

The Effects of Passive and Active Screen Time on College Students' Emotions and Their Potential Mechanisms

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Abstract

Screen use is ubiquitous in university life, yet debates continue about its impact on emotional well-being. This narrative review synthesizes evidence on the differential emotional effects of passive versus active screen time in college students. Drawing on epidemiological, experimental, and neurocognitive studies, we first define passive screen time as non-interactive, undirected content consumption and active screen time as goal-directed, interactive engagement. Passive use, especially late-night social media and short-video scrolling, is consistently associated with higher depressive and anxiety symptoms and co-occurs with sedentary behavior, rumination, attentional narrowing and sleep disruption. In contrast, brief bouts of active use, including casual games, prosocial games, and exergames, can produce short-term mood repair, enhance positive affect, and support executive functioning, although excessive exposure to competence-impeding, violent, or highly arousing content may elicit frustration, anger, and physiological stress responses. Integrating emotion regulation theory, broaden-and-build theory, and recent neuroimaging findings, we propose a multi-level framework in which prefrontal-limbic circuitry, physiological arousal, and attentional dynamics jointly mediate these effects. Based on this framework, we argue that interventions for university students should move from a “reduce total screen time” approach toward optimizing configurations of use, discouraging passive scrolling while promoting adaptive, goal-aligned active use and off-screen restorative alternatives such as physical activity and exposure to green spaces. Future work should employ longitudinal, ecologically valid, and multimodal designs to clarify causal pathways and to identify individual and cultural moderators of screen-related emotional outcomes.

Keywords

Passive screen time; Active screen time; College students; Emotion; Emotion regulation; Video games.

1. Introduction

Screen use permeates daily life, extending from academic activities to leisure, and from social interaction to entertainment. The relationship between screen time and mental health has been extensively debated in the literature; however, findings remain mixed and are sometimes even directly contradictory. Early studies largely focused on total screen time as the primary exposure, examining its associations with psychological outcomes such as depression, anxiety, and subjective well-being. Yet several reviews and large-scale empirical investigations have indicated that total duration has limited explanatory power for mental health outcomes, and in some cases the observed correlations are so weak that they are difficult to replicate [1, 2]. These inconsistencies have prompted researchers to reconsider how screen use should be conceptualized and to argue that more attention should be directed to how screens are used rather than simply how long they are used.

Within this context, the distinction between passive screen time and active screen time has become increasingly prominent. Passive screen time typically refers to non-interactive, undirected media consumption, such as mindlessly browsing short videos, endlessly scrolling through social media feeds, or merely watching films and television programs. In contrast, active screen time emphasizes goal-directed engagement and interactivity, including activities such as playing video games, participating in motion-based interactive media, or engaging in task-oriented digital learning [3, 4]. This functional distinction appears to better account for individual differences in psychological and emotional outcomes than total duration alone and has been proposed as a promising direction for future research. For university students, this distinction is particularly salient: they are both heavy users of digital screens and a group at elevated risk for mental health problems. Clarifying how different forms of screen time shape emotional states therefore has important implications for campus-based psychological interventions and for the design of digital health education programs.

2. Core Concepts and Operationalization

Passive screen time typically refers to screen use in contexts that lack clear goals, interaction, or explicit task demands, where individuals primarily consume content rather than actively engage with it. The most common examples include mindless scrolling through social media feeds or short-video platforms. These forms of use are highly engaging due to instant feedback and algorithmic recommendations, yet they are often accompanied by loss of track of time and a greater tendency toward repetitive, ruminative thinking [5]. In contrast, active screen time is characterized by goal-directed and interactive engagement, such as playing video games, using educational software, or participating in creative digital platforms. Such activities require users to allocate attention, perform specific operations, make decisions, and sometimes cooperate with others, thereby imposing notable cognitive and affective demands [6]. Empirical evidence suggests that this distinction between passive and active screen time accounts more effectively for psychological and health outcomes in children and adolescents [7], and appears to be equally relevant in university populations.

For the assessment of emotional states, commonly used instruments include the Profile of Mood States (POMS) and its Chinese normative version, which evaluate dimensions such as anger, depression, tension, and vigor [8]. The Two-Dimensional Mood Scale (TDMS) is particularly suitable for capturing rapid mood changes that occur during transitions between learning and leisure activities [9]. In laboratory-based studies, the Chinese Emotional Picture System (CEPS) provides a standardized set of stimuli for eliciting emotional responses [10]. More recently, as neuroscientific methods have been integrated into behavioral research, functional near-infrared spectroscopy (fNIRS), electroencephalography (EEG), and eye-tracking techniques have increasingly been employed to examine how screen-based stimuli influence prefrontal activation, temporal dynamics of affect, and the allocation of visual attention [11–13]. These methodological advances extend research beyond self-report measures, enabling the investigation of the neural mechanisms underlying screen-related emotional processes.

It is important to recognize that screen use is a highly multidimensional construct. Platform type (e.g., smartphones, personal computers, or game consoles), content category (e.g., prosocial, violent, competitive, or recreational), mode of play (solo versus cooperative), and the presence or absence of physical activity components (exergaming vs. non-exergaming) may each differentially influence emotional outcomes [14–15]. Consequently, when operationalizing screen use, researchers need to provide clear criteria for what is classified as “passive” versus “active” use, rather than relying solely on total duration as a proxy for usage patterns.

3. Passive Screen Time and Emotional Outcomes in University Students

A growing body of evidence supports a positive association between passive screen time and negative affect. Systematic reviews have shown that excessive social media use is significantly related to depression and anxiety among adolescents and university students, with underlying mechanisms largely attributed to processes such as social comparison, stress arising from online interpersonal interactions, and sleep deprivation [5, 16]. Re-analysing a range of reviews and key empirical studies, Orben (2020) further suggested that passive scrolling, as opposed to active engagement, is more likely to be accompanied by declines in mood and reductions in subjective well-being [5].

Subsequent empirical work has provided more fine-grained support for this pattern, indicating that passive forms of screen use are more closely linked to depressive symptoms and anxiety than active forms. For example, Kim et al. (2020) reported that passive browsing showed stronger associations with depressive and anxiety symptoms among adolescents than did active interaction on social media platforms [17]. Similarly, Kidokoro et al. (2021) found that different categories of screen behavior differed significantly in their associations with emotional health, with passive use showing the strongest relationship with depressive symptomatology [18].

Increases in sedentary behavior offer additional context for understanding these associations. National survey data from the United States (2001–2016) indicate a steady rise in sedentary time, which has been linked to a higher prevalence of depressive symptoms and low energy levels [19]. Among Chinese university students, sedentary behavior and passive screen activities often co-occur. One study of design majors, for instance, observed longer sedentary time alongside significantly higher levels of depressive symptoms [20]. These findings suggest that passive screen time rarely occurs in isolation; rather, it tends to cluster with other unhealthy lifestyle factors, such as prolonged sitting and insufficient physical activity, thereby amplifying the risk of negative emotional outcomes.

Context-specific patterns further highlight the adverse consequences of passive scrolling. Spending extended periods before bedtime browsing short-video platforms or social media can shorten sleep duration and intensify ruminative thinking and anxiety-related experiences. Such effects may not be immediately apparent, but they accumulate and become evident in subsequent learning activities and social interactions, manifesting as impaired attention, lowered mood, and reduced self-regulatory capacity. In other words, passive screen time may, via a chain involving rumination, attentional narrowing, and sleep deprivation, transform seemingly brief episodes of mindless use into a sustained burden on emotional functioning.

4. Active Screen Time and Emotional Outcomes in University Students

The emotional impact of active screen time is more nuanced than that of passive use, involving both potential benefits and notable risks. A substantial literature shows that brief episodes of active digital interaction—such as casual video games or light interactive tasks—can produce rapid improvements in mood and short-term stress relief. These activities have been repeatedly shown to exert immediate mood-repair effects [21–23]. Prosocial content and cooperative gameplay further appear to enhance empathy, positive affect, social connectedness, and even certain cognitive skills [24].

Motion-based or physically active forms of screen use warrant particular attention. Research with children and adolescents indicates that exergames not only improve executive function and attentional control but also contribute to mood enhancement [25–26]. By integrating physical movement with cognitive engagement, such activities may serve as an efficient means of psychological recovery for university students during study breaks. For students who spend

long hours in sedentary learning, even brief bouts of exergame interaction may outperform passive rest in improving emotional states.

However, active screen use does not universally yield positive emotional outcomes. When task demands exceed an individual's ability, or when the interactive content is violent or highly arousing, students often experience frustration, anger, or heightened aggression [27]. Violent or fast-paced competitive games can acutely elevate heart rate and blood pressure, and prolonged high-frequency exposure may alter cardiovascular reactivity patterns over time [28–29]. Health research on esports similarly suggests that long-term, high-intensity engagement may be linked to psychological stress, anxiety, and disrupted sleep routines [30]. Taken together, these findings indicate that the emotional consequences of active screen time depend strongly on factors such as task difficulty, content characteristics, and users' motivational orientations.

5. Multi-level Explanations of Underlying Mechanisms

5.1. Emotion Regulation and Attentional Processes

Theories of emotion regulation provide an important lens for interpreting differential effects of screen use. According to Gross's process model, reappraisal and suppression exert distinct emotional consequences; reappraisal promotes sustained positive affect, whereas suppression is often accompanied by psychological costs [31]. Passive scrolling tends to foster rumination and a narrowed attentional focus, conditions that make adaptive reappraisal less likely. In contrast, active forms of interaction—particularly those that facilitate goal achievement and perceived competence—are more likely to support reappraisal processes and thereby generate positive emotional experiences. Consistent with broaden-and-build theory, positive affect can expand attentional scope and enhance flexible information processing and creativity, helping explain the rapid mood improvements observed in certain active interactions [32–34].

5.2. Neural Mechanisms

Neuroimaging research highlights a central role of the prefrontal–limbic circuitry—including the vmPFC, OFC, ACC, and amygdala—in the evaluation and regulation of emotional states. Findings from fMRI and tDCS studies show that modulating activity within the mPFC/vmPFC can directly influence emotional experience and anger reactivity [35–37]. Intracranial electrophysiological evidence further demonstrates frequency-specific directional coupling between the amygdala and prefrontal regions, suggesting that emotion processing depends not only on localized activation but also on coordinated dynamics within distributed neural networks [38].

5.3. Physiological Arousal and Immersive Experience

Active interaction is typically accompanied by heightened physiological arousal, including increases in heart rate, blood pressure, and dynamic changes in EEG microstates. Such arousal may produce hedonic activation, but when paired with violent content or high-stress situations, it can also amplify psychological stress [41–42]. In contrast, passive screen use is often characterized by attentional stickiness and inefficient recovery, limiting its capacity to alleviate negative affect. Importantly, exposure to natural environments has repeatedly been shown to promote rapid restoration of mood and attention [43], underscoring the importance of off-screen alternatives in emotional regulation strategies.

6. Limitations and Future Directions

A review of the current literature reveals several notable limitations. First, much of the existing work relies on cross-sectional designs, which precludes strong causal inference. Even when

passive screen time is found to be associated with depressive symptoms, the temporal sequence between exposure and outcome remains unclear. Future studies should therefore place greater emphasis on longitudinal cohort designs, within-subject experiments, and natural experiments to better elucidate potential causal pathways. Second, measurement approaches are often restricted to self-report questionnaires. Integrating wearable devices and application usage logs would allow researchers to capture screen-use behaviors with greater temporal precision and ecological validity. Third, motivational and contextual factors are frequently overlooked, despite large-scale studies showing that gaming motives and social context are stronger predictors of mental health than total screen time alone [2, 44]. These findings highlight the need for future models to systematically incorporate the interplay between use form, motivation, and context.

For university students, the available evidence suggests a shift in emphasis from simply reducing overall screen time to reducing passive and increasing adaptive active use. In everyday life, prolonged passive scrolling before bedtime should be discouraged, whereas brief, goal-directed interactions may be a more adaptive alternative. Casual games or motion-based interactive activities can serve as recovery strategies during study breaks, potentially facilitating mood repair while also supporting attention and executive functioning. At the institutional level, campus mental health programs could incorporate dedicated “digital health” modules to help students recognize how different motives and modes of use relate to emotional outcomes. In parallel, building green and restorative campus environments to provide off-screen alternatives remains crucial, as exposure to natural settings has consistently been shown to promote recovery of mood and attention [43].

Future research can be advanced in several directions. First, there is a need to standardize operational definitions and to draw clear boundaries between passive and active screen time, thereby reducing conceptual ambiguity. Second, longitudinal and causally informative designs should be strengthened by combining ecological momentary assessment (EMA) with natural experiments, in order to characterize the dynamic, bidirectional relations between screen use and emotional states. Third, multimodal approaches that integrate eye-tracking, fNIRS, cardiovascular markers, and subjective reports are needed to build a more comprehensive picture of the underlying mechanisms. Fourth, cultural and gender differences warrant closer attention, as patterns of screen use and associated emotional outcomes may vary substantially across subgroups [45]. Finally, researchers should move beyond a narrow focus on “reducing duration” toward an “optimizing configuration” perspective—that is, identifying which combinations of use form, motivation, and context are most conducive to emotional well-being in university students.

7. Conclusion

Taken together, the evidence reviewed here indicates that the emotional impact of screen use among university students cannot be adequately captured by total screen time alone. Distinguishing between passive and active forms of use provides a more informative framework for understanding these effects. Passive screen time tends to co-occur with rumination, attentional narrowing, and sleep deprivation, thereby elevating the risk of depressive and anxiety symptoms. By contrast, when it is aligned with users’ goals and embedded in supportive social contexts, active screen use is more likely to elicit positive affect and facilitate psychological recovery; however, under conditions of excessive task demands or predominantly negative content, it can also give rise to adverse emotional experiences. Future research and practical interventions should be grounded in this distinction, with the aim of promoting healthier configurations of screen use and supporting emotional well-being in university student populations.

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