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Behavioural Design and Consumer Psychology of Digital Overload and Emotional Balance Among Youth

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ABSTRACT— Persuasive design elements such as infinite scroll, autoplay, streaks, variable rewards, and push notifications are incorporated into the design of digital platforms used by young people. Although these design elements help in attracting and retaining attention, they can also result in overload and emotionality. This study aims to find the relationship between exposure to persuasive design and digital overload, FOMO, digital self-regulation, and emotional balance of people aged 18-25. For the purpose of this study, cross-sectional survey was conducted on a sample size of 412 participants from three major Indian metropolitan cities. Emotional balance was measured with the use of Scale of Positive and Negative Experience (SPANE-B). Results from hierarchical regression analysis revealed negative associations of perceived digital overload ($\beta = -.30$, $p < .001$) and FOMO ($\beta = -.17$, $p < .001$) with emotional balance and positive association of digital self-regulation ($\beta = .18$, $p < .001$). Together, these predictors explained 28.1% of variance in emotional balance. Parallel mediation analysis results revealed that the indirect effects of exposure to persuasive design on emotional balance occurred via perceived overload (indirect effect = −1.73, 95% CI [−2.31, −1.20]) and via FOMO (indirect effect = −0.77, 95% CI [−1.19, −0.40]); while the direct effect was insignificant. Emotional balance also differed with the amount of time spent on screens per day, $F(3, 408) = 8.59$, $p < .001$, $\eta^2 = .059$. It can be concluded that emotional costs of persuasive design mainly occur due to the states they elicit and not because of exposure to them.

KEYWORDS—Behavioural design; persuasive technology; digital overload; fear of missing out; emotional balance; youth; consumer psychology

INTRODUCTION

Young adults are the most connected consumers in the digital space. For many of the individuals in this category, the use of social media sites, short video apps, messaging services, and online stores consume a considerable part of their waking hours. This is not coincidental but purposefully designed

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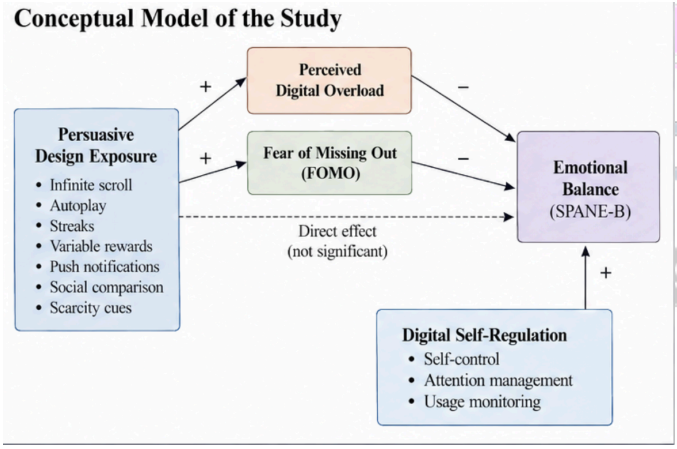
according to behavioral science knowledge on how humans pay attention to something, how long they spend on it, and how often they visit.

From the perspective of consumer psychology, such features create an environment where user's time and engagement are a product. As the young generation forms their identity, develops peer connections, and emotional self-regulation, the questions arise regarding the impact of such design on the balance of positive and negative experiences of these people.

Previous research associated screen time with well-being but did not produce conclusive evidence on that matter. The better approach is to consider the underlying processes of how design elements influence users' emotions. Information overload and fear of missing out (FOMO) may serve as the mechanisms. Self-regulation strategies can help overcome both challenges. The current study incorporates all three concepts in one model and tests it using a young sample.

This study states four objectives: (a) to measure exposure to persuasive design, perceived digital overload, FOMO, and digital self-regulation among the young consumers; (b) to determine the association between these variables and the state of emotional balance; (c) to investigate whether digital overload and FOMO play a mediating role between the exposure to persuasive design and emotional balance; and (d) to conduct emotional balance comparisons among the daily screen time groups.



LITERATURE REVIEW

Persuasive and Behavioural Design

The concept of persuasive technology, according to Fogg (2003), is the development of computing technologies for the purpose of attitude and behavior change. Fogg states that behavior is generated as a result of interaction between motivation, ability, and triggering events. Thaler and Sunstein (2008) expand on this idea by introducing the concept of "nudges" – small changes in the choice architecture that lead to the predictably desirable decisions, but without limiting the available options. On the consumer platforms, such ideas are often applied to drive engagement rather than benefit the users. Eyal (2014) introduces the "hook" model – consisting of trigger, action, variable reward, and investment – as a model for developing products forming habits. Alter (2017) further states that the same model can lead to behavior similar to addiction.

Persuasive design elements may sometimes cross the line into manipulation. Gray et al. (2018) introduce a typology of "dark patterns" that includes nagging, obstruction, sneaking, interface obstruction, and forcing actions. Mathur et al. (2019) report occurrence of such dark patterns on more than 1,800 of about 11,000 examined shopping sites, illustrating their prevalence in consumer settings. Montag et al. (2019) associate specific social media and freemium games features, such as endless scrolling, likes, and in-game rewards, with concepts of psychology and economics related to addiction.

Digital and Information Overload

Information overload is defined as the situation where the amount of information or demands exceed individual's capacity to process them (Eppler & Mengis, 2004). This constraint is based on the idea of cognitive load – individual's working memory capacity is limited, therefore increasing load leads to performance decline and increase in the strain perceived (Sweller, 1988). Misra and Stokols (2012) demonstrated that perceived information overload, especially coming from cyber sources, is associated with higher perceived stress and worse health outcomes. In organizational context, Tarafdar et al. (2007) identified "techno-overload" as one of the major factors of technostress resulting in lower productivity and role strain. The persuasive features of amplifying notifications and content streams are likely to cause overload in young users.

Fear of Missing Out

Przybylski et al. (2013) define FOMO as a feeling of pervasive anxiety that other people are enjoying rewarding experiences not attended by oneself. The authors have developed 10 items scale and demonstrated associations of FOMO with lowered mood and life satisfaction, especially among younger individuals. Platform features such as time-limited stories, live

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counters, and social comparison metrics are aimed to communicate social activity, therefore increasing FOMO. In experimental study, Hunt et al. (2018) showed that limiting social media usage to about 30 minutes daily for 3 weeks significantly decreased loneliness and depressive symptoms, accompanied by lowering of FOMO in both experimental conditions.

Emotional Balance and Youth Well-Being

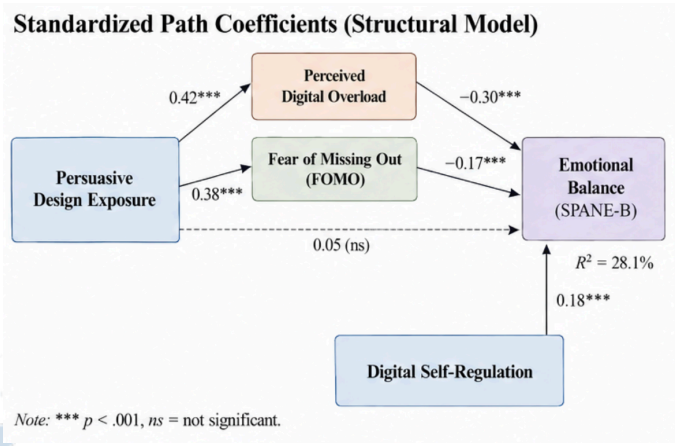
Emotional balance is the ratio between the number of positive and negative emotions experienced by the individual. Diener et al. (2010) have operationalized the concept using the Scale of Positive and Negative Experiences (SPANE), with the balance score (SPANE-B) being computed as a difference between positive and negative emotions. The research on emotion regulation has shown that different strategies used by individuals, including reappraisal vs. suppression, affect the outcome (Gross & John, 2003). The results on digital technology and youth well-being remain inconclusive. Twenge et al. (2018) reported increases in depressive symptoms among US adolescents, coinciding with the increase in new-media screen time. In contrast, Orben and Przybylski (2019), studying large data sets, concluded that the correlation between technology use and adolescent well-being is negative but extremely small. Therefore, it seems that psychological aspect of the platforms is more important than just time spent.

Digital Self-Regulation

Digital self-regulation refers to the strategies used by individuals to regulate their own technology use, for example disabling notifications, setting limits on app usage, applying grayscale mode, or scheduling offline times. Lyngs et al. (2019) have analyzed digital self-control tools using the framework of dual-systems theory, and concluded that such tools can help reflective goals to overcome impulsive, design-driven behaviors. Thus, digital self-regulation can serve as a resource of emotional balance despite significant persuasive exposure.

Research Gap

Existing studies usually analyze the persuasive design, information overload, FOMO, or well-being separately, rarely paying attention to the interrelation of these constructs. There is also lack of empirical evidence from young consumers in emerging digital markets, like India, where smartphone usage increased and cost of data is relatively low. This study aims to fill the gap, examining integrated mediation model in the youth sample.



Hypotheses

H1: Exposure to persuasive design is positively related to digital overload perception as well as FOMO.

H2: Digital overload perception is negatively related to emotional balance.

H3: FOMO is negatively related to emotional balance.

H4: Digital self-regulation is positively related to emotional balance.

H5: Digital overload perception and FOMO serve as mediators between exposure to persuasive design and emotional balance.

H6: Emotional balance differs by daily screen time groups.

METHODOLOGY

Research Design

In the current study, a quantitative approach with a cross-sectional survey design was adopted. This design is suitable in analyzing relationships and indirect effects between psychological variables in a specified population.

Population and Sample

The population of interest was the youth aged 18-25 who use at least two entertainment or social media sites. A sampling approach involving stratified-purposive sampling was utilized

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in three urban areas with strata based on age and employment status. Out of the total of 468 completed questionnaires, 56 were disqualified because of incomplete questionnaire, failure in attention test and straight lining, leaving a final sample size of 412 and a response rate of 88.0%. A prior power analysis of multiple regression with seven predictors and an expected effect size ($f^2 = 0.05$), $\alpha = .05$, and power = .95 yielded a minimum required sample size of 403 participants.

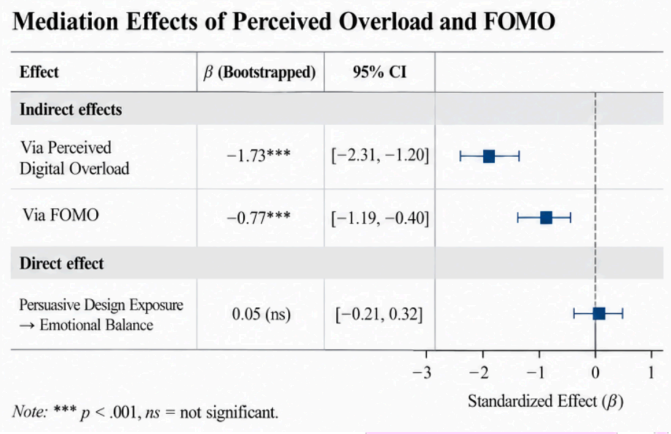

Table 1. Demographic Profile of Respondents (N = 412)

Variable	Category	Frequency	Percentage
Gender	Female	214	51.9
	Male	193	46.8
	Non-binary / Prefer not to say	5	1.2
Age	18–20 years	148	35.9
	21–23 years	171	41.5
	24–25 years	93	22.6
Occupation	Undergraduate student	236	57.3
	Postgraduate student	104	25.2
	Early-career employed	72	17.5
Daily screen time	Less than 3 hours	41	10.0
	3–5 hours	118	28.6
	5–7 hours	149	36.2
	More than 7 hours	104	25.2

Measures

Exposure to Persuasive Design (PDE) was assessed with an eight-item scale derived from literature related to dark patterns and addictive features (Gray et al., 2018; Mathur et al., 2019; Montag et al., 2019). Respondents' experience with the following features were measured: infinite scroll, autoplay, streaks, push notifications, variable rewards, scarcity, social metrics and default opt-ins (answer options ranged from 1 – never to 5 – very frequently).

Perceived Digital Overload (PDO) was measured with eight items taken from the cyber-based part of the perceived information overload scale created by Misra and Stokols (2012) (1-5).

Fear of Missing Out (FOMO) was measured with the ten-item scale developed by Przybylski et al. (2013) (1-5).

Digital Self-Regulation (SRB) was measured with six items reflecting digital self-regulation strategies revealed by Lyngs et al. (2019), namely notification management, app timers and offline scheduling (1-5).

Emotional Balance (EB) was measured with SPANE (Diener et al., 2010): six positive and six negative items (1-5). SPANE-B is computed as a difference between SPANE-P and SPANE-N and ranges between -24 and +24.

Daily screen time was measured based on participants' device dashboard reporting for the previous seven days. The questionnaire was pre-tested on 30 young people, and then wording of items was revised for increased comprehensibility.

Procedure

The data were collected online for eight weeks through university networks and youth community websites. The participation in the study was voluntary, anonymous and required electronic informed consent. Ethical approval for the data collection was obtained from the Institutional Review Board.

Data Analysis

The analysis of data was done in SPSS Version 27 with the use of PROCESS macro v4.2 (Hayes, 2018). Methods of analysis included the descriptive statistics, Cronbach's alpha, Pearson correlations, hierarchical multiple regression, parallel mediation analysis (PROCESS Models 4 and 5 with 5,000 bootstrap resamples), and one-way ANOVA with Tukey HSD post hoc tests. The first factor explained only 27.4% of the total

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variance in the data and thus indicated that common method bias was not a serious problem. Kaiser–Meyer–Olkin measure was .89, and Bartlett's test of sphericity showed $\chi^2 = 7{,}846.21$, $p < .001$.

RESULTS

Descriptive Statistics and Reliability

All measures were found to have high reliability (Cronbach's $\alpha \geq .81$). High level of exposure to persuasive design ($M = 3.62$) and moderate level of overload ($M = 3.48$) were reported by participants. Digital self-regulation was reported at below-median levels ($M = 2.74$). Emotional balance was above-zero and moderate ($M = 3.20$).

Table 2. Descriptive Statistics and Reliability

Construct	Items	Mean	SD	Cronbach's α
Daily screen time (hours)	1	5.80	2.10	—
Persuasive Design Exposure (PDE)	8	3.62	0.71	.86
Perceived Digital Overload (PDO)	8	3.48	0.76	.88
Fear of Missing Out (FOMO)	10	3.21	0.79	.84
Digital Self-Regulation (SRB)	6	2.74	0.82	.81
SPANE – Positive	6	20.60	3.90	.87
SPANE – Negative	6	17.40	4.10	.85
Emotional Balance (SPANE-B)	12	3.20	6.40	—

Correlation Analysis

All correlations were in line with expectations and statistically significant ($p < .001$). The correlation that demonstrated the greatest strength was between persuasive design exposure and overload ($r = .54$). Overload showed the strongest negative correlation with emotional balance ($r = -.46$).

Table 3. Pearson Correlation Matrix (N = 412)

Variable	1	2	3	4	5	6
1. Screen time	1					
2. PDE	.32	1				
3. PDO	.36	.54	1			
4. FOMO	.29	.41	.47	1		
5. SRB	−.22	−.18	−.31	−.27	1	
6. Emotional Balance	−.24	−.29	−.46	−.38	.33	1

Note. All coefficients significant at $p < .001$.

Hierarchical Regression Analysis

In Step 1, age, gender (female = 1) and screen time explained 6.4% of the variance in emotional balance, $F(3, 408) = 9.30$, $p < .001$. Adding the four psychological predictors in Step 2 raised R^2 to .281 ($\Delta R^2 = .217$, $p < .001$), $F(7, 404) = 22.56$, $p < .001$, adjusted $R^2 = .269$. In the final model, overload ($\beta = -.30$), FOMO ($\beta = -.17$) and self-regulation ($\beta = .18$) were significant. Persuasive design exposure and screen time were not, which supports H2, H3 and H4. VIF values ranged from 1.08 to 1.71, so multicollinearity was not a concern.

Table 4. Hierarchical Regression Predicting Emotional Balance

Predictor	Step 1 β	t	p	Step 2 β	t	p
Age	.05	1.04	.298	.04	0.93	.353
Gender (female = 1)	−.06	−1.25	.212	−.05	−1.18	.239
Screen time	−.24	−4.97	<.001	−.04	−0.81	.418
PDE				−.01	−0.20	.842
PDO				−.30	−5.48	<.001
FOMO				−.17	−3.47	<.001
SRB				.18	3.92	<.001
R^2	.064			.281		
ΔR^2				.217		<.001
F	9.30***			22.56***		

Note. ***p < .001.

Mediation Analysis

PROCESS Model 4 investigated overload and FOMO as mediators to the same extent between PDE and emotional

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balance. Persuasive design exposure positively predicted overload (a1 = 0.58, SE = 0.044, p < .001) and FOMO (a2 = 0.46, SE = 0.050, p < .001), thus H1 was supported. Overload and FOMO both had a significant negative influence on emotional balance (b1 = -2.99, SE = 0.46, p < .001; b2 = -1.68, SE = 0.41, p < .001). Total PDE effect (c = -2.61, SE = 0.43, p < .001) declined to non-significant level in direct effect (c' = -0.11, SE = 0.47, p = .818). Model explained 25.0% of variance in emotional balance. Hypothesis 5 (H5) is supported.

Table 5. Parallel Mediation Results (5,000 Bootstrap Samples)

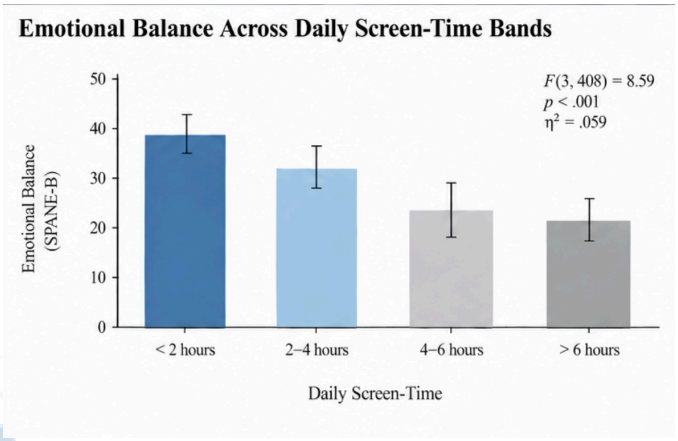
Path	Effect	Boot SE	95% CI Lower	95% CI Upper
Total effect (PDE → EB)	−2.61	0.43	−3.45	−1.77
Direct effect (PDE → EB)	−0.11	0.47	−1.04	0.81
Indirect via PDO	−1.73	0.28	−2.31	−1.20
Indirect via FOMO	−0.77	0.20	−1.19	−0.40
Total indirect effect	−2.50	0.29	−3.10	−1.94

Emotional Balance Across Screen-Time Bands

One-way ANOVA analysis showed significant differences in emotional balance by screen time categories, $F(3, 408) = 8.59$, $p < .001$, $\eta^2 = .059$, in support of hypothesis six. Results of post-hoc analysis with the help of Tukey HSD method revealed that respondents, who used screen for less than 3 hours, were emotionally balanced compared to respondents in the category of 5-7 hours ($p = .028$) and in the category of more than 7 hours ($p < .001$). Those in the 3-5 hour category also scored better in terms of emotional balance when compared to those in the category of more than 7 hours ($p < .001$).

Table 6. Emotional Balance by Daily Screen-Time Band

Screen-time band	n	Mean SPANE-B	SD
Less than 3 hours	41	5.90	6.00
3–5 hours	118	4.60	6.20
5–7 hours	149	2.80	6.30
More than 7 hours	104	1.10	6.40
Total	412	3.20	6.40



Discussion

The results suggest that persuasive design is not a direct determinant of emotional balance of youth. Its effects operate through psychological factors. Persuasive design was found to have a very strong relationship with perceived overload and FOMO, while the direct effect on emotional balance became insignificant after introducing the mediating variables. It is consistent with Eppler and Mengis (2004) and Misra and Stokols (2012), who see overload as a strain, both cognitive and affective. Also, it corroborates Przybylski et al. (2013), according to whom FOMO represents an important source of negative emotions due to social comparisons.

Overload was identified as a more significant mediating variable – it accounted for about 69% of the total indirect effect (−1.73 of −2.50). It suggests that continuous flow of notifications, feeds, and prompts exerts more strain on the limited cognitive abilities of young users than social comparison only. The finding is consistent with the concept of cognitive load (Sweller, 1988) and with the techno-overload element of technostress outlined by Tarafdar et al. (2007).

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Screen time proved to be significantly correlated with emotional balance but its significance diminished upon controlling for psychological factors, which is consistent with Orben and Przybylski (2019) in that time-based measures of usage do not predict well-being. There is a gradient of emotional balance across screen-time categories, though the effect size is quite small ($\eta^2 = .059$).

Self-regulation turned out to be an important protective factor. The finding supports Lyngs et al. (2019), who see in enhancing

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reflective control an effective strategy for combating impulsivity and design-induced usage. The low mean score on digital self-regulation scale (M = 2.74) indicates that many young users lack such skills. That is, there is some room for intervention. It may bring similar results as restricted use does, according to Hunt et al. (2018).

Implications

For platform designers: The results suggest shifting from engagement optimization to well-being-oriented design. The practical steps to take include implementing batched notifications, embedding natural stopping points rather than infinity scrolls, making autoplay an option, and providing users with usage dashboards. Such changes will reduce overload but not diminish the utility. Moreover, avoiding the dark patterns identified by Gray et al. (2018) and Mathur et al. (2019) will help avoid ethical and reputational risk.

For educators and youth counselors: The digital literacy programs should equip young people with knowledge of how to identify design patterns and employ self-regulation strategies, rather than just reduce their screen time.

For policymakers: The results speak for the need for consumer protection frameworks that deal with manipulative design, especially regarding young people.

Limitations and Future Research

The cross-sectional design prevents from drawing causal conclusions. Longitudinal and experimental designs are needed to figure out the temporal order of the effects. Even though screen time was calculated based on dashboards of user's devices, self-report measures may still suffer from social desirability bias. The sample of respondents recruited from metropolitan India should be applied to this population with caution. Further research may benefit from incorporating objective app-level measures, exploring platform-specific effects, and testing design interventions with field experiments.

Conclusion

The results suggest that persuasive design affects the emotional balance of young people mostly through increased perception of digital overload and fear of missing out. Digital self-regulation serves as a protective resource. It seems that emotional well-being in the age of digital media depends more on the design of the platform and users' ability to regulate their usage than on the time spent online.

References

1. Alter, A. (2017). *Irresistible: The rise of addictive technology and the business of keeping us hooked*. Penguin Press.
2. Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*(2), 143–156.
3. Eppler, M. J., & Mengis, J. (2004). The concept of information overload: A review of literature from organization science, accounting, marketing, MIS, and related disciplines. *The Information Society, 20*(5), 325–344.
4. Eyal, N. (2014). *Hooked: How to build habit-forming products*. Portfolio/Penguin.
5. Fogg, B. J. (2003). *Persuasive technology: Using computers to change what we think and do*. Morgan Kaufmann.
6. Gray, C. M., Kou, Y., Battles, B., Hoggatt, J., & Toombs, A. L. (2018). The dark (patterns) side of UX design. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Paper 534). ACM.
7. Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*(2), 348–362.
8. Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Press.
9. Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No more FOMO: Limiting social media decreases loneliness and depression. *Journal of Social and Clinical Psychology, 37*(10), 751–768.
10. Lyngs, U., Lukoff, K., Slovak, P., Binns, R., Slack, A., Inzlicht, M., Van Kleek, M., & Shadbolt, N. (2019). Self-control in cyberspace: Applying dual systems theory to a review of digital self-control tools. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (Paper 131). ACM.
11. Mathur, A., Acar, G., Friedman, M. J., Lucherini, E., Mayer, J., Chetty, M., & Narayanan, A. (2019). Dark patterns at scale: Findings from a crawl of 11K shopping websites. *Proceedings of the ACM on Human-Computer Interaction, 3*(CSCW), Article 81.
12. Misra, S., & Stokols, D. (2012). Psychological and health outcomes of perceived information overload. *Environment and Behavior, 44*(6), 737–759.
13. Montag, C., Lachmann, B., Herrlich, M., & Zweig, K. (2019). Addictive features of social media/messenger platforms and freemium games against the background of psychological and economic theories. *International Journal of Environmental Research and Public Health, 16*(14), 2612.
14. Orben, A., & Przybylski, A. K. (2019). The association between adolescent well-being and digital technology use. *Nature Human Behaviour, 3*(2), 173–182.
15. Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior, 29*(4), 1841–1848.
16. Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science, 12*(2), 257–285.
17. Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & Ragu-Nathan, T. S. (2007). The impact of technostress on role stress and productivity. *Journal of Management Information Systems, 24*(1), 301–328.
18. Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.
19. Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2018). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science, 6*(1), 3–17.

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