

There is an unprecedented epidemic of depression and anxiety among young people. Can we fix this? How?

Introduction

Depression and anxiety are related yet distinct mental health conditions with the former reflecting persistent despair and loneliness and the latter representing uneasiness or nervousness [1]. Clinically, the DSM-5 has defined major depressive disorders as recurrent thoughts of death without a specific plan and generalized anxiety disorders as excessive anxiety and worry occurring for at least six months [2]. In our modern age, numerous pressures increase these symptoms: isolation, social media, and the spreading of misinformation [3]. The question then becomes, can the unprecedented epidemic of clinical depression and anxiety among youth be solved in the modern world? To grasp the solutions, this essay explores the sociocultural and neurobiological causations affecting human psychology while discussing possible treatments. Then it argues that recent preventative models, government intervention, and collective norms can counter the stressors of contemporary society, concluding that the unprecedented epidemic of depression and anxiety among youth can, in fact, be solved.

What Have We Done?

The rise in depression and anxiety among young people has been exacerbated by increased social media usage and social isolation. Since the 2010s U.S. adolescents ages 12-17 have had a 145% increase in major depression for girls and a 161% increase for boys [4]. Social media similarly became one of the fastest technological adaptations in US households during this time [5]. In 2020, the COVID-19 pandemic isolated young people on a massive scale, contributing to a further rise in anxiety, stress, depression, sleep problems, post-traumatic stress disorder, and suicidal behavior [6]. Quarantine regulations exacerbated psychological distress by increasing anxiety and depression worldwide by 25% [7]. This unveils the necessity of addressing isolation and social media use to fully mitigate the risks for young people.

Neuroscience research can be useful in helping us grasp the short- and long-term effects of social isolation. Social isolation causes the neuroendocrine pathways to initiate the hypothalamic-pituitary-adrenal (HPA) axis, which plays an important role in the body's stress response [8]. Social isolation acts as a stressor, and the body attempts to regain homeostasis, flattening the cortisol rhythm, meaning higher cortisol levels [9]. Social children have less pronounced rates of increased cortisol (thus less stress) compared to isolated children [10]. Moreover, children in isolation with better social care by adults have higher morning cortisol and pronounced reductions throughout the day [11]. Thus social support is required to prevent disease and reduce stress and anxiety levels. One extreme example is that traumatized Vietnam War veterans who received social support were 180% less likely to develop PTSD compared to those with low levels of support [12]. Socializing with friends and family must be valued to

restore one's stable mental health. Since so many young people have habituated to isolation during COVID-19, based on the aforementioned research, we can expect long-term stress sensitivity and inability to cope for these children and adolescents.

With isolation comes boredom, and with boredom comes increased social media use (SMU), which also carries a range of psychological effects [13]. The real world and the digital have become a “new playing field for the same game” of living life: bullying in the real world becomes bullying online; friendships in the real world become friendships online, and so on [14]. For adolescents surveyed during the COVID-19 pandemic, the average daily SMU was 7.70 hours/day, exceeding pre-pandemic estimates of 3.8 hours/day [15]. Dopamine, a neurotransmitter involved in reward pathways, has lured users through feedback loops toward this social media addiction. Social media platforms diminish dopamine by utilizing variable work schedules (similar to slot machines), where unexpected rewards are given at random to engage users [16]. Over time, this creates a deficiency in the brain, causing users to experience less pleasure when avoiding addictive applications [17]. Adolescents are especially vulnerable during puberty due to heightened sensitivity to both positive and negative experiences, revealing the necessity of stronger parental controls. Parents allow “overprotection in the real world but under protection in the virtual world,” unveiling that parents having greater awareness would substantially reduce social media usage [18].

A sociocultural factor to examine in the depression and anxiety epidemic is the effect of social contagion. Social contagion is defined as “the spread of behaviors, attitudes, and affect through crowds and other types of social aggregates from one member to another” [19]. Social media readily promotes social contagion by provoking documentation of tics, eating-disordered behavior, self-harm, suicidality, and gender dysphoria among adolescents [20]. Social contagions have led adolescents to slot themselves into mental health disorders through self-diagnosis. For example, unreliable internet sources like TikTok influencers and Google have become sources of mental health diagnoses online with hashtags like #depresseddisorder having millions of views [21]. This makes distinguishing between diagnostic categories difficult, as effective diagnosis requires the recognition of a range of criteria and development over time [22]. Some adolescents search for validation rather than seeking professional help, diagnosing an illness onto themselves to give their struggles meaning, including such struggles as suffering from a setback, underperformance at school, or not living up to one's potential [23]. These sufferings become proof for young people seeking to identify with others online who rely on the same sources of identification [24]. This trend undermines doctors and other reliable means of self-improvement, further manifesting a depression and anxiety epidemic across an entire online generation, often making problems worse. However, social media itself is a double-edged sword, as social contagion could be positively utilized through the creation of online health communities that reduce the stigma of illness and ultimately the cleansing of depression and anxiety [25].

The neurobiological effects of the current mental health epidemic are vital to ground our understanding of depression and anxiety as well as to motivate change now rather than later. The brain is organized into functional networks and fully matures in one's early 20s. The

hippocampus—vital for learning, memory, and emotion—has also been shown to be smaller in depressed people [26]. Meanwhile, children with high anxiety have larger amygdala volume and connectivity to other sectors of the brain responsible for emotional perception and regulation [27]. From this research, it can be reasoned that interferences in brain maturation are one aspect of depression and anxiety among youth, meaning a supportive environment, healthy genetics, and wise decisions are necessary for healthier development.

What to Do Now?

Despite the prevalence of treatment, there is an increase in depression, which may mean that most of the modern treatments have low effectiveness. One convincing piece of evidence for this is that even in the impossible situation of perfect coverage where everyone is treated in ideal conditions more than “three-fifths of the burden of mental disorders... remains unavertable” [28]. That means the likelihood of preventing depression and anxiety is slim even with all of the current existing knowledge. This shows the importance of preventing mental disorders before they happen. Therefore, past efforts of prevention must be examined. Unfortunately, since the 1980s, hundreds of cognitive behavioral therapy (CBT) and educational approaches have been implemented in psychological and educational institutions targeting individuals such as students. These have been cost-effective short term but have shown only modest effectiveness in reducing depression incidence (20-25%) [29]. This highlights that preventative initiative results have a limited impact. We must find more innovative and holistic solutions.

Learning from other successful public health models (e.g. reducing smoking), integrating structural long-term models (e.g. into schools and communities), and improving intervention strategies may promote positive psychology, giving us the potential for increased effectiveness and cost-effectiveness [30]. For instance, the Truth Initiative through television and other media has reduced teen cigarette usage from 23% in 2000 to 3% at the present day by connecting young children and adults through digital outlets while at the same time exposing the tobacco industry [31]. By effectively integrating communities and individuals with campaigns and extensive partnerships, youth became empowered to rise as leaders in ceasing tobacco addiction. This model could be adapted to the anxiety and depression epidemic to empower young people to enact change. In addition, with more than 90% of children ages 5-15 attending primary schools, school-based health initiatives (HPIs), including IPSY, KISS, and CHANGE! have also had a strong positive effect score of five (being the highest) after seven months, targeting multiple target groups (not only children) [32]. The effectiveness of these HPIs relied upon the structural elements of their implementation, with strong cohesion with participating institutions. Adopting and expanding this structural cohesion can lead to long-term anti-anxiety and anti-depression prevention. Furthermore, transcranial magnetic stimulation (TMS) has shown itself to be effective, as this treatment only affects a limited area and is twice as effective compared to first-line approaches, including antidepressants and psychotherapy [33]. TMS devices operating outside of the body target the brain’s salience network (SN), fortifying neuronal pathways and

improving neuronal plasticity by utilizing magnetic fields to recover SN connections [34]. Approximately 50% to 60% of people with depression who have failed to receive benefits from other medications have experienced a clinically meaningful response with TMS, with one-third undergoing full remission and a low recurrence rate [35]. Further studies toward treating other disorders in different sections of the brain would help advance our understanding of depression and further improve this technological sector.

Some might argue that with the nature of social media, reforming the platform is extremely difficult, as technology advances much faster than society can psychologically plan or account for. Because young people have become substantially addicted to the overload of information at the touch of their fingers and have been incentivized to do the same as their peers, a social dilemma or “collective action problem” is evident [36]. Adolescents fear missing out, which drives them to be hooked on social media and to lose their childhood independence and social interactions. One effective strategy to combat this collective action problem is through government intervention. For instance, the European Union introduced the Digital Services Act (DSA) in 2022, a new legislation meant to reduce the harmful content from online social media networks [37]. DSA focuses its efforts on the most harmful content to increase the overall effectiveness of moderation [38]. Some progress in legislation is also being made in the U.S. with half of the U.S. Senate supporting the Kids Online Safety Act (KOSA) in 2022 to protect youth from the Internet by giving parents tools to safeguard their children [39]. New York also passed legislation called Stop Addictive Feeds Exploitation (SAFE) in 2024 to prohibit social media platforms from delivering addictive content feeds to minors under 18 years old without parental permission [40]. Although these legislations have yet to be implemented, pressure on social media use has been placed on the federal and local levels, challenging the indomitable influence of online platforms.

Parents themselves must also take action. For instance, two mothers from the UK created a WhatsApp group—Smartphone Free Childhood—sparking a nationwide campaign of thousands of members, with laws being successfully passed as multiple schools in the UK have gone smartphone-free [41]. These acts of messaging can occur alongside establishing new norms, such as not only strictly limiting social media but also counterintuitively allowing more childhood independence. Parents must overcome their overbearing fear that limits children from being outside on their own (e.g. overestimating the likelihood of kidnapping) as youth currently spend half the time outside than parents in the past [42]. One simple and effective program has been Let Grow, handing kids the opportunity to have free reign by being given outdoor homework (a psychological mind trick) to accomplish independently, and with everyone doing the work, it becomes socially validated [43]. These strategies unveil that instead of fully concentrating on censorship of social media, parents can focus on the incentive of freedom for greater effect.

Isolation, social media, and mass behavior have evolved into an epidemic of anxiety and depression. Through new preventions, coordinated institutions, and social movements, the

epidemic can be resolved. This requires thinking beyond typical treatments and adopting new conventions of behavior. We can ultimately fix this dilemma.

Endnotes

1. "Anxiety." Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriam-webster.com/dictionary/anxiety>. Accessed 27 Jun. 2024.
2. "DSM-5-TR™ Update Supplement to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision." American Psychiatric Association, 4 September 2023, <https://www.psychiatry.org/getmedia/eeccefb91de-4171-b7ba-8d6c1aae3d11/PA-DSM5TR-Update-September-2023.pdf>. Accessed 27 June 2024.
3. Ventriglio, Antonio. "Social media use and emerging mental health issues." *Industrial Psychiatry Journal*, 2024, https://journals.lww.com/inpj/fulltext/9900/social_media_use_and_emerging_mental_health_issues.46.aspx. Accessed 27 June 2024.
4. "Vermont Testimony." *Vermont Legislature*, 4 April 2024, <https://legislature.vermont.gov/Documents/2024/WorkGroups/House%20Commerce/Bills/S.289/Witness%20Documents/S.289~Zachary%20Rausch~Impact%20of%20Digital%20Technology%20on%20Adolescent%20Mental%20Health~4-4-2024.pdf>. Accessed 27 June 2024.
5. Ortiz, Esteban. "The rise of social media." *Our World in Data*, 18 September 2019, <https://ourworldindata.org/rise-of-social-media>. Accessed 27 June 2024.
6. Theberath, Monique. "Effects of COVID-19 pandemic on mental health of children and adolescents: A systematic review of survey studies." *NCBI*, 30 March 2022, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8972920/>. Accessed 27 June 2024.
7. "COVID-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide." *World Health Organization (WHO)*, 2 March 2022, <https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide>. Accessed 27 June 2024.
8. Brandt, Lasse. "The effects of social isolation stress and discrimination on mental health." *NCBI*, 21 September 2022, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9490697/>. Accessed 27 June 2024.
9. Zilioli, Samuele. "Endocrine and immunomodulatory effects of social isolation and loneliness across adulthood." *ScienceDirect*, June 2021, <https://www.sciencedirect.com/science/article/abs/pii/S0306453021000688>. Accessed 27 June 2024.
10. Pediatr, Rev Paul. "Social isolation and its impact on child and adolescent development: a systematic review." *NCBI*, 4 October 2021, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8543788/>. Accessed 27 June 2024.
11. Ibid.
12. Southwick, Steven. "Social Support and Resilience to Stress - PMC." *NCBI*, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2921311/>. Accessed 27 June 2024.

13. Orsolini, Laura. "The Mediatory Role of the Boredom and Loneliness Dimensions in the Development of Problematic Internet Use." *NCBI*, 2 March 2023, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10001960/>. Accessed 27 June 2024.
14. Firth, Joseph. "The "online brain": how the Internet may be changing our cognition." *Wiley Online Library*, 6 May 2019, <https://onlinelibrary.wiley.com/doi/10.1002/wps.20617>. Accessed 27 June 2024.
15. Nagata, Jason M. "Screen Time Use Among US Adolescents During the COVID-19 Pandemic: Findings From the Adolescent Brain Cognitive Development (ABCD) Study." *NCBI*, 1 November 2021, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8561427/>. Accessed 27 June 2024.
16. Haynes, Trevor. "Dopamine, Smartphones & You: A battle for your time." *Science in the News*, 1 May 2018, <https://sitn.hms.harvard.edu/flash/2018/dopamine-smartphones-battle-time/>. Accessed 27 June 2024.
17. McNamara, Brittney. "The Science Behind Social Media's Hold on Our Mental Health." *Teen Vogue*, 10 November 2021, <https://www.teenvogue.com/story/the-science-behind-social-medias-hold-on-our-mental-health>. Accessed 27 June 2024.
18. Haidt, Jonathan. *The Anxious Generation: How the Great Rewiring of Childhood is Causing an Epidemic of Mental Illness*. Allen Lane, 2024.
19. Martinez, Vania. "Social contagion, violence, and suicide among adolescents." *NCBI*, 15 February 2023, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10090320/>. Accessed 27 June 2024.
20. Weigle, Paul. "Psychoeducation or Psychiatric Contagion? Social Media and Self-Diagnosis." *Psychiatric Times*, 8 May 2023, <https://www.psychiatrictimes.com/view/psychoeducation-or-psychiatric-contagion-social-media-and-self-diagnosis>. Accessed 27 June 2024.
21. Pretorius, Claudette. "Mental health professionals as influencers on TikTok and Instagram: What role do they play in mental health literacy and help-seeking?" *NCBI*, 18 November 2022, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9706523/>. Accessed 27 June 2024.
22. Bahorsky, Russ. "Calling Dr. TikTok: Experts Weigh In on an Alarming Social-Media Trend | Giving." *Giving*, November 2022, <https://give.as.virginia.edu/news/story/calling-dr-tiktok-experts-weigh-alarming-social-media-trend>. Accessed 27 June 2024.
23. Ibid.
24. "How the Internet Effects Personal Identity." *How the Internet Effects Personal Identity | Applied Social Psychology (ASP)*, 16 March 2018, <https://sites.psu.edu/aspsy/2018/03/16/how-the-internet-effects-personal-identity/>. Accessed 27 June 2024.

25. Smith, Jonathan. "Behavioral contagion on social media: Effects of social norms, design interventions, and critical media literacy on self-disclosure." *NCBI*, 19 July 2021, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8289004/>. Accessed 27 June 2024.
26. "What causes depression?" *Harvard Health*, 10 January 2022, <https://www.health.harvard.edu/mind-and-mood/what-causes-depression>. Accessed 27 June 2024.
27. "How the Brain's Amygdala Can Play a Role in Teen Anxiety." *+ProActive Approaches*, <https://proactiveapproaches.co.uk/the-brains-amygdala-can-play-a-role-in-teen-anxiety/>. Accessed 27 June 2024.
28. Andrews, Gavin. "Utilising survey data to inform public policy: Comparison of the cost-effectiveness of treatment of ten mental disorders." *Cambridge University Press*, 2 January 2018, <https://www.cambridge.org/core/journals/the-british-journal-of-psychiatry/article/utilising-survey-data-to-inform-public-policy-comparison-of-the-costeffectiveness-of-treatment-of-ten-mental-disorders/E90EB31FACFC42C0D1E9EF8F46F3AC63>. Accessed 27 June 2024.
29. Ormel, Johan. "What is needed to eradicate the depression epidemic, and why." *ScienceDirect*, ScienceDirect, March 2020, <https://www.sciencedirect.com/science/article/pii/S2212657019300911#bib0091>. Accessed 27 June 2024.
30. Ibid.
31. "Youth smoking and vaping prevention." *Truth Initiative*, <https://truthinitiative.org/what-we-do/youth-smoking-prevention-education>. Accessed 27 June 2024.
32. Zurc, Joca. "Effectiveness of Health Promotion Interventions in Primary Schools—A Mixed Methods Literature Review." *NCBI*, 21 June 2023, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10340694/>. Accessed 27 June 2024.
33. "Transcranial Magnetic Stimulation (TMS)." *UC San Diego Health*, <https://health.ucsd.edu/care/behavioral-mental-health/depression-treatment/tms/>. Accessed 27 June 2024.
34. "The Salience Network." *Salience TMS*, 17 October 2023, <https://salienceeuro.com/the-salience-network/>. Accessed 27 June 2024.
35. Stern, Adam P. "Transcranial magnetic stimulation (TMS): Hope for stubborn depression." *Harvard Health*, 27 October 2020, <https://www.health.harvard.edu/blog/transcranial-magnetic-stimulation-for-depression-2018022313335>. Accessed 27 June 2024.
36. "New study targets effects of social media on collective action." *Virginia Tech*, 15 March 2018, <https://news.vt.edu/articles/2018/03/bi-minerva-social.html>. Accessed 27 June 2024.

37. Schneider, Philipp J. "The effectiveness of moderating harmful online content." *PNAS*, 28 June 2023, <https://www.pnas.org/doi/full/10.1073/pnas.2307360120>. Accessed 27 June 2024.
38. Ibid.
39. "Kids Online Safety Act | U.S." *Senator Richard Blumenthal*, 15 February 2024, <https://www.blumenthal.senate.gov/about/issues/kids-online-safety-act>. Accessed 27 June 2024.
40. "Speaker's Press Releases." *Speaker's Press Releases | New York State Assembly*, 7 June 2024, <https://nyassembly.gov/Press/?sec=story&story=110717>. Accessed 27 June 2024.
41. Hill, Amelia. "Group of 17 London secondary schools join up to go smartphone-free." *The Guardian*, 6 June 2024, <https://www.theguardian.com/technology/article/2024/jun/06/group-of-17-london-secondary-schools-join-up-to-go-smartphone-free>. Accessed 27 June 2024.
42. "Do Parents Need To Let Kids Go Outside More? | Time To Log Off." *Time to Log Off*, 20 June 2022, <https://www.itstimetologoff.com/2022/06/20/parents-stop-kids-going-outside/>. Accessed 27 June 2024.
43. "'Let Grow' Project Gives Kids Their Freedom Back." *Stand Together*, <https://standtogether.org/stories/education/let-grow-project-gives-kids-their-freedom-back>. Accessed 27 June 2024.