teenagers leave the platform. Rumination provides a possible explanation. Rumination refers to repeatedly thinking about negative experiences, one's own shortcomings or pain, but not effectively solving the problems behind it. In social media situations, after experiencing negative comparisons or disappointing social feedback, teenagers may continue to think about what happened, why others look more successful, or what the experience means to them.

This process can prolong the psychological impact of a network event. Aalbers et al. [12] showed through the perspective of network analysis that there may be a complex dynamic relationship between social media use, mood swings and depressive symptoms. Feinstein et al. [13] provided evidence for such a path: negative social comparisons on Facebook are associated with depressive symptoms through rumination. Conceptually, this path can be expressed as: Negative social comparison → rumination → depressive symptoms. However, the evidence should still be

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interpreted cautiously. Feinstein et al. [13] studied young adults of college age, not entirely for teenagers.

Therefore, the study cannot directly prove that the same complete intermediary path also exists in the adolescent group. The complete sequence of "social media experience → rumination → depression" is still limited in evidence directly from teenagers. Therefore, it is better to describe rumination as a reasonable or potential mechanism in this article, rather than a confirmed path of adolescent action.

3.3. Online social support and sense of belonging

To balance the interpretation of the relationship between social media and adolescent depression, the potential protective process must also be considered. Social media can promote private communication, emotional expression, relationship maintenance, and contact with people with similar experiences. These functions may help teenagers maintain existing relationships and gain emotional connection and a sense of belonging.

Online social support may be especially meaningful when it is difficult for teenagers to gain understanding in the offline environment. Communicating with peers who can provide support can provide emotional resources and make teenagers feel that their experiences can be understood by others. Zhou and Cheng [14] conducted a systematic review and meta-analysis of teenagers and found that there is a positive relationship between online social support and mental health. This provides evidence that the potential protective path matches the age of the research subject.

However, a positive correlation cannot be interpreted as evidence that online support can directly prevent depression. The existing evidence more firmly supports the conclusion that online interaction can provide social connection and emotional resources. The effectiveness of these resources may depend on their quality, the interpersonal relationships that teenagers have, and the specific situation in which they receive support. Therefore, online social support should be described as a potential protective path, not an inevitable and effective buffer factor.

3.4. Individual susceptibility: who is more susceptible, and under what conditions

One of the most powerful challenges to the simple explanation of "social media causes depression" comes from the evidence of individual differences. The same digital experience may be associated with completely different emotional outcomes of different teenagers. This means that a complete model must distinguish between two types of factors: the mechanism that explains how the influence occurs, and the susceptibility factor that explains who has a stronger impact on.

Social comparison, rumination and online social support can be conceptualized as intermediary psychological processes: they help explain how digital experiences are associated with depressive symptoms. In contrast, characteristics such as self-esteem, comparative tendencies, and offline family or peer support are more suitable as susceptibility factors or regulators. For example, adolescents with low baseline self-esteem may be more likely to interpret upward comparisons as evidence of their own inadequacy. Teenagers with stronger tendencies may also have a stronger reaction to the same content. Good offline relationships may provide a psychological safety net, thus reducing the impact of negative online experiences.

The Differential Susceptibility to Media Effects Model (DSMM) provides a useful theoretical framework for understanding this difference [15]. The model does not assume that the media influence is unified, but emphasizes that the susceptibility between individuals and situations may be different. The study of Beyens et al. [7] provides particularly relevant empirical evidence,

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because its empirical sampling design shows that there are significant differences in the relationship between social media experience and happiness among different teenagers. This individual-centered perspective is very important, because the group average effect may cover up meaningful differences between individuals.

4. Critical evaluation and future research

4.1. Limitations of existing evidence

Although existing studies provide evidence for the association between social media use and adolescent depressive symptoms, it is still difficult to establish simple causal conclusions. A major limitation is the widespread use of cross-sectional research design. When social media use and depression are measured at the same time, researchers cannot clearly determine which occurs first. Some social media usage patterns may cause depressive symptoms, but it is also possible that teenagers who have already had depressive symptoms use social media in different ways.

The second limitation is the measurement problem. Self-reporting of social media use may have recall errors, and the definitions of broad categories such as "active use" and "passive use" in different studies are not always consistent. Different platforms also have different technical characteristics and social norms, which means that research results obtained on one platform may not be transferable to another platform. Cultural differences further increase the complexity of interpretation. For example, in different educational and social environments, comparison objects and achievement norms may have different meanings for teenagers.

Finally, the average at the group level may obscure the differences at the individual level. If some teenagers experience negative effects, some experience positive effects, and others have little change, the average effect may seem small, even if a certain experience is very important to a particular individual. This helps to explain why different studies may come to seemingly inconsistent conclusions that are still compatible with process-oriented explanations.

4.2. Future research directions

Future research should first go beyond the total usage time and capture the actual digital experience that occurs in real time. Experience Sampling Method (ESM) and Ecological Momentary Assessment (EMA) can repeatedly evaluate the ongoing online activities of teenagers. Movement and immediate feelings after the activity. These methods help to distinguish whether a specific experience, such as upward comparison or supportive communication, will trigger emotional changes.

Second, researchers should incorporate digital log data as much as possible. Log-based measurement can provide information on actual usage patterns more objectively than backtracking estimation. Combining log data with repeated emotional assessments can help establish a more accurate time series: Digital experience → instant psychological response → follow-up mental health results. Longitudinal research is particularly important because it can test whether recurring short-term reactions can accumulate into long-term depressive symptoms.

Third, future research should use individual specificity models to understand heterogeneity. Researchers should not only ask whether there is an average effect on social media, but should further ask: Which experiences affect which teenagers, and under what conditions? This method can model self-esteem, comparison tendency, ruminant tendency and offline support as potential

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regulatory factors or susceptibility factors. Such research also helps to explain why passive browsing seems to have a negative impact on some teenagers and not on others.

Finally, cross-cultural and platform-specific research deserves more attention. Especially for Chinese teenagers, academic achievement, exam pressure and college promotion may shape the meaning of online comparison in a different way from other cultural situations. The research of Niu et al. [11] shows the value of studying these processes in specific cultural groups. Therefore, future research should avoid assuming that these mechanisms operate in exactly the same way in different countries or platforms.

5. Conclusion

The evidence summarized in this article shows that the psychological consequences of using social media cannot be understood simply by asking teenagers how many hours they are online every day. More importantly, teenagers may experience different digital experiences and interpret them in different ways. Active use may support interpersonal relationships and may also create pressure to seek external recognition; passive browsing may increase the opportunity to compare with the upper society, but it will not harm every teenager.

The three psychological paths help to explain how digital experiences are associated with depressive symptoms. Social comparison is a potential risk path, especially when idealized content leads to negative self-evaluation. Rumination may prolong the psychological impact of negative online experiences, but the direct evidence of this complete path among teenagers is still limited. In contrast, online social support and sense of belonging constitute a potential protective path by providing social connection and emotional resources.

The most important thing is that these paths do not necessarily affect every teenager in the same way. Individual characteristics such as self-esteem, comparative tendencies, and offline support may affect how teenagers interpret and respond to the same digital experience. Therefore, individual susceptibility provides an explanation for understanding an important phenomenon: even if certain specific experiences are important to some teenagers, the average effect of social media use may still be small or inconsistent.

Therefore, the core revelation of this review is that the research perspective needs to change: The study should not only ask whether the use of social media is related to adolescent depression, but should further ask "what teenagers have experienced when using social media, how they psychologically process these experiences, and who are most important to those experiences". Process and individual-centered research strategies, combined with ESM/EMA, digital log data, longitudinal research design and appropriate statistical models, can provide a stronger foundation for understanding these differences.

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