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Letter

The Tantalus effect: developmental psychiatry perspective on digital adolescence

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> 'Above his head grew lofty trees heavy with fruit – pears, apples, figs and olives, and sweet pomegranates. Whenever the old man reached out with his hands to grasp them, a wind would hurl them back to the dark clouds.'
>
> *Homer, Odyssey*, Book XI

Greek mythology often anticipated fundamental truths about human psychology long before the emergence of modern psychiatry. Among its most enduring figures is Tantalus, condemned to eternal hunger and thirst while standing beneath fruit that continually receded and in water that withdrew whenever he attempted to drink. His punishment was not deprivation itself but the perpetual anticipation of satisfaction without ever achieving it. Recent contributions in the literature, and specifically in *BJPsych*, have highlighted the growing need to understand how digital environments reshape attention, reward processing and vulnerability to mental disorders. The notion of algorithmic dopamine economies has emphasised how artificial intelligence continuously optimises behavioural engagement through reinforcement architectures, whereas other contributions have considered the psychiatric implications of digital environments, cue reactivity and excessive online engagement.[1–3] We suggest that these apparently diverse observations can be integrated within a single developmental framework inspired by one of the oldest narratives of human psychology: the punishment of Tantalus.

Recent psychiatric research has described a growing constellation of digital-related conditions, including problematic smartphone use, problematic internet use, social media addiction, problematic short-video use, compulsive checking, doomscrolling and fear of missing out. Although these phenomena are typically investigated as separate constructs, they may share a common psychological denominator: the continuous maintenance of reward anticipation rather than reward attainment. Unlike traditional media, contemporary digital platforms are intentionally designed around intermittent reinforcement schedules. Notifications, infinite scrolling, autoplay functions, personalised recommendation algorithms and social approval cues rarely provide lasting satisfaction. Instead, each interaction generates the expectation that the next notification, the next video or the next post may finally provide a more rewarding experience. Satisfaction is continuously deferred, whereas anticipation is continuously renewed.

Recent evidence from Antons and colleagues[1] suggests that even distal digital cues can elicit craving and cue reactivity among individuals with problematic internet use. Likewise, Kudlow et al[3] argue that digital environments may fundamentally reshape attentional processes and contribute to emerging psychiatric vulnerabilities. Together, these findings suggest that anticipation itself may become a persistent psychological state, maintained by the architecture of digital environments rather than by the rewards they ultimately deliver. This perspective is particularly relevant during adolescence. Developmental neuroscience consistently demonstrates that adolescence is characterised by heightened dopaminergic responsiveness, increased novelty-seeking, greater sensitivity to peer evaluation and social rewards, and still-maturing executive control systems. These normative developmental characteristics may render adolescents especially susceptible to environments specifically engineered to maintain reward anticipation.

The Tantalus effect therefore proposes that the defining psychological burden of problematic digital engagement is not excessive gratification but perpetual incompletion. Adolescents do not remain connected because digital technologies consistently satisfy their psychological needs; rather, they remain connected because satisfaction is endlessly promised but rarely achieved. Every swipe, refresh, recommendation or notification becomes another opportunity for reward while simultaneously renewing the expectation that something better is just beyond reach. This framework may also unify several constructs that currently dominate digital psychiatry research. Fear of missing out reflects the persistent anticipation that meaningful experiences are occurring elsewhere. Doomscrolling reflects the expectation that the next piece of information will finally resolve uncertainty. Compulsive smartphone checking frequently occurs even without incoming notifications, whereas problematic short-video consumption exploits novelty-driven reward prediction. Although phenomenologically distinct, these behaviours may represent different manifestations of the same underlying mechanism: persistent engagement driven by anticipated rather than experienced reward.

Notably, the Tantalus effect extends beyond addiction models. Rather than conceptualising digital technologies exclusively as addictive stimuli, it suggests that they exploit a fundamental developmental mechanism: the adolescent brain's adaptive orientation towards future rewards, exploration and uncertainty. Artificial intelligence and personalised recommendation systems amplify this mechanism by continuously adjusting content to maximise anticipation, perfectly illustrating what has recently been described as an algorithmic dopamine economy.[2]

The clinical implications are equally important. Recent calls have encouraged psychiatrists to routinely assess patients' online activities as part of psychiatric evaluation.[4] We argue that clinicians should also consider the quality of digital engagement, specifically whether patients are trapped in cycles of perpetual anticipation rather than meaningful digital experiences. Likewise, interventions should move beyond limiting screen time alone and instead target the mechanisms that sustain chronic reward anticipation, including attentional regulation, tolerance of uncertainty, strengthening of offline social connectedness and promotion of healthier digital architectures. Finally, as psychiatry increasingly embraces digital innovation,[5] conceptual models capable of integrating developmental neuroscience with

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contemporary digital ecology become increasingly necessary. We propose that the myth of Tantalus offers more than a literary metaphor; it provides a parsimonious developmental framework capable of unifying diverse findings across adolescent psychiatry, cognitive neuroscience and digital mental health. Perhaps the greatest psychiatric challenge of the digital era is not that adolescents receive too much gratification, but that they are increasingly immersed in environments specifically designed to ensure that gratification always remains just beyond reach.

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Declaration of interest

None.

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