

REGULATING ATTENTION: GAMING ADDICTION IN CHILDREN

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INTRODUCTION

Recent years have witnessed a marked shift in the governance of children’s online lives: choices once left to families alone are now recast by regulators, lawmakers, and courts as problems of children’s “digital addiction” that warrant public intervention.¹ Regulators have moved swiftly: Australia has banned social media for children under sixteen, California and New York have restricted addictive feeds, and countries across Europe are

1. See GAIA BERNSTEIN, UNWIRED: GAINING CONTROL OVER ADDICTIVE TECHNOLOGIES 22–32, 109–22 (2023) (tracing how the overuse of addictive technologies has been framed as a failure of individual users and parents, and arguing that responsibility should shift to the firms that design them); Orsolya Király et al., *Policy Responses to Problematic Video Game Use: A Systematic Review of Current Measures and Future Possibilities*, 7 J. BEHAV. ADDICTIONS 503 (2018) (reviewing governmental and industry measures against problematic gaming, including shutdown laws, fatigue systems, and parental controls, adopted predominantly in Asia); *Social Media Ban for Children Under 16 Starts in Australia*, NPR (Dec. 10, 2025, at 01:34 ET), <https://www.npr.org/2025/12/10/nx-s1-5639694/social-media-ban-children-australia> [<https://perma.cc/3UQL-MRUD>] (reporting the entry into force of the world’s first nationwide ban on under-sixteen social media use, a decision formerly left to each family and now made by national law).

imposing access limits.² In March 2026, a Los Angeles jury found Meta and YouTube liable for designing their platforms to engineer compulsive engagement in children.³ Together, these developments mark a belated recognition that platform design, not just content, demands regulatory attention.

As lawmakers in Canberra and jurors in Los Angeles move to hold social media platforms accountable for children’s digital addiction, the online gaming industry has confronted this problem longer and in a purer form. Gaming platforms systematically engineer compulsive engagement in children.⁴ Their business model depends on attention extraction.⁵ As a result, the regulation of online gaming may shed light on where the current regulatory wave on social media must eventually arrive, and where its limitations will be most exposed.

Through addictive designs⁶ such as variable-ratio reward schedules, progress-loss architectures, and real-time behavioral optimization, gaming

2. On the regulatory shift toward digital addiction frameworks, see *Online Safety Amendment (Social Media Minimum Age) Act 2024* (Cth) (Austl.) (world’s first under-16 social media ban, commenced Dec. 10, 2025); Regulation 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and Amending Directive 2000/31/EC (Digital Services Act), art. 28, 2022 O.J. (L 277) 1, 60 (EU) [hereinafter Digital Services Act] (requiring platforms accessible to minors to ensure high level of privacy, safety, and security); CAL. HEALTH & SAFETY CODE §§ 28000–02 (Deering 2026) (effective Jan. 1, 2027) (social media warning labels).

3. See *K.G.M. v. Meta Platforms Inc.*, No. 22SCV21355, 2026 WL 922262 (Cal. Super. Ct. Mar. 25, 2026); see also Cecilia Kang, Ryan Mac & Eli Tan, *Meta and YouTube Found Negligent in Landmark Social Media Addiction Case*, N.Y. TIMES (Mar. 25, 2026), <https://www.nytimes.com/2026/03/25/technology/social-media-trial-verdict.html> (on file with the *Fordham Urban Law Journal*); Kali Hays, Nardine Saad & Regan Morris, *Campaigners Welcome Meta and YouTube’s Defeat in Landmark Social Media Addiction Trial*, BBC NEWS (Mar. 27, 2026), <https://www.bbc.com/news/articles/c747x7gz249o> [<https://perma.cc/PP9C-XTDD>].

4. See Anson Chui Yan Tang et al., *How Gacha Gaming and Life Quality Shape Problem Gambling Risk: Insights from a Cross-Sectional Study Using Hong Kong-Based Online Survey of Young Adults*, 16 FRONTIERS PSYCHIATRY, Sep. 21 2025, at 2, 7, <https://www.frontiersin.org/journals/psychiatry/articles/10.3389/fpsyt.2025.1663328/full> [<https://perma.cc/CT5W-QPYH>].

5. See JAMES WILLIAMS, STAND OUT OF OUR LIGHT: FREEDOM AND RESISTANCE IN THE ATTENTION ECONOMY 32–35 (2018).

6. This Article uses “addictive design” to mean design features deliberately engineered to capture, prolong, and manipulate user attention by exploiting psychological and neurobiological vulnerabilities, with the aim of maximizing players’ time and spending. The definition is developed *infra* Part I.A. This Article focuses on attention extraction rather than clinical addiction categories (such as “Internet Gaming Disorder” in DSM-5 or “Gaming Disorder” in ICD-11) because the regulatory analysis does not depend on whether individual users meet diagnostic criteria. See AM. PSYCHIATRIC ASS’N, *Internet Gaming Disorder*, in DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS 913 (5th ed. text rev. 2022)

platforms extract what is arguably children's scarcest developmental resource: attention.⁷ Unlike alcohol, gambling, or pornography, which serve functions beyond attention capture, gaming represents the purest form of attention extraction: its business model depends almost exclusively on monopolizing user time, with revenue correlating directly to engagement duration.⁸ A child who games for eight hours daily is spending finite time and cognitive capacity that, once spent during critical developmental windows, cannot be recovered or reallocated to the diverse experiences, unstructured play, relational depth, and academic focus through which self-governance capacities develop.⁹

Conventional regulatory frameworks treat gaming primarily as a *content* problem. As a result, age-based rating systems classify games by violence or sexual themes that they contain. Alternatively, gaming is regulated as a matter of individual family responsibility. These regulations delegate protection to parental monitoring tools that platforms themselves design, and that their own behavioral optimization is built to circumvent.¹⁰ Neither approach addresses the key structural problem. Platforms profit by extracting maximal attention from users whose developing brains are least equipped to resist compulsion, while the developmental costs of that

[hereinafter DSM-5]; WORLD HEALTH ORGANIZATION, 6C51 GAMING DISORDER, INTERNATIONAL CLASSIFICATION OF DISEASES AND RELATED HEALTH PROBLEMS § 6C51 (11th rev. 2022) [hereinafter ICD-11]. The question for platform duties is not whether children develop clinically diagnosable disorders but whether platforms systematically extract developmental attention in ways that foreclose future autonomy. On debates over gaming disorder validity, compare PATRICK M. MARKEY & CHRISTOPHER J. FERGUSON, MORAL COMBAT: WHY THE WAR ON VIOLENT VIDEO GAMES IS WRONG 115–18 (2017) (skeptical), with Douglas A. Gentile et al., *Pathological Video Game Use Among Youths: A Two-Year Longitudinal Study*, 127 PEDIATRICS 319, 319–29 (2011).

7. On attention as scarce developmental resource, see TIM WU, THE ATTENTION MERCHANTS: THE EPIC SCRAMBLE TO GET INSIDE OUR HEADS 6–8 (2017) (arguing attention has become “the ultimate commodity” in digital economy); WILLIAMS, *supra* note 5, at 101, 122; Tim Wu, *Blind Spot: The Attention Economy and the Law*, 82 ANTITRUST L.J. 771, 773–76 (2019) [hereinafter Wu, *Blind Spot*] (monetize attention capture).

8. On gaming's business model dependence on attention extraction, see Kyle Langvardt, *Regulating Habit-Forming Technology*, 88 FORDHAM L. REV. 129, 134–41 (2019) (habit-forming designs dependence on sustained engagement); Yan Huang, Stefanus Jasin & Puneet Manchanda, “Level Up”: *Leveraging Skill and Engagement to Maximize Player Game-Play in Online Video Games*, 30 INFO. SYS. RSCH. 1, 1–2, 28–29 (2019) (revenue correlates with time spent).

9. See Laurence Steinberg, *A Social Neuroscience Perspective on Adolescent Risk-Taking*, 28 DEV. REV. 78, 78–85 (2008) (critical periods in adolescent brain development); B.J. Casey, Rebecca M. Jones & Todd A. Hare, *The Adolescent Brain*, 1124 ANNALS N.Y. ACAD. SCI. 111, 112–18 (2008) (neuroplasticity during developmental windows); Tamar Schapiro, *What Is a Child?*, 109 ETHICS 715, 728–34 (1999) [hereinafter Schapiro, *What Is a Child?*] (self-governance as developmental achievement requiring diverse experiences).

10. See Sonia Livingstone & Ellen J. Helsper, *Parental Mediation of Children's Internet Use*, 52 J. BROADCASTING & ELEC. MEDIA 581, 581–99 (2008).

extraction are externalized onto families, schools, healthcare systems, and the children themselves.¹¹ This mismatch between the architecture of harm and the architecture of response creates the regulatory puzzle this Article addresses.

This Article argues for a fundamental reorientation in how legal systems conceptualize and regulate gaming's effects on children—what it terms the shift to *attention regulation*. Attention regulation targets not what content platforms provide but how much attention platforms extract, for how long, through what mechanisms, and from which populations.¹² This reorientation follows a pattern visible across other domains where systematic harms from addictive products ultimately triggered regulatory intervention. Alcohol regulation evolved from Prohibition's failed attempt to ban content (liquor itself) to the three-tier system's successful regulation of distribution architecture that limits exposure.¹³ Gambling regulation shifted from moral prohibition of wagering to design-focused controls on slot machine algorithms which manufacture compulsion through attention-capture mechanisms.¹⁴ Pornography regulation has moved haltingly from obscenity doctrine's content standards—which proved conceptually incoherent and practically unenforceable—toward age-verification requirements and platform duties that regulate exposure rather than eliminate material.¹⁵ Each domain's regulatory evolution reflects the same insight: when products are engineered to capture attention and generate compulsion, particularly in

11. See Shoshana Zuboff, *Big Other: Surveillance Capitalism and the Prospects of an Information Civilization*, 30 J. INFO. TECH. 75, 79–84 (2015) (arguing mechanisms of extraction exile individuals from their behavior); JONATHAN HAIDT, *THE ANXIOUS GENERATION: HOW THE GREAT REWIRING OF CHILDHOOD IS CAUSING AN EPIDEMIC OF MENTAL ILLNESS* 25–45 (2024).

12. See WU, *Blind Spot*, *supra* note 7, at 776–82 (distinguishing attention markets from traditional product markets); WILLIAMS, *supra* note 5, at 45–54 (attention regulation protects autonomy).

13. See Roni Elias, *Three Cheers for Three Tiers: Why the Three-Tier System Maintains Its Legal Validity and Social Benefits After Granholm*, 14 DEPAUL BUS. & COM. L.J. 209, 210 (2016) (regulating distribution architecture to minimize social risk rather than substance bans); Harry G. Levine, *The Discovery of Addiction: Changing Conceptions of Habitual Drunkenness in America*, 15 J. STUD. ON ALCOHOL 493, 493–506 (1978) (tracing addiction's shift from moral failing to “loss of control” disease).

14. See NATASHA DOW SCHÜLL, *ADDICTION BY DESIGN: MACHINE GAMBLING IN LAS VEGAS* 258–89 (2012) (slot machine design regulation); Luke Clark et al., *Gambling Near-Misses Enhance Motivation to Gamble and Recruit Win-Related Brain Circuitry*, 61 NEURON 481, 481–85 (2009) (neurobiological mechanisms).

15. See *Miller v. California*, 413 U.S. 15, 24–25 (1973) (obscenity doctrine); *Reno v. ACLU*, 521 U.S. 844, 874–79 (1997) (content regulation failures); Online Safety Act 2023, c. 50, §§ 79–81 (UK) (age verification for pornographic content); see also Frederick Schauer, *Codifying the First Amendment*: New York v. Ferber, 1982 SUP. CT. REV. 285, 304–09 (analyzing content versus access regulation distinction).

vulnerable populations, content-based prohibition fails, whereas attention-focused regulation can succeed.

Gaming platforms represent the frontier of this evolution. Contemporary games deploy AI-enabled personalization to optimize attention extraction at individual scale, continuously adapting to each user's psychological vulnerabilities in real time.¹⁶ If vice regulation's historical trajectory offers guidance, effective intervention requires abandoning the content-and-parental-responsibility framework in favor of duties that directly regulate platforms' capacity to monopolize children's developmental attention.

The argument proceeds in five parts. Part I establishes the architecture of attention capture—the specific design mechanisms through which gaming platforms manufacture compulsive engagement by systematically overriding deliberative choice rather than satisfying pre-existing preferences. Parts II and III address the normative question in two stages. Part II analogizes between online gaming and historical precedents of the regulation of vice, establishing three conditions under which addiction justifies moving from individual responsibility to public regulation. It then demonstrates that gaming meets all three conditions, with AI-enabled optimization amplifying each. Part III establishes that children occupy a unique status requiring categorical protection: gaming addiction harms children not merely by creating dependence (which also affects adults) but by foreclosing the developmental process through which children acquire self-governance capacity, violating what legal philosopher Joel Feinberg terms the child's "right to an open future."¹⁷

Part IV shifts from normative foundations to regulatory models first, comparing how different legal systems allocate protective duties across state, platform, and family actors, then theorizing why such divergence persists despite shared commitment to protecting children's developmental futures. This analysis reveals that effective attention regulation requires duty specifications that are simultaneously normatively justified (reflecting legitimate authority over child welfare), institutionally viable (possible given

16. On AI-enabled optimization, see Ryan Calo, *Digital Market Manipulation*, 82 GEO. WASH. L. REV. 995, 1003–12 (2014) (personalized psychological targeting); Micah L. Berman, *Manipulative Marketing and the First Amendment*, 103 GEO. L.J. 497, 524–33 (2015) (marketing exploitation of cognitive vulnerabilities).

17. Joel Feinberg, *The Child's Right to an Open Future*, in JUSTICE, POLITICS, AND THE FAMILY 145, 146 (Daniel Engster & Tamara Metz eds., 2014); see also Tamar Schapiro, *Childhood and Personhood*, 45 ARIZ. L. REV. 575, 586–93 (2003) [hereinafter Schapiro, *Childhood and Personhood*] (developmental autonomy); Gerald Dworkin, *Paternalism*, 56 MONIST 64, 76–78 (1972) (prospective consent justification); Anca Gheaus, *The Intrinsic Goods of Childhood and the Just Society*, in THE NATURE OF CHILDREN'S WELL-BEING 35, 40–48 (Alexander Bagattini & Colin Macleod eds., 2015) (childhood as developmental period).

regulatory capacity and constitutional constraints), and functionally adequate (matching duty type to harm structure). Part V then draws these findings together into a model of platform obligation built on the constitutive interest, specifying the design duties that follow once children's developmental interests, rather than harm prevention alone, supply the regulatory foundation. Together, these five parts establish both the case for attention regulation as a new regulatory paradigm and the platform duties that follow from it calibrated to the technological conditions of AI-driven attention extraction.

I. THE ATTENTION TRAP: TECHNOLOGICAL ARCHITECTURE

Playing is an inherent part of human life, especially in childhood.¹⁸ Video games tap into this drive with unusual force,¹⁹ combining visually rich content, immersive narratives, and immediate reward systems that resonate with basic human needs for stimulation, mastery, and social connection.²⁰ Through layered sensory cues, opportunities for interaction with peers, and rapid feedback on performance, games engage the brain's reward circuitry in ways that can make play feel nearly irresistible.²¹ For many years, and for good reason, scholars have documented the developmental benefits of play and have treated video games as one more medium through which children can build cognitive skills, social capacities, and emotional resilience.²² Admittedly, there is nothing inherently problematic about gaming per se as a common human activity. Yet the regulatory question we should ask is how the business models and design architectures that govern contemporary gaming systematically shape the allocation of children's finite developmental attention, not merely whether gaming also confers benefits.

18. See generally S.M. Sivy, *A Brain Motivated to Play: Insights Into the Neurobiology of Playfulness*, 153 BEHAVIOUR 819 (2016) (describing play as "an important part of normal childhood development" and examining the neurobiological and developmental functions of play).

19. See JANE MCGONIGAL, *REALITY IS BROKEN: WHY GAMES MAKE US BETTER AND HOW THEY CAN CHANGE THE WORLD* 21–52 (2011).

20. On play as developmental necessity, see PETER GRAY, *FREE TO LEARN: WHY UNLEASHING THE INSTINCT TO PLAY WILL MAKE OUR CHILDREN HAPPIER, MORE SELF-RELIANT, AND BETTER STUDENTS FOR LIFE* 170, 176–80 (2013).

21. See Mark D. Griffiths & Filip Nuyens, *An Overview of Structural Characteristics in Problematic Video Game Playing*, 4 CURR. ADDICT. REPS. 272, 274 (2017) (structural features like advancement rates and win/loss mechanics); Gary W. Selnow, *Playing Videogames: The Electronic Friend*, 34 J. COMM'N 148, 148–56 (1984) ("satisficing" behaviors in heavy users).

22. See Isabela Granic, Adam Lobel & Rutger C.M.E. Engels, *The Benefits of Playing Video Games*, 69 AM. PSYCH. 66, 66–71 (2014) (focusing on benefits in four areas: cognitive, motivational, emotional, and social skills).

Over the past several decades, the video game industry has evolved from a provider of discrete entertainment products—games sold as self-contained experiences—into a highly commercial enterprise that deliberately maximizes sustained user engagement.²³ This transformation marks a fundamental shift in how platforms generate revenue.²⁴ Where traditional games monetized through one-time purchases, contemporary platforms profit from sustained attention. The longer players remain engaged, the more opportunities arise for in-game purchases, advertising exposure, subscription renewals, and data collection that enables increasingly sophisticated behavioral targeting.²⁵ With this monetization approach, game designers function as “wizards of engagement,”²⁶ engineering behavioral reinforcers that convert occasional play into daily routine and fleeting curiosity into entrenched habit.²⁷ Because user retention drives profitability across freemium,²⁸ subscription, and advertising-supported models, firms treat the maximization of user “stickiness” as a core business objective.²⁹ To achieve

23. See Daniel L. King & Paul H. Delfabbro, *Video Game Monetization (e.g., ‘Loot Boxes’): A Blueprint for Practical Social Responsibility Measures*, 17 INT’L J. MENTAL HEALTH & ADDICT. 166, 166–79 (2019).

24. See VILI LEHDONVIRTA & EDWARD CASTRONOVA, VIRTUAL ECONOMIES: DESIGN AND ANALYSIS 45–67 (2014); Myriam Davidovici-Nora, *Paid and Free Digital Business Models Innovations in the Video Game Industry*, 94 DIGIWORLD ECON. J. 83, 83–90 (2014); André Marchand & Thorsten Hennig-Thurau, *Value Creation in the Video Game Industry: Industry Economics, Consumer Benefits, and Research Opportunities*, 27 J. INTERACTIVE MKTG. 141, 143–48 (2013).

25. See Mingliu Chen, Adam N. Elmachetoub & Xiao Lei, *Matchmaking Strategies for Maximizing Player Engagement in Video Games*, MGMT. SCI. (Feb. 6, 2026), <https://pubsonline.informs.org/doi/10.1287/mnsc.2023.02957> [<https://perma.cc/B39D-Q9S8>]; Juho Hamari et al., *Why Do Players Buy In-Game Content? An Empirical Study on Concrete Purchase Motivations*, 68 COMPUTERS HUM. BEHAV. 538, 539–41, 543–45 (2017).

26. Granic, Lobel & Engels, *supra* note 22, at 70.

27. See Yoonsik Jung et al., *Explainable AI for Player Retention: Hyperpersonalized Promotions to Prevent Game User Churn*, 18 IEEE TRANSACTIONS ON GAMES 369, 369–72 (2026) (explaining that the game industry increasingly analyzes players’ play styles, preferences, and purchase patterns to deliver personalized promotions aimed at sustaining user engagement).

28. “Freemium,” a portmanteau of “free” and “premium,” refers to a business model in which consumers access a product’s core content free of charge and revenue is generated through optional paid add-ons. Unlike the premium model, in which payment precedes use, freemium transactions are “temporally decoupled such that (initial) consumption precedes consumer payment(s).” Joost Rietveld, *Creating and Capturing Value from Freemium Business Models: A Demand-Side Perspective*, 12 STRATEGIC ENT’SHIP J. 171, 172 (2018); Xin Fu et al., *User Segmentation for Retention Management in Online Social Games*, 101 DECISION SUPPORT SYS. 51, 51–68 (2017) (analyzing targeted retention strategies).

29. Fu et al., *supra* note 28, at 52. “User stickiness” refers to the degree to which users are encouraged to stay on a digital platform longer, repeatedly return, and sustain continued usage over time during the post-adoption stage. See also Seeun Kim et al., *Factors Affecting Stickiness and Word of Mouth in Mobile Applications*, 10 J. RSCH. INTERACTIVE MKTG. 177, 178–80 (2016).

this objective, platforms profile and harvest data on users' psychology, behavioral patterns, and in-game actions, constructing what this Article terms an *attention chain*: a sequence of design mechanisms calibrated to extract sustained engagement regardless of whether continued play aligns with users' own considered judgments about how to allocate their time.³⁰

Part I.A first attempts to define addictive designs. Then, Part I.B, organizes the mechanisms of attention extraction into three functional categories based on the roles they play in the commercial attention chain: engagement-oriented features that structure time and habit, performance-oriented features that leverage status and reward, and social-interaction-oriented features that mobilize peer pressure and belonging. This analysis proceeds descriptively, establishing how each category of mechanisms operates before turning in Part II to the normative question of when such extraction crosses the threshold to *regulatory salience*.

A. Addictive Design as Attention Extraction

While “immersion,” “engagement,” and “addiction” are often used interchangeably in casual discussion of online games, understanding how gaming platforms systematically extract children's attention requires sharper distinctions. This Article defines “engagement” as the process by which users attend to and interact with particular online content—a neutral descriptor that may reflect either genuine interest or manufactured compulsion.³¹ “Immersion” captures the subjective experience of feeling fully absorbed or “lost” in a virtual environment, a state that can arise from compelling narrative, skillful gameplay, or social connection just as readily as from manipulative design.³² “Addiction,” by contrast, denotes in common usage “a compulsive, chronic, physiological or psychological need for a habit-forming substance, behavior, or activity having harmful physical, psychological, or social effects and typically causing well-defined symptoms

30. See Daniel Susser, Beate Roessler & Helen Nissenbaum, *Online Manipulation: Hidden Influences in a Digital World*, 4 GEO. L. TECH. REV. 1, 29–34 (2019) (real-time behavioral adaptation).

31. The concept of “engagement” has been studied in the context of internet and digital technologies from several perspectives, including user experience, psychological motivation, and behavioral participation. See generally Heather L. O'Brien & Elaine G. Toms, *What Is User Engagement? A Conceptual Framework for Defining User Engagement with Technology*, 59 J. AM. SOC'Y FOR INFO. SCI. & TECH. 938 (2008); Rebecca Dolan et al., *Social Media Engagement Behavior: A Framework for Engaging Customers Through Social Media Content*, 53 EUR. J. MKTG. 2213 (2019); Andrew K. Przybylski, C. Scott Rigby & Richard M. Ryan, *A Motivational Model of Video Game Engagement*, 14 REV. GEN. PSYCH. 154 (2010).

32. SEE MAY-LI SEAH & PAUL CAIRNS, FROM IMMERSION TO ADDICTION IN VIDEOGAMES, PROCS. 22ND ANN. BRIT. HCI GRP. ANN. CONF. ON PEOPLE & COMPUTERS: CULTURE, CREATIVITY, INTERACTION 55, 55–56 (2008) (linking immersion to addiction).

(such as anxiety, irritability, tremors, or nausea) upon withdrawal or abstinence.”³³ Clinical frameworks refine this lay understanding of addiction into more specific diagnostic criteria: a clinical condition characterized by compulsive engagement, impaired control, and continued use despite serious negative consequences³⁴—criteria the World Health Organization formalized for gaming specifically in 2019 by recognizing “gaming disorder” in the ICD-11 as a behavioral addiction.³⁵

While gaming disorder represents a legitimate clinical concern, the regulatory question, properly framed, is not whether individual children meet diagnostic thresholds but whether platforms deploy design mechanisms that systematically extract finite developmental attention in ways that foreclose children’s capacity for self-governance.³⁶ In other words, regulation need not wait for any child’s diagnosis; it begins with the design itself. These mechanisms operate by exploiting well-documented cognitive vulnerabilities—including loss aversion, social obligation, variable-ratio reinforcement, and sunk-cost commitment—to extract sustained engagement.³⁷

For minors, whose capacities for self-regulation are still developing, the deployment of addictive designs is especially consequential.³⁸ attention allocated during these non-renewable developmental windows³⁹—when diverse experiences are critical to building self-governance capacities⁴⁰—

33. See *Addiction*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/addiction> [<https://perma.cc/8B6C-VJJU>] (last visited Feb. 2, 2026).

34. See also DSM-5, *supra* note 6, at § III (Conditions for Further Study); Gentile et al., *supra* note 6, at 320.

35. ICD-11, *supra* note 6, § 6C51.

36. On the distinction between clinical diagnosis and regulatory analysis, see Lars Noah, *Medicine’s Epistemology: Mapping the Haphazard Diffusion of Knowledge in the Biomedical Community*, 44 ARIZ. L. REV. 373, 439–45 (2002).

37. See Jon D. Hanson & Douglas A. Kysar, *Taking Behavioralism Seriously: The Problem of Market Manipulation*, 74 N.Y.U. L. REV. 630, 677–713 (1999) (examining systematic exploitation of bounded rationality); see generally Susser, Roessler & Nissenbaum, *supra* note 30 (defining online manipulation as covert influence over decision-making and explaining how digital technologies facilitate it and undermine autonomy).

38. See generally Cecilie Schou Andreassen et al., *The Relationship Between Addictive Use of Social Media and Video Games and Symptoms of Psychiatric Disorders: A Large-Scale Cross-Sectional Study*, 30 PSYCH. ADDICT BEHAV. 252 (2016) (correlation between addictive use and psychiatric disorders); Jenny Radesky et al., *Prevalence and Characteristics of Manipulative Design in Mobile Applications Used by Children*, 5 JAMA NETWORK OPEN, June 17, 2022, at 1–11 (manipulative design prioritizes profits over child welfare).

39. See Gaia Bernstein, *When New Technologies Are Still New: Windows of Opportunity for Privacy Protection*, 51 VILL. L. REV. 921, 945–50 (2006) (arguing interactive designs prioritize corporate profits over children’s interests).

40. See Schapiro, *What Is a Child?*, *supra* note 9, at 732–36; Gheaus, *supra* note 17, at 41.

cannot be recovered or reallocated once those windows close.⁴¹ Platforms engineer addictive design mechanisms to monopolize this attention, thereby externalizing the developmental costs of sustained attention extraction onto children and their families—treating children’s finite developmental attention as an extractable resource while capturing the commercial benefits of prolonged engagement.⁴²

This Article uses “addictive design” to describe design features deliberately engineered to capture, prolong, and manipulate user attention by exploiting psychological and neurobiological vulnerabilities, with the aim of maximizing players’ time and spending.⁴³ Building on the dark-patterns literature,⁴⁴ these designs do more than make a game appealing or enjoyable: they are engineered, often through data-driven experimentation and user segmentation, to convert sporadic play into routine, hard-to-resist engagement.⁴⁵ They typically combine variable-ratio reward schedules,

41. See Damien A. Fair et al., *The Maturing Architecture of the Brain’s Default Network*, 105 PNAS 4028, 4028–32 (2008) (neural development as temporally bounded).

42. See generally Christopher Burr, Nello Cristianini & James Ladyman, *An Analysis of the Interaction Between Intelligent Software Agents and Human Users*, 28 MINDS & MACHS. 735 (2018) (arguing that feedback used by learning agents undermines autonomy and fostering addictive or compulsive behaviors).

43. Addictive designs form a specific category of dark patterns. Both exploit psychological vulnerabilities, but addictive designs aim at capturing, prolonging, and manipulating attention over time rather than at any single manipulated choice. See Xin Ye, *Dark Patterns and Addictive Designs*, 5 WEIZENBAUM J. DIGIT. SOC’Y, May 12, 2025, at 7–13 (classifying addictive designs as a type of dark pattern); Fabrizio Esposito & Thaís Maciel Cathoud Ferreira, *Addictive Design as an Unfair Commercial Practice: The Case of Hyper-Engaging Dark Patterns*, 15 EUR. J. RISK REGUL. 999, 999–1001 (2024) (analyzing addictive interfaces that exploit behavioral traits to make users spend more time on a service).

44. The dark-patterns literature examines manipulative interface designs that exploit users’ cognitive biases to steer them toward decisions against their own interests. The term originates with the user-experience designer Harry Brignull, who coined it for design tricks that make users do things they did not mean to do. See Arunesh Mathur, Jonathan Mayer & Mihir Kshirsagar, WHAT MAKES A DARK PATTERN... DARK? DESIGN ATTRIBUTES, NORMATIVE CONSIDERATIONS, AND MEASUREMENT METHODS, CHI ‘21: PROCS. 2021 CHI CONF. ON HUM. FACTORS IN COMPUTING SYS. May 7, 2021, at 2, 5, <https://dl.acm.org/doi/epdf/10.1145/3411764.3445610> (on file with the *Fordham Urban Law Journal*); Arvind Narayanan et al., *Dark Patterns: Past, Present, and Future*, 63 COMM’NS ACM 42, 42–43 (2020); Vibhav Singh, Niraj Kumar Vishvakarma & Vinod Kumar, *Unveiling Digital Manipulation and Persuasion in e-Commerce: A Systematic Literature Review of Dark Patterns and Digital Nudging*, 23 J. INTERNET COM. 144, 144–46 (2024).

45. See JOSÉ P. ZAGAL, STAFFAN BJÖRK & CHRIS LEWIS, DARK PATTERNS IN THE DESIGN OF GAMES, PROCS. 8TH INT’L CONF. ON FOUNDS. DIGIT. GAMES 1, 7 (2013), http://fdg2013.org/program/papers/paper06_zagal_etal.pdf [<https://perma.cc/CP99-5M42>] (defining dark game design patterns as intentional choices that manipulate player behavior against their best interests). See generally Jesper Aagaard et al., *A Game of Dark Patterns: Designing Healthy, Highly-Engaging Mobile Games*, in CHI’22: PROCEEDINGS OF THE 2022

artificial scarcity, time-limited events, and personalized prompts with freemium monetization schemes,⁴⁶ so that players are nudged to return frequently, stay longer, and spend more. In retention-management terms, addictive design treats “user stickiness” as the central business objective and uses behavioral data to fine-tune mechanics that keep players, including children, continuously engaged.⁴⁷

How do we distinguish addictive design from legitimate game design features? What matters is whether design systematically overrides users’ capacity to allocate attention according to their own considered judgments about competing priorities. Whether play generates pleasure is beside the point, since extraction mechanisms often ensure that it does.⁴⁸ A game that offers compelling challenges enables users to decide whether continued play serves their interests; a game that engineers escalating login streaks with forfeiture penalties manufactures costs for discontinuation that systematically defeat that deliberative process. The *intentionality* behind design choices is therefore central. Platforms deploying mechanisms specifically engineered to exploit cognitive vulnerabilities in ways that predictably override judgment are creating addictive designs. This *ex ante* focus on what platforms do when they deploy mechanisms *foreseeably* harmful to vulnerable populations, rather than on the actual outcomes for individual users, is particularly useful when establishing duties to protect children, whose developing self-regulatory capacities make them especially vulnerable to designs that defeat deliberative judgment.⁴⁹

CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS (Simone Barbosa et al. eds., 2022) (examining how mobile developers leverage data-driven design practices to maximize engagement); Scott Goodstein, *When the Cat’s Away: Techlash, Loot Boxes, and Regulating “Dark Patterns” in the Video Game Industry’s Monetization Strategies*, 92 U. COLO. L. REV. 285, 285–314 (2021) (analyzing how manipulative monetization strategies exploit behavioral tendencies to drive compulsive play); Fu et al., *supra* note 28, at 52.

46. See generally King & Delfabbro, *supra* note 23.

47. See Hamari et al., *supra* note 25, at 11–12 (identifying social interaction and economic rationale as primary drivers for user engagement and monetization).

48. WILLIAMS, *supra* note 5, at 17–24 (how immediately rewarding designs can draw attention away from other desired goals); see also James Ash, *Attention, Videogames and the Retentional Economies of Affective Amplification*, 29 THEORY, CULTURE & SOC’Y 3, 3–4, 14 (2012) (how game design can modulate affect and capture attention).

49. On children’s developing self-regulatory capacities and heightened vulnerability to manipulative design, see Laurence Steinberg, *Cognitive and Affective Development in Adolescence*, 9 TRENDS COGNITIVE SCIS. 69, 71–73 (2005) (ongoing development of impulse control); B.J. Casey & Kristina Caudle, *The Teenage Brain: Self Control*, 22 CURRENT DIRECTIONS PSYCH. SCI. 82, 83–86 (2013) (neurobiological basis for limited self-regulation during adolescence); Adriana Galván et al., *Earlier Development of the Accumbens Relative to Orbitofrontal Cortex Might Underlie Risk-Taking Behavior in Adolescents*, 26 J. NEUROSCIENCE 6885, 6891 (2006) (imbalance between reward sensitivity and regulatory capacity).

B. Three Mechanisms of Attention Extraction

The account of addictive, attention-extracting gaming design developed here draws on a growing interdisciplinary literature. Psychologists, neuroscientists, and game-studies scholars have mapped how particular structural features, such as variable-ratio rewards,⁵⁰ time-gated progress,⁵¹ social-ranking systems,⁵² and loot-box mechanics,⁵³ sustain compulsive play. Their findings supply the evidentiary backbone for treating these features as “addiction-inducing” design choices that extract children’s developmental attention rather than respond to their preferences. The question is how this extraction operates in practice.

Game designers deploy three functional categories of mechanisms, each targeting a distinct leverage point in the commercial attention chain.⁵⁴ *Engagement-oriented* features structure time and habit, manufacturing temporal commitment through daily rewards, login streaks, and energy systems that make non-play costly. *Performance-oriented* features exploit status drives and achievement motivation, using progression ladders, loot-box mechanics, and competitive rankings that extend sessions and prevent natural stopping points. *Social-interaction-oriented* features mobilize peer

50. See generally, e.g., Luke Clark & Martin Zack, *Engineered Highs: Reward Variability and Frequency as Potential Prerequisites of Behavioural Addiction*, 140 ADDICTIVE BEHAVS, May 2023 (examining how unpredictable, variable-ratio rewards, combined with frequent exposure, may sustain reward-seeking and contribute to compulsive behaviour in gambling and digital activities).

51. See, e.g., Andrew Fishman, *Why Is This Game So Addictive? A Video Game Guide for Parents*, PSYCH. TODAY (Nov. 20, 2018), <https://www.psychologytoday.com/us/blog/video-game-health/201811/why-is-game-so-addictive> (on file with the *Fordham Urban Law Journal*). On temporal structuring mechanisms, see B. J. FOGG, PERSUASIVE TECHNOLOGY: USING COMPUTERS TO CHANGE WHAT WE THINK AND DO 41–75 (2003); NIR EYAL & RYAN HOOVER, HOOKED: HOW TO BUILD HABIT-FORMING PRODUCTS 35–58 (2014).

52. See Shang Hwa Hsu, Ming-Hui Wen & Muh-Cherng Wu, *Exploring User Experiences as Predictors of MMORPG Addiction*, 53 COMPUTS. & EDUC. 990, 993, 996 (2009); Christian Klemm & Wolter Pieters, *Game Mechanics and Technological Mediation: An Ethical Perspective on the Effects of MMORPG’s*, 19 ETHICS & INFO. TECH. 81, 85–86 (2017).

53. See, e.g., David Zendle & Paul Cairns, *Video Game Loot Boxes Are Linked to Problem Gambling: Results of a Large-Scale Survey*, 13 PLOS ONE, Nov. 21, 2018, at 2, <https://doi.org/10.1371/journal.pone.0206767> [<https://perma.cc/AY73-9PAU>]; Aaron Drummond & James D. Sauer, *Video Game Loot Boxes Are Psychologically Akin to Gambling*, 2 NATURE HUM. BEHAV. 530, 530, 532 (2018).

54. This functional categorization draws on retention-management models identifying how platforms strategically combine mechanism types to capture sustained engagement. See Fong-Ling Fu, Rong-Chang Su & Sheng-Chin Yu, *EGameFlow: A Scale to Measure Learners’ Enjoyment of E-Learning Games*, 52 COMPUTS. & EDUC. 101, 105–08 (2009); Hamari et al., *supra* note 25, at 540–41, 543–44.

pressure and a sense of belonging, embedding children in guild obligations and team dependencies that make disengagement a betrayal.⁵⁵ Together, these mechanisms form a comprehensive architecture for monopolizing finite attention during the developmental windows when diverse time allocation is critical to building self-governance capacity.

1. Engagement-Oriented Mechanisms: Structuring Time and Habit

Engagement-oriented mechanisms manufacture temporal structures that dictate when children play, how often they return, and how long they remain engaged.⁵⁶ Unlike features that respond to existing play patterns, these mechanisms create play patterns by making certain times salient, certain intervals mandatory, and certain sessions open-ended.⁵⁷ Daily check-in and task systems in titles such as *World of Warcraft (WoW)*,⁵⁸ *Star Wars: Galaxy of Heroes*,⁵⁹ and *Angry Birds*⁶⁰ tie rewards and progression directly to attendance: missing a day means forfeiting that day's reward, exploiting loss aversion to convert what should be "Do I want to play today?" into "Can I

55. See Fu et al., *supra* note 28, at 55–57. This Article adapts Fu et al.'s empirical framework to categorize addictive designs by how they manipulate user behavior across these temporal, reward-based, and social dimensions.

56. See sources cited *supra* note 51.

57. See generally Amon Rapp, *Time, Engagement and Video Games: How Game Design Elements Shape the Temporalities of Play in Massively Multiplayer Online Role-Playing Games*, 32 INFO. SYS. J. 5 (2022) (showing, through an ethnographic study of World of Warcraft, how game design elements interact with players' routines and social expectations to shape the timing, frequency, and duration of play).

58. See Blizzard Entertainment, *World of Warcraft* (2004), <https://worldofwarcraft.blizzard.com/en-us/> [<https://perma.cc/6XJV-RT96>]. On its daily quest system, see *Daily Quest*, WOWPEDIA, https://wowpedia.fandom.com/wiki/Daily_quest [<https://perma.cc/7Z32-3FCH>] (last visited Aug. 12, 2026) (describing quests that reset daily and tie rewards to attendance); see also *Inspiring Examples of Daily Login Rewards for Your Mobile Game*, BEAMABLE (Oct. 27, 2020), <https://beamable.com/blog/inspiring-examples-of-daily-login-rewards-for-your-mobile-game> [<https://perma.cc/F79G-3EYU>] (discussing *World of Warcraft*, a massively multiplayer online role-playing game that uses daily login mechanics to encourage routine engagement).

59. See Electronic Arts, *Star Wars: Galaxy of Heroes* (2015), <https://www.ea.com/games/starwars/galaxy-of-heroes> [<https://perma.cc/MQ68-T8MT>]; *Daily Login Rewards*, STAR WARS: GALAXY OF HEROES WIKI, https://swgoh.wiki/wiki/Daily_Login_Rewards [<https://perma.cc/GBX7-RNJ2>] (last visited Oct. 15, 2026) (describing daily activity calendars that control player progression).

60. See Rovio Entertainment, *Angry Birds* (2009), <https://www.angrybirds.com/> [<https://perma.cc/2CXU-MKBQ>]. On login-streak rewards in the franchise, see *What Are Daily Rewards?*, ROVIO SUPPORT, <https://roviosupport.helpshift.com/hc/en/4-angry-birds-dream-blast/faq/3061-what-are-daily-rewards/> [<https://perma.cc/5Q3P-GFYL>] (last visited Sep. 4, 2026); BEAMABLE, *supra* note 58 (describing *Angry Birds*' login-streak rewards).

afford to sacrifice twenty-nine days of investment?”⁶¹ A child playing *Fortnite* who purchases a paid Battle Pass⁶² faces compounding commitment mechanisms: the monetary sunk cost creates pressure to “get their money’s worth,” daily challenges that reset every twenty-four hours, and a tier structure requiring near-daily play throughout the ten-week season.⁶³ Missing even a few days makes completion nearly impossible without purchasing additional tier skips.⁶⁴ These mechanisms weaponize “fear of missing out” (FOMO).⁶⁵ Time-gated “energy” systems⁶⁶ in rhythm games such as *Ensemble Stars!! Music* or *Project Sekai*⁶⁷ create artificial scarcity by limiting play sessions unless users pay to continue or wait for energy to

61. See Daniel Kahneman & Amos Tversky, *Choices, Values, and Frames*, 39 AM. PSYCH. 341, 342–47 (1984) (explaining loss aversion and framing effects); see generally Hal R. Arkes & Catherine Blumer, *The Psychology of Sunk Cost*, 35 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 124 (1985) (linking sunk-cost persistence to the desire not to appear wasteful).

62. See *What Is the Battle Pass? Where Can I Learn More?*, EPIC GAMES SUPPORT, <https://www.epicgames.com/help/fortnite-battle-royale-c202300000001636/gameplay-c-202300000001721/what-is-the-battle-pass-where-can-i-learn-more-a2023000000013265> [<https://perma.cc/T6J5-K7JZ>] (last visited Aug. 12, 2026) (describing the Fortnite Battle Pass as an in-game purchase that unlocks successive rewards through XP earned from daily, weekly, and character quests before the pass expires).

63. See generally Epic Games, *Fortnite* (2017), <https://www.fortnite.com/> (on file with the *Fordham Urban Law Journal*); see also Jamie Madigan, *The Psychology of Fortnite’s Battle Pass*, FORBES (July 6, 2019), <https://www.forbes.com/sites/jamiemadigan/2019/07/06/the-psychology-of-fornites-battle-pass/> [<https://perma.cc/TST8-G6L2>].

64. See Madigan, *supra* note 63.

65. FOMO (fear of missing out) drives engagement through anxiety about missed rewards. In game design, companies exploit this through time-limited events and daily login rewards. See *How to Use Daily Login Rewards to Drive Engagement & Retention in Your Mobile Game*, MISTPLAY (Mar. 26, 2026), <https://business.mistplay.com/resources/daily-login-rewards> [<https://perma.cc/J3LC-AG97>].

66. See Adrian Crook, *Energy Systems: Lessons from Top Freemium Games*, ADRIAN CROOK & ASSOCS. (June 15, 2026), <https://adriancrook.com/energy-systems-lessons-top-freemium-games/> [<https://perma.cc/C88J-K4R6>] (describing energy systems in freemium games as limiters that restrict gameplay through renewable resources or timers, encouraging players either to return periodically or to pay to continue playing).

67. See Happy Elements, *Ensemble Stars!! Music* (2020), <https://ensemblestars.com/> [<https://perma.cc/RW3B-7DE3>]; SEGA, *Project Sekai: Colorful Stage! feat. Hatsune Miku* (2020), <https://www.colorfulstage.com/> [<https://perma.cc/JL4Y-BPWP>]; Emily Lau, *Ensemble Stars!! Music Game Tips Part 1*, HANASAKUSHOP (June 3, 2020), <https://hanasakushop.com/blogs/hanasaku-blog/ensemble-stars-music-game-tips-part-one> [<https://perma.cc/XH4B-6VV7>] (explaining how this rhythm game uses “BP” as an energy system to scale item drop rates during rhythm stages and limited-time events); *Project Sekai Stamina Efficiency*, JACEN’S BLOG (Jan. 31, 2023), <https://jacen.moe/blog/20230131-project-sekai-stamina-efficiency/> [<https://perma.cc/ND36-WAL5>] (analyzing “Bonus Energy” in Project Sekai, a gacha rhythm game, where players consume renewable stamina to multiply event points, reward drops, and leaderboard progression).

regenerate, exploiting the Zeigarnik effect—the cognitive tension created by incomplete tasks to sustain attention during non-play hours.⁶⁸ Mobile games like *Candy Crush Saga* terminate sessions at moments of failure rather than success, ensuring users disengage while experiencing frustration and incomplete goal satisfaction, maximizing psychological pull toward re-engagement.⁶⁹

Today, these mechanics repeatedly pair time-limited opportunities with small but salient rewards, activating reward pathways and cultivating a cycle of anticipation and return that is difficult for minors to resist.⁷⁰ When platforms deliberately engineer temporal structures that dictate children's play schedules and make disengagement costly, the addictive, attention-extracting design itself becomes a potential source of liability rather than a neutral feature of entertainment. Once characterized in this way, engagement mechanics can ground specific duties.⁷¹ They also create conditions that raise a more fundamental question: where should protective duties lie? Part IV takes up that question through a comparative analysis of how different legal systems allocate responsibility across state, platform, and family actors.

2. Performance-Oriented Mechanisms: Leveraging Status and Reward

If engagement designs capture a user's time, performance-oriented designs target players' drives for achievement, mastery, and status, then

68. The cognitive tension created by incomplete tasks is known as the Zeigarnik effect. See Bluma Zeigarnik, *On Finished and Unfinished Tasks*, in A SOURCE BOOK OF GESTALT PSYCHOLOGY 300, 306, 313 (Willis D. Ellis ed. & trans., 1938). On energy mechanics in *Ensemble Stars!! Music* and *Project Sekai*, see Lau, *supra* note 67 (explaining the game's "BP" energy system, which scales item drop rates during rhythm stages and limited-time events); JACEN'S BLOG, *supra* note 67 (analyzing the game's renewable stamina, which players consume to multiply event points and reward drops).

69. See King, *Candy Crush Saga* (2012), <https://candycrush.com/> [<https://perma.cc/HL3R-ULAD>]; SCHÜLL, *supra* note 14, at 68–75; see also Rietveld, *supra* note 28, at 172 (describing Candy Crush Saga's limited lives and menu of paid add-on features that let players accelerate progress, access extra content, or boost their skills); Sree Harsha & Sree Hari, *How Candy Crush Mastered Game Development and Monetization*, JUEGOSTUDIO (Mar. 13, 2025), <https://www.juegostudio.com/blog/candy-crush-success-story> [<https://perma.cc/GB3H-9VKP>] (describing *Candy Crush Saga* as a match-three puzzle mobile game that uses limited "lives" and failure-based session termination to restrict continuous play, creating artificial scarcity and driving user retention).

70. See Davide Pirrone, Regina J.J. M. van den Eijnden & Margot Peeters, *Why We Can't Stop: The Impact of Rewarding Elements in Videogames on Adolescents' Problematic Gaming Behavior*, 27 MEDIA PSYCH. 379, 380, 383, 391 (2024).

71. See *infra* Parts III–V (developing the normative basis for platform design obligations and specifying the duties that follow).

nudge those motives toward spending.⁷² Instead of “You must log in TODAY or lose your streak,” performance demands “There’s always a higher rank to reach.” Performance-oriented systems build hierarchies of progression, skill-based challenges, and cumulative “grind” milestones. These progression markers function as recurring prompts that keep players pursuing the next goal.⁷³ In *Team Fortress 2*, milestone systems unlock unique functional weapons after set achievement thresholds⁷⁴ while in *Arknights* players display exclusive badges as proof of completing high-difficulty levels or limited-time events.⁷⁵

In addition, these systems no longer just track in-game skill; they also reward “purchasing performance” by sorting players into “whale” and “Free-to-Play” (F2P) users.⁷⁶ Rare items, VIP tiers, and purchase-contingent titles are engineered as social signals that satisfy the desire for comparison and status and depend increasingly on paid boosts.⁷⁷ High-profile titles such as *Genshin Impact* push this logic further by embedding Gacha (loot-box) mechanics⁷⁸ into the broader achievement structure, gating desirable

72. See generally Yunyan Huang & Joston Gary, *Monetizing Achievement: Flow Experience, Game Genre, and In-Game Consumption in the Marketing Communication of Virtual Goods*, 11 FRONTIERS COMM’N, Aug. 27, 2026, <https://doi.org/10.3389/fcomm.2026.1905570> (on file with the *Fordham Urban Law Journal*) (finding that achievement motivation was positively associated with self-reported in-game expenditure, with a stronger association in competitive game contexts).

73. See Joshua Plotnek, *7 Reward Systems in Mobile Games That Keep Players Hooked*, KEEWANO (Mar. 5, 2025), <https://keewano.com/blog/reward-systems-mobile-games/> [<https://perma.cc/Z6V4-Z98G>].

74. See generally Valve, *Team Fortress 2* (2007), <https://www.teamfortress.com/> [<https://perma.cc/4PDU-99UK>]. On *Team Fortress 2*’s achievement mechanics, see *Achievements*, OFFICIAL TEAM FORTRESS WIKI (July 14, 2026), <https://wiki.teamfortress.com/wiki/Achievements> [<https://perma.cc/VP5R-ZHS7>] (explaining that a player who collects enough achievements in a class set unlocks a “Milestone” achievement rewarding an untradable achievement weapon).

75. See *Path to Glory*, ARKNIGHTS TERRA WIKI (Aug. 18, 2024), https://arknights.wiki.gg/wiki/Path_to_Glory [<https://perma.cc/RA94-MQRU>] (explaining that each “Path to Glory” achievement awards a medal displayable on the player’s Friend and Support Unit menus, in categories that include the high-difficulty “SSS mode” and limited-time events).

76. A “whale” is a player who spends significantly more than the average user, typically providing a substantial percentage of a game’s revenue. See M. Dreier et al., *Free-to-Play: About Addicted Whales, at Risk Dolphins and Healthy Minnows. Monetization Design and Internet Gaming Disorder*, 64 ADDICTIVE BEHAVS. 328, 328–31 (2017).

77. See Luc Chaoui, *Understanding Game Design: The Psychology of Addiction*, MEDIUM (July 18, 2024), https://medium.com/@luc_chaoui/understanding-game-design-the-psychology-of-addiction-41128565305f (on file with the *Fordham Urban Law Journal*).

78. As a global phenomenon and one of the most prominent representatives of the “Gacha” genre, *Genshin Impact* is a free-to-play open-world action role-playing game that

characters and time-limited weapons behind probabilistic draws that must often be repeated many times with real money.⁷⁹ These variable-ratio reward schedules operate through the same dopamine-based neurological pathways as slot machines, with near-miss outcomes engineered to sustain engagement despite repeated failure.⁸⁰

Performance mechanisms extract attention by manufacturing an infinite competitive treadmill. Games perpetually expand their content by adding new levels, challenges, and collectibles to ensure that “catching up” or “finishing” remains structurally impossible. This architectural logic inverts traditional game design: whereas classic games featured fixed content players could fully complete, contemporary games remove the natural moment at which players might evaluate whether continued investment is desirable and stop.

3. Social-Interaction-Oriented Mechanisms: Mobilizing Peer Pressure and Belonging

Unlike engagement features (which create temporal commitment) or performance features (which create status competition), social-interaction-oriented features operate through the player’s relationships with others. Interpersonal obligations make stopping psychologically costly even when children recognize harms. The architecture transforms what might be voluntary play into felt duty. Players describe guild participation as creating social obligations and making gameplay feel work-like. In particular, players have described guilds as resembling work units, regular raiding as “feeling like work,” and other guild members as “counting on you to do your job and

monetizes through randomized digital prize draws for virtual characters and weapons. Gacha (or loot boxes) are randomized reward systems purchased with real-world currency. Low probabilities for rare assets often compel players to buy an indeterminate number of boxes to achieve goals. These mechanics leverage sometimes-opaque rewards to drive in-game purchases. See Orlando Woods, *The Affective Embeddings of Gacha Games: Aesthetic Assemblages and the Mediated Expression of the Self*, 26 NEW MEDIA & SOC’Y 823, 829–36 (2024) (using *Genshin Impact* to illustrate how gacha mechanics monetize players’ affective attachments to characters, skins, and collections); see also “Chronicled Wish” Rules & FAQ, GENSHIN IMPACT (Mar. 1, 2024), <https://genshin.hoyoverse.com/en/news/detail/122695> [<https://perma.cc/HBQ4-9635>] (explaining the gacha mechanics in *Genshin Impact*, where players purchase randomized prize draws (“wishes”), backed by a ninety-draw hard guarantee on the character, standard and chronicled banners).

79. See miHoYo, *Genshin Impact* (2020), <https://genshin.hoyoverse.com/> [<https://perma.cc/BD8A-ECZG>] (free-to-play open-world action role-playing game monetized through randomized draws for characters and weapons).

80. See Chanel J. Larche et al., *Rare Loot Box Rewards Trigger Larger Arousal and Reward Responses, and Greater Urge to Open More Loot Boxes*, 37 J. GAMBLING STUD. 141, 158–61 (2021).

do it well.”⁸¹ Massively multiplayer online role-playing games (MMORPGs) and other team-based online titles now occupy a large share of the global games market,⁸² and their appeal rests heavily on built-in social interaction systems. Social-interaction-oriented systems foreground players’ positions within groups, so that collective honor, role-based identity, and responsibility toward others become additional forces that pull them back into the game and push them to invest ever more time and effort.⁸³ These systems strengthen players’ interpersonal ties in the game world through guilds, friend lists, chat channels, and coordinated team play, turning solitary sessions into participation in a standing virtual community.⁸⁴

Empirical work indicates that sustained attention extraction intensifies when these social systems bind players into patterns of identity performance, group belonging, and fixed obligations,⁸⁵ as in scheduled raids, daily guild tasks, or time-limited ranked seasons. In *World of Warcraft (WoW)*, guild structures integrate collective goals with competitive pressures to drive character growth, item optimization, and ranking advancement,⁸⁶ and for many players, the guild becomes a primary source of social support and emotion-focused coping.⁸⁷ *League of Legends (LoL)* and similar Multiplayer Online Battle Arena (MOBA) games deploy friends lists, team

81. See BONNIE A. NARDI, MY LIFE AS A NIGHT ELF PRIEST: AN ANTHROPOLOGICAL ACCOUNT OF WORLD OF WARCRAFT 99–100 (Ellen Seiter & Mimi Ito eds., 2010).

82. See *MMORPG Games Market Size & Share Analysis - Growth Trends & Forecasts (2023–2028)*, YAHOO! FINANCE (Aug. 10, 2023), <https://finance.yahoo.com/news/mmorpg-games-market-size-share-161600203.html> [<https://perma.cc/CNN3-96SA>].

83. Hsu, Wen & Wu, *supra* note 52, at 996.

84. Fu et al., *supra* note 28, at 52–56.

85. See Jeffrey G. Snodgrass et al., *Magical Flight and Monstrous Stress: Technologies of Absorption and Mental Wellness in Azeroth*, 35 CULTURE, MED. & PSYCH. 26, 26–35, 53–54 (2011) (examining the role of character identification in “dissociative” gaming and addiction).

86. For basic information on *WoW*, see *supra* note 58 and accompanying text. *WoW* is a MMORPG set in a persistent virtual world where thousands of players interact simultaneously, forming structured communities to pursue shared goals. See generally Dmitri Williams et al., *From Tree House to Barracks: The Social Life of Guilds in World of Warcraft*, 1 GAMES & CULTURE 338 (2006) (analyzing how *WoW*’s guild structures unite players around collective goals while game mechanics moderate competitive dynamics, team coordination, and character advancement).

87. See Huon Longman, Erin O’Connor & Patricia Obst, *The Effect of Social Support Derived from World of Warcraft on Negative Psychological Symptoms*, 12 CYBERPSYCH., BEHAV. & SOC. NETWORKING 563, 563–66 (2009) (finding that *World of Warcraft* players derive meaningful in-game social support, which correlates with reduced negative psychological symptoms); Regan L. Mandryk et al., *How Passion for Playing World of Warcraft Predicts In-Game Social Capital, Loneliness, and Wellbeing*, 11 FRONTIERS PSYCHIATRY 2165, 2165 (2020) (demonstrating that *World of Warcraft* engagement helps players cope with daily stressors and regulate emotion, with harmonious play fostering bonding social capital and emotional well-being).

invitations, and persistent ranking ladders so that players are constantly compared with peers and invited into just one more match.⁸⁸ Across these games, social-interaction-oriented features tap core psychological needs, such as companionship, belonging, recognition, and competitiveness, and convert them into powerful levers for retention.⁸⁹

Engagement mechanisms manufacture temporal commitment, making specific times and intervals mandatory; performance mechanisms eliminate completion points, extending sessions indefinitely; social mechanisms create relational obligations that make disengagement a betrayal. Together, they form an architecture that systematically defeats deliberative capacity: children cannot simply “choose” to stop when temporal costs have accumulated. The mechanisms compound, creating extraction that operates continuously across the attention chain.

For children, this extraction occurs during developmental windows when diverse time allocation is non-fungible. Hours allocated to maintaining login streaks, pursuing infinite progression, or fulfilling team obligations cannot later be reallocated to academic focus, unstructured exploration, face-to-face relationships, or the progressive autonomy exercises through which deliberative capacity itself develops. The extraction is irreversible, and its effects are particularly acute for children with pre-existing vulnerabilities.

Part I has established how gaming platforms extract attention through mechanisms that systematically override children’s deliberative judgment. Part II addresses the moment extraction crosses the threshold to *regulatory salience*, justifying the duties that constrain platform conduct later discussed in Part III.

88. *LoL* structures play as discrete, session-based matches, in which automated matchmaking pairs players according to skill ratings derived from their recent performance history. For more information on *LoL*, see Riot Games, *League of Legends* (2009), <https://www.leagueoflegends.com/> [<https://perma.cc/VCB7-JU96>]; see also April Tyack, Peta Wyeth & Daniel Johnson, THE APPEAL OF MOBA GAMES: WHAT MAKES PEOPLE START, STAY, AND STOP, PROCS. 2016 ANN. SYMP. ON COMPUT. HUM. INTERACTION IN PLAY 313, 316 (explaining how social mechanics, such as playing with friends and team invitations, drive initial engagement and sustained play in MOBA games); see generally Tiansheng Xia et al., *Players’ Continuous Willingness to Play in MOBA Game Ranking Mode: Through the Lens of Self-Determination Theory and Social Comparison Theory*, 11 HUMANS. & SOC. SCI. COMM’NS 1398 (2024) (surveying 396 MOBA players and finding that social comparison in the competitive ranking mode enhances players’ continuous willingness to play, both directly and through identification with their avatars).

89. See generally Chaoui, *supra* note 77 (explaining how guilds, leaderboards, and cooperative missions foster belonging and competition, making it harder for players to disengage from game); Jinyu Guan & Tiancheng Chen, *Exploring Addiction Mechanism of Different Game Types*, 8 J. EDUC. HUMANS. & SOC. SCI. 1490, 1493–94 (2023).

II. ATTENTION ADDICTION AS REGULATORY HARM FOR CHILDREN

Gaming platforms present the hardest case for attention regulation: similar to social media scrolling, gaming environments are engineered to monopolize children's attention, a problem that cannot be addressed by *ad hoc* remedies alone.⁹⁰ Part I demonstrated how gaming platforms systematically extract children's developmental attention through three categories of mechanisms: engagement features that manufacture temporal commitment, performance features that eliminate completion points, and social features that create relational obligations. These mechanisms operate as a comprehensive system that defeats deliberative capacity.

But not all commercial engineering of attention capture justifies regulatory intervention. The question this Part addresses is when systematic harm from engineered mechanisms crosses the threshold that justifies duties constraining those who engineer such systems, and why children occupy a unique status requiring categorical protection.

To this effect, this Part unfolds in two major subsections, each addressing a distinct theoretical foundation for regulating gaming platforms' systematic extraction of children's developmental attention. Part II.A. connects digitally engineered addiction in gaming with centuries-old debates over vices such as alcohol,⁹¹ gambling,⁹² and pornography.⁹³ The histories of regulating these traditional vices reveal a consistent evolution: intervention

90. See *supra* Part I (establishing the engagement, performance, and social-interaction mechanisms through which gaming platforms are engineered to capture and hold children's attention).

91. See generally National Minimum Drinking Age Act of 1984, 23 U.S.C. § 158 (providing for the withholding of a portion of federal highway funds from states that permit persons under twenty-one to purchase or publicly possess alcoholic beverages); Alexander C. Wagenaar & Traci L. Toomey, *Effects of Minimum Drinking Age Laws: Review and Analyses of the Literature from 1960 to 2000*, J. STUD. ALCOHOL 206 (Supp. No. 14, 2002) (finding higher age limits reduce youth alcohol harms); Licensing Act 2003, c. 17, §§ 136–159 (UK) (prohibiting the sale of alcohol to persons under eighteen).

92. See generally Gambling Act 2005, c. 19, § 46 (UK) (prohibiting gambling by persons under eighteen); Roger Collier, *Do Slot Machines Play Mind Games with Gamblers?*, 179 CANADIAN MED. ASS'N J. 23, 23–24 (2008) (analogizing deceptive features of slot machines to “loaded dice” and noting their illegality in Australia and New Zealand).

93. See *Ginsberg v. New York*, 390 U.S. 629, 637–43, 645 n.4 (1968) (establishing “variable obscenity” doctrine permitting broader content restrictions for minors than for adults and holding that the state's interest in youth well-being justifies such regulation); *Miller v. California*, 413 U.S. 15, 24–25 (1973) (establishing a three-part test for adult obscenity, but recognizing that states may adopt more specific guidelines for material deemed harmful to minors); 47 U.S.C. § 230(e)(1) (stating that nothing in Section 230 shall be construed to impair the enforcement of federal criminal statutes, including those related to obscenity and sexual exploitation of children); 47 U.S.C. § 231, *invalidated by*, *ACLU v. Mukasey*, 534 F.3d 181 (3d Cir. 2008), *cert. denied*, 555 U.S. 1137 (2009); see also *Ashcroft v. ACLU*, 542 U.S. 656, 673 (2004) (affirming the preliminary injunction against enforcement).

shifted from prohibiting content or products toward regulating the design mechanisms through which industries engineer manipulation. The subsections that follow trace this evolution in each domain, from total bans that proved excessive and unenforceable to design-based regulation that succeeded by targeting the mechanisms of harm.

Part II.B. then establishes that children occupy a unique status requiring heightened protection beyond what the vice analogy alone provides: gaming's attention extraction during developmental windows forecloses the developmental process through which children acquire the capacity for self-governance, violating what Feinberg terms the "right to an open future."⁹⁴ These two subsections operate in tandem to establish gaming addiction as a paradigmatic regulatory harm. Together, they provide the empirical and normative foundations to justify the regulatory frameworks and platform duties examined in Part III.

A. Addiction as Regulatory Harm

Not all commercial manipulation justifies regulatory intervention. Gaming and social media addiction, in a similar vein, might initially present as a matter of personal or familial concern. The key question is when such manipulation crosses the threshold from ordinary commerce to regulatory concern. The answer lies in three conditions that emerge consistently across the regulatory evolution of alcohol, gambling, and pornography: when harm is *systematic* rather than idiosyncratic (affecting predictable populations at predictable rates, not merely isolated individuals with unique vulnerabilities); when mechanisms are *identifiable and modifiable* (industries intentionally engineer features that produce the harm, and those features can be isolated and regulated without eliminating the product); and when *vulnerable populations* face injuries that ex post remedies cannot adequately address (tort liability arrives too late to undo developmental damage, contract rescission cannot reverse formed dependencies, parental monitoring cannot penetrate sophisticated design systems), then design-based manipulation acquires what this Article terms *regulatory salience*. Once attained, regulatory salience moves the problem from private choice and parental oversight to public regulation, making it a legitimate target for ex ante duties imposed on those who engineer manipulative environments.

The state has crossed this regulatory threshold before. Vices have been subject to extensive regulatory control throughout modern legal history for

94. Feinberg, *supra* note 17, at 146.

adults,⁹⁵ and even more stringently for minors.⁹⁶ This analogy serves to establish horizontal consistency, developing the conditions under which digital addiction constitutes a *regulatory harm* to children. It demonstrates that gaming platforms' extraction of children's attention meets all three conditions.

B. Traditional Vices as Precedent

The regulatory history of alcohol, gambling, and pornography reveals diverse trajectories, but a common inflection point. Though these domains differ in regulatory focus,⁹⁷ each began with efforts at outright prohibition.⁹⁸ Regulatory success came only when jurisdictions shifted from prohibiting products to regulating the design mechanisms through which industries engineered compulsive consumption. In other words, the regulations targeted not the substance, content, or behavior itself, but the architectural relationship between design and user.

In essence, alcohol, gambling, and pornography were able to be regulated because three conditions converged. First, the harm became *systematic* rather than idiosyncratic, affecting predictable populations at predictable rates. Second, the harm became traceable to identifiable and *intentional design* mechanisms, rather than individual weakness; manufacturers

95. See, e.g., Gambling Act 2005, c. 19 (UK) (noting a primary objective to protect children and vulnerable persons from gambling-related harm).

96. See 23 U.S.C. § 158 (conditioning states' receipt of federal highway funds on their adoption of a minimum drinking age of twenty-one); Gambling Act 2005, c. 19, § 46 (UK); *Ginsberg*, 390 U.S. at 637–45.

97. Alcohol is regulated primarily as a *substance*, pornography as *content*, and gambling as a *behavior*, though some regimes combine these approaches. See *infra* note 98.

98. See U.S. CONST. amend. XVIII, *repealed by* U.S. CONST. amend. XXI (prohibiting “the manufacture, sale, or transportation of intoxicating liquors”); National Prohibition (Volstead) Act, ch. 85, 41 Stat. 305 (1919), *repealed by*, U.S. CONST. amend. XXI; Comstock Act of 1873, ch. 258, 17 Stat. 598 (codified as amended in scattered sections of 18, 19, and 39 U.S.C.) (criminalizing the mailing of “obscene, lewd, or lascivious” materials); *Roth v. United States*, 354 U.S. 476, 485 (1957) (holding obscenity outside the protection of the First Amendment); *Stone v. Mississippi*, 101 U.S. 814, 818–21 (1879) (upholding a state's police power to suppress lotteries as a form of gambling). See RICHARD F. HAMM, *SHAPING THE EIGHTEENTH AMENDMENT: TEMPERANCE REFORM, LEGAL CULTURE, AND THE POLITY, 1880–1920*, at 1–55 (1995) (explaining the legal and political movements that led to the radical prohibition of the liquor industry); Jan McMillen, *Understanding Gambling: History, Concepts and Theories*, in *GAMBLING CULTURES: STUDIES IN HISTORY AND INTERPRETATION* 6 (Jan McMillen ed., 1996) (discussing how gambling was historically perceived as deviant behavior, laying the groundwork for prevailing policies of moral constraint and outright prohibition); Thomas C. Arthur, *The Problems with Pornography Regulation: Lessons from History*, 68 EMORY L.J. 867, 874–88 (2019) (analyzing the history of anti-obscenity movements and legal prohibitions aimed at the total suppression of sexually explicit materials).

engineered addictiveness through manipulated delivery and architectural features calibrated to maximize compulsion. Third, the harm concentrated on populations whose limited capacity for self-regulation, such as children and other individuals with addiction vulnerabilities, rendered *ex post* remedies *inadequate*. Tort liability arrived too late to undo developmental damage, contract rescission could not reverse formed dependencies, parental monitoring could not penetrate sophisticated commercial design systems, and criminal penalties addressed symptoms rather than causes.

The regulatory histories that follow reveal how states learned to target the design mechanisms that produce compulsion rather than the individual choices that manifest it. Part II.B.1 will discuss how alcohol established the paradigm: systematic harm, identifiable design mechanisms, and a population whose developmental characteristics render *ex post* remedies inadequate, taken together, justify state intervention. And when those conditions converge, effective regulation targets design rather than prohibiting the product itself. Part II.B.2 will discuss how gambling confirmed and refined this analysis by demonstrating that the harm triggering regulatory intervention need not be a consequence of what is consumed; it may be the temporal extraction itself, or in other words, the engineered suspension of deliberative self-governance produced by the activity as a design output, not merely an incidental effect. Finally, Part II.B.3. will survey how pornography extended the framework to the digital platform context, illustrating, at cost, the consequences of regulatory frameworks that attend to content while platform design goes unexamined, and the direction in which regulation moves when it finally addresses the mechanism layer.

1. Alcohol: Prohibition Failure and the Regulatory Turn

From moral crusade to design-based protection, alcohol regulation presents the most volatile trajectory. The temperance movement⁹⁹ and the national prohibition it produced (1920–1933)¹⁰⁰ treated alcohol itself as a moral evil to be eliminated.¹⁰¹ That diagnosis mistook the nature of the problem. Excessive drinking in the pre-Prohibition saloon was not an individual moral weakness. It was through their business model that saloons engineered drinking behavior. Under the tied-house system, brewers owned or financed most urban saloons and bound their keepers to exclusive sales contracts, so a saloonkeeper's livelihood depended on the volume his

99. See Paul Aaron & David Musto, *Temperance and Prohibition in America: A Historical Overview*, in *ALCOHOL AND PUBLIC POLICY: BEYOND THE SHADOW OF PROHIBITION* 127, 149 (Mark H. Moore & Dean R. Gerstein eds., 1981).

100. See U.S. CONST. amend. XVIII, *repealed by*, U.S. CONST. amend. XXI.

101. See Selden D. Bacon, *The Classic Temperance Movement of the U.S.A.: Impact Today on Attitudes, Action and Research*, 62 *BRIT. J. ADDICTION* 5, 7–10 (1967).

customers drank.¹⁰² The saloon environment was engineered accordingly, with free salted lunches that provoked thirst, customs that obliged each man to buy a round, and credit that kept patrons drinking past their means.¹⁰³ Prohibition banned the substance and left this commercial architecture untouched. It failed because a total ban could not separate systematic harm from ordinary use, because it overrode adult autonomy in the service of a contested moral vision, and because it bred organized crime and unenforceable restrictions worse than the harms it targeted.¹⁰⁴

The post-Prohibition regulatory framework learned this lesson. Rather than banning alcohol outright, regulations targeted intentional design mechanisms that worsened harms associated with drinking.¹⁰⁵ John D. Rockefeller, Jr. commissioned legal scholars Raymond Fosdick and Albert Scott to design a regulatory system that avoided Prohibition's failures.¹⁰⁶ Their blueprint, *Toward Liquor Control* (1933), identified the pre-Prohibition problem: not alcohol itself, but the vertical integration that gave breweries ownership of saloons and incentives to maximize consumption regardless of patron harm.¹⁰⁷ The structural solution was the three-tier

102. See MARK E. LENDER & JAMES K. MARTIN, *DRINKING IN AMERICA: A HISTORY* 104–06 (2d ed. 1987) (describing how large brewers owned most urban saloons as outlets for their beer and encouraged heavy drinking through treating customs, salted “free lunches,” and free drinks for boys calculated to create habitual drinkers).

103. See generally Sébastien Tutenges & Frederik Bøhling, *Designing Drunkenness: How Pubs, Bars and Nightclubs Increase Alcohol Sales*, 70 INT’L J. DRUG POL’Y 15 (2019) (documenting how contemporary drinking venues use architectural and commercial techniques to increase consumption).

104. See LISA MCGIRR, *THE WAR ON ALCOHOL: PROHIBITION AND THE RISE OF THE AMERICAN STATE* 231–55 (2016).

105. See, e.g., THOMAS F. BABOR ET AL., *ALCOHOL: NO ORDINARY COMMODITY: RESEARCH AND PUBLIC POLICY* 156–79 (3d ed. 2022) (reviewing evidence that the modern alcohol marketing mix, including youth-targeted branding, lifestyle sponsorships, and algorithmically targeted digital channels, shapes drinking norms and consumption, and evaluating restrictions on such marketing); Jonathan Howland et al., *Caffeinated Alcoholic Beverages: An Emerging Public Health Problem*, 40 AM. J. PREVENTATIVE MED. 268, 269–70 (2011) (explaining that combining caffeine with alcohol blunts the sensation of intoxication and prolongs drinking, and recounting the 2008 state attorney-general settlements and the Federal Drug Administration’s 2009 safety challenge targeting these products).

106. See generally RAYMOND B. FOSDICK & ALBERT L. SCOTT, *TOWARD LIQUOR CONTROL*, at vii–xii, 5–9, 20–27 (1st ed. 1933) (describing the study commissioned by John D. Rockefeller Jr. in response to the failures of Prohibition proposing the post-repeal framework that separated manufacturers from retail sale).

107. In the liquor trade, vertical integration between manufacturers and retailers was known as the “tied house.” See Charles Merz, *The Rockefeller Report on Liquor Control*, N.Y. TIMES, Nov. 12, 1933, at T5; see also Harry G. Levine & Craig Reinerman, *From Prohibition to Regulation: Lessons from Alcohol Policy for Drug Policy*, 69 MILBANK Q. 461, 478–79 (1991) (explaining how post-prohibition regulation dismantled the traditional all-purpose

system that mandated separation among producers, distributors, and retailers.¹⁰⁸ This regulation severed the direct profit link between manufacturers and point-of-sale consumption, eliminating the business-model incentive to engineer compulsive drinking environments through architectural design.¹⁰⁹ States adopted Fosdick and Scott's framework nearly universally.¹¹⁰ Liquor regulation had crossed from prohibiting products to regulating design.

The youth-protection turn came four decades later. Adolescent neurobiology made young drinkers disproportionately vulnerable to alcohol's effects¹¹¹ and to marketing that exploited developmental characteristics.¹¹² Advertising saturated the media young people consumed with images of sociability, status, and adventure, themes calibrated to a reward system that responds powerfully to social approval and novelty while self-regulation is still maturing. The favorable expectancies this built translated into earlier initiation and heavier drinking.¹¹³ In the early 1970s,

saloon by separating off-premises retail sales from public drinking places, shifting consumption to home settings moderated by family norms).

108. See Tom Wark, *The Blueprint for a Modern Alcohol Regulatory System*, TOM WARK'S FERMENTATION (May 24, 2022), <https://tomwark.substack.com/p/blueprint-alcohol-regulatory-system> [https://perma.cc/Q5BY-43ND] (describing the tied-house problem and the three-tier separation the post-repeal system was built to prevent, while arguing that the framework now needs modernization).

109. See John D. Rockefeller, Jr., *Foreword to FOSDICK & SCOTT*, *supra* note 106, at x (“[O]nly as the profit motive is eliminated is there hope of controlling the liquor traffic in the interest of a decent society. To approach the problem from any other angle is only to tinker with it and to insure failure.”); see also Wark, *supra* note 108. See generally Merz, *supra* note 107 (explaining that Rockefeller commissioned Fosdick and Scott to examine problems Prohibition had failed to solve and propose a workable system of state liquor control).

110. See Levine & Reinerman, *supra* note 107, at 475–77 (observing that almost every state legislature adopted the core principles of the Rockefeller report, shifting state policy from product prohibition to structural and design controls); see, e.g., 27 U.S.C. § 205(b) (prohibiting tied houses); Alcoholic Beverage Control Act, CAL. BUS. & PROF. CODE §§ 25500–25512, 25600, 25631–25633, 25658 (West 2026); N.Y. ALCO. BEV. CONT. LAW §§ 2, 101, 101-b, 105–106 (McKinney 2026); TEX. ALCO. BEV. CODE ANN. § 1.01 (West 2025) (comprehensive licensing and three-tier regulation).

111. See generally Linda Patia Spear, *The Adolescent Brain and Age-Related Behavioral Manifestations*, 24 NEUROSCI. & BIOBEHAV. REVS. 417 (2000) (explaining that immature prefrontal control and reduced sensitivity to alcohol's sedative effects leave adolescents prone to heavier drinking before impairment registers).

112. See Steinberg, *supra* note 9, at 78–85; Tutenges & Böhling, *supra* note 103, at 15.

113. See generally David Jernigan et al., *Alcohol Marketing and Youth Alcohol Consumption: A Systematic Review of Longitudinal Studies Published Since 2008*, 112 ADDICTION 7 (2017) (finding across longitudinal studies that exposure to alcohol marketing is associated with earlier initiation of drinking and with binge drinking among young people); Franco Manuel Sancho-Esper, Maria-Jose Miquel-Romero & Joaquín Aldás-Manzano, *Factors Influencing Youth Alcohol Consumption Intention: An Approach from Consumer Socialization Theory*, 1 J. SOC. MKTG. 192 (2011) (finding that advertising shapes young

twenty-nine states lowered their minimum drinking age to eighteen, following the Twenty-Sixth Amendment's reduction of the voting age.¹¹⁴ Alcohol-related traffic fatalities among newly legal drinkers immediately spiked. Massachusetts saw a forty percent increase in fatal accident involvement among the eighteen-to-twenty age group; Michigan documented similar jumps.¹¹⁵ After empirical evidence revealed this systematic harm concentrated among adolescents, states began raising the drinking age again. By 1984, when Congress passed the National Minimum Drinking Age Act conditioning highway funds on states adopting age twenty-one, the evidence base was overwhelming: the policy saved an estimated 900 lives annually in traffic fatalities alone.¹¹⁶ The youth-protection turn, unlike the three-tier reform that preceded it, worked through access rather than design. It drew an age line after the fatalities had been counted, and left the environments in which young people drank untouched.

The drinking-and-driving history also shows why the law settled on age as its regulatory line. Adolescent risk-taking is social at its core, since the developing reward system responds most strongly to peer approval, and a car full of teenagers amplifies exactly the impulses that a still-maturing prefrontal cortex is least equipped to check.¹¹⁷ Alcohol enters that mix twice over, because adolescents feel its sedating warning signals less acutely than adults do, while their developing brains remain more vulnerable to lasting cognitive harm from heavy exposure.¹¹⁸ A rule that kept alcohol away from drivers under twenty-one asked nothing of adolescent judgment at the

people's drinking expectancies and plays a more important role in underage intentions to consume alcohol than in those of legal drinking age, and urging strict regulation of alcohol advertising).

114. See Traci L. Toomey et al., *The Minimum Legal Drinking Age: History, Effectiveness, and Ongoing Debate*, 20 ALCOHOL HEALTH & RSCH. WORLD 213, 213 (1996).

115. See Matthew Gever & Melissa Savage, *Lowering the Minimum Legal Drinking Age*, NAT'L CONF. OF STATE LEGISLATURES: LEGISBRIEF (Jan. 2009), <https://radarcart.boisestate.edu/library/files/2017/07/LoweringtheMinimumLegalDrinkingAge.pdf> [<https://perma.cc/B4E7-A3LF>].

116. See 23 U.S.C. § 158; NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., COMMUNITY HOW TO GUIDE ON UNDERAGE DRINKING PREVENTION: COALITION BUILDING, app. 7 (2001), <https://files.eric.ed.gov/fulltext/ED474116.pdf> [<https://perma.cc/F8EE-L4QD>] (estimating that minimum drinking age laws saved 18,220 lives between 1975 and 1998).

117. See generally Steinberg, *supra* note 9 (explaining how peer presence can heighten adolescents' reward-seeking and risky driving while the brain systems supporting self-regulation are still maturing); see also *Roper v. Simmons*, 543 U.S. 551, 569–70 (2005) (recognizing juveniles' developmental immaturity and vulnerability to external pressures).

118. See Spear, *supra* note 111, at 426–28; see also NAT'L RSCH. COUNCIL & INST. OF MED., REDUCING UNDERAGE DRINKING: A COLLECTIVE RESPONSIBILITY 64–65 (Richard J. Bonnie & Mary Ellen O'Connell eds., 2004) (reporting that alcohol exposure during adolescence may disrupt brain development, with adolescent drinkers showing smaller hippocampal volumes and impaired memory and executive functioning).

moment judgment was least available, which is why the age-twenty-one line succeeded where the 1970s experiment with lower drinking ages had failed.

This regulatory evolution demonstrates when design-based manipulation justifies intervention. Prohibition failed because it treated the product as the problem, unable to distinguish systematic harm from engineered business models versus individual consumption choices. Regulatory success came only when intervention shifted to targeting the mechanisms through which industries manufactured excessive consumption.¹¹⁹ First, the harm was systematic. Traffic fatalities concentrated among young drinkers at predictable rates, rather than in idiosyncratic individual failures. Second, the mechanisms were identifiable and modifiable, so vertical integration and saloon architecture could be regulated without prohibiting alcohol itself. Third, populations were vulnerable, and adolescent neurobiology made ex post remedies inadequate.

2. Gambling: From Banning Corruption to Mechanism-focused Regulation

Gambling regulation repeated alcohol regulators' early error: treating the activity as inherently corrupt rather than examining the mechanisms that manufactured harm. Colonial America financed civic infrastructure through lotteries.¹²⁰ For example, Harvard, Yale, and Princeton built campuses with lottery revenues, and states funded roads and bridges through public drawings that functioned as voluntary taxation.¹²¹ No one called this vice. It was civic participation.¹²² The Second Great Awakening transformed this civic tool into moral evil when evangelical reformers condemned gambling as idleness and the abandonment of honest labor.¹²³ An 1813 *Old Farmer's*

119. See Levine & Reinerman, *supra* note 107, at 482–90; FOSDICK & SCOTT, *supra* note 106, at 147–52.

120. See I. Nelson Rose, *Gambling and the Law: The Third Wave of Legal Gambling*, 17 JEFFREY S. MOORAD SPORTS & ENT. L.J. 361, 368–69 (2010) (describing the first wave of American legal gambling, in which colonial and early state governments used lotteries as an accepted means of financing roads and other public operations, before scandal and moral reform produced near-universal bans).

121. See generally Asa Earl Martin, *Lotteries in Pennsylvania Prior to 1833*, 47 PA. MAG. HIST. & BIOGRAPHY 307 (1923) (analyzing the historical role of lotteries in financing public infrastructure prior to their 1833 abolition); Anthony Pompliano, *How the Lottery Funded America and Grew to \$1 Billion Jackpots*, POMP LETTER (July 20, 2023), <https://pomp.substack.com/p/how-the-lottery-funded-america-and> [https://perma.cc/533H-MBN4].

122. See Rose, *supra* note 120, at 368.

123. See T. H. Breen, *Horses and Gentlemen: The Cultural Significance of Gambling Among the Gentry of Virginia*, 34 WM. & MARY Q. 239 (1977) (analyzing the use of anti-gambling sentiment to challenge gentry authority in the mid-eighteenth century); Steven Riess, *The Cyclical History of Horse Racing: The USA's Oldest and (Sometimes) Most*

Almanac warned that lotteries were “[the] path [that] leads down to the gloomy pits of ruin.”¹²⁴ By 1818, New York’s Society for the Prevention of Pauperism listed lotteries as one of the leading causes of poverty.¹²⁵ The Massachusetts governor told his legislature in 1833 that lotteries had “pernicious effect upon morals,” creating “a spirit of gambling which was productive of idleness, vicious habits, and the ruin of credit and character.”¹²⁶ Most states banned lotteries entirely by the 1840s.¹²⁷ This wave of prohibition treated the product as the problem, exactly as temperance advocates would later ban alcohol rather than saloon architecture.

Louisiana’s post-Civil War desperation demonstrates the cost of this regulatory failure. The state granted a private monopoly lottery charter,¹²⁸ and the resulting profits proved so enormous that the company systematically bought off the government through bribes to legislators, judges, and newspapers¹²⁹ until federal intervention killed the scheme in 1890.¹³⁰ The company collapsed, and what followed was a seventy-year national prohibition that banned all gambling rather than examining what made the Louisiana regime toxic: monopoly profits, absence of competitive pressure, and state revenue dependence that discouraged oversight.¹³¹ Reformers treated gambling as inherently corrupt rather than identifying the structural features that enabled both compulsion and corruption.

Popular Spectator Sport, 31 INT’L J. HIST. SPORT 29, 32 (2014) (noting how twentieth-century moral opposition to “idleness and dissipation” compelled state governments to close American racetracks).

124. See GEORGE LYMAN KITTREDGE, *THE OLD FARMER’S ALMANACK* 90 (1920).

125. See Raymond A. Mohl, *Humanitarianism in the Preindustrial City: The New York Society for the Prevention of Pauperism, 1817–1823*, 57 J. AM. HIST. 576, 583–84 (1970) (quoting SOC’Y FOR PREVENTION OF PAUPERISM, REPORT OF A COMMITTEE ON THE SUBJECT OF PAUPERISM 4–9 (1818)).

126. See Ronald J. Rychlak, *Lotteries, Revenues and Social Costs: A Historical Examination of State-Sponsored Gambling*, 34 B.C. L. REV. 11, 34–35 (1992) (quoting A.R. Spofford, *Lotteries in American History*, in ANNUAL REPORT OF THE AMERICAN HISTORICAL ASSOCIATION FOR THE YEAR 1892, S. Misc. Doc. No. 52-57, at 194–95 (2d Sess. 1893)).

127. By 1862, only Missouri and Kentucky maintained legal lotteries; most states had banned them on moral grounds following evangelical pressure and fraud scandals. See Rose, *supra* note 120, at 369.

128. See generally Berthold C. Alwes, *The History of the Louisiana State Lottery Company* (1929) (M.A. thesis, Louisiana State University) (on file with LSU Historical Dissertations and Theses) No. 8416 (explaining the 1868 charter that granted a twenty-five-year monopoly with minimal state payment).

129. See *id.* at 126–51.

130. Cf. *Horner v. United States*, 147 U.S. 449, 449–50 (1893) (describing federal restrictions on the use of the mail for lottery advertisements, tickets, and related materials).

131. No state operated legal lotteries from 1893 (Louisiana closure) to 1964 (New Hampshire). See Rychlak, *supra* note 126, at 44.

Exactly as Prohibition would ban alcohol rather than regulating saloon business models, Louisiana's regulatory attempt failed because regulators targeted individual vice while ignoring the mechanism that manufactured corruption. Modern gambling regulation turned to a design-focused approach¹³² only after evidence showed the industry engineering addiction through identifiable, modifiable features.¹³³ Nevada's response to organized crime infiltration demonstrated this shift: rather than re-banning casinos, the state created the Gaming Control Board (created in 1955 and strengthened in 1959),¹³⁴ imposing background checks, financial audits, and licensing standards that regulated ownership structures and business practices—structural intervention targeting features that enabled corruption rather than blanket prohibition.¹³⁵ Nevada had learned Louisiana's lesson: the problem was not that people gambled, but how operations were structured. New Hampshire's lottery took a different path to the same insight.¹³⁶ Both paths—Nevada casinos and state lotteries—moved from revenue-focused legalization toward design-focused regulation, identifying features that manufactured harm and modifying them without banning gambling entirely.

The regulatory breakthrough came when behavioral psychology revealed that slot machines implemented variable-ratio reinforcement schedules, deliberately programming “near-misses” and “losses disguised as wins” to manufacture compulsion.¹³⁷ Manufacturers designed machines to create what anthropologist Natasha Dow Schüll terms the “machine zone,” a “solitary, absorptive activity” in which players enter a dissociative state where a sense of “time, space, monetary value, social roles, and sometimes even one's very sense of existence” dissolves.¹³⁸ Systematic harm was undeniable. Slot machine revenue concentrated disproportionately among

132. See 1931 Nev. Stat. 168–69; New Hampshire Sweepstakes Act, 1963 N.H. Laws 52 (signed Apr. 30, 1963) (commencing ticket sales on March 12, 1964).

133. SCHÜLL, *supra* note 14, at 53–54, 115–27 (examining player-centered machine design and specific game features used to prolong play and maximize time on device).

134. See 1955 Nev. Stat. 883–898 (creating the State Gaming Control Board and authorizing the Board and the Nevada Tax Commission to administer gaming licensing and oversee gaming operations), *amended by* 1959 Nev. Stat. 427 (creating the Nevada Gaming Commission and strengthening state oversight of gaming regulation).

135. See *generally* NEV. LEGIS. COUNS. BUREAU, POLICY AND PROGRAM REPORT: GAMING IN NEVADA (2016) (outlining the development of Nevada's comprehensive gaming licensing and auditing framework since 1955).

136. See 1963 N.H. Laws 48–50.

137. A variable-ratio reinforcement schedule delivers reinforcement after an unpredictable number of responses rather than after a fixed number or time interval. Such schedules produce exceptionally high, persistent response rates and are particularly resistant to extinction, making them a foundational concept in operant conditioning and behavioral psychology. See B.F. SKINNER, SCIENCE AND HUMAN BEHAVIOR 99–106, 396–97 (1953).

138. See SCHÜLL, *supra* note 14, at 11–12.

players exhibiting addiction symptoms, and adolescent brains with heightened reward sensitivity and immature impulse control proved especially susceptible to risk-taking behaviors.¹³⁹

Regulatory frameworks evolved to target these mechanisms. Nevada imposed minimum payoff requirements and oversight of gaming device design,¹⁴⁰ and the Indian Gaming Regulatory Act of 1988 created federal standards for tribal casinos.¹⁴¹ The shift paralleled alcohol regulation. Instead of prohibiting the product, regulators identified design features that engineered compulsive engagement and modified them. But what made gambling regulation genuinely precedent-setting was the recognition of a form of harm that no other vice precedent addressed: temporal extraction itself.

Unlike alcohol (where moderate consumption exists) or pornography (where viewing does not inherently injure), slot machine play is itself the injury in the hours absorbed in the machine zone, which are irretrievably lost, regardless of money won or lost.¹⁴² Modern gambling regulation reflects this: South Australia requires mandatory display of prescribed responsible gambling messages on gaming machines; Victoria's YourPlay incorporates optional time and spending limits, accompanied by alert pop-ups as gamblers approach those thresholds, thereby supporting temporal self-regulation.¹⁴³ Regulators in Norway have proposed to introduce mandatory time limits in legislation, and there are also suggestions to protect minors from gambling.¹⁴⁴ These interventions do not protect wallets; they protect time.

139. See NAT'L GAMBLING IMPACT STUDY COMM'N, FINAL REPORT 4-16 (1999). On adolescent vulnerability to reward-based risk-taking, see generally Steinberg, *supra* note 9.

140. See NEV. ADMIN. CODE §§ 14.040–14.050 (2026) (requiring minimum 75% theoretical payout for gaming devices and establishing technical standards).

141. See Indian Gaming Regulatory Act of 1988, 25 U.S.C. §§ 2701–2721; see also Unlawful Internet Gambling Enforcement Act of 2006, 31 U.S.C. §§ 5361–5367.

142. See SCHÜLL, *supra* note 14, at 51–88.

143. See *Casino Regulations 2013* (S. Austl.) sch 2 (Austl.) (authorizing the prescription of responsible gambling information requirements through subordinate instruments and requiring gaming machines to display expenditure limits); S. AUSTL. CTR. FOR ECON. STUD., EVALUATION OF YOURPLAY – FINAL REPORT, at v, 122 (2019), <https://apo.org.au/sites/default/files/resource-files/2020-02/apo-nid277096.pdf> [<https://perma.cc/3XGX-FS3J>] (finding “YourPlay” facilitates self-regulation via limit-setting and alerts).

144. See *Lov om pengespill m.v. [Act on Gambling etc.]*, Aug. 28, 1992, No. 103 (Nor.), repealed by, *Lov om pengespill (pengespilloven) [Act on Gambling]* § 38, Mar. 18, 2022, No. 12 (Nor.); Jonny Engebø et al., *Regulatory Measures' Effect on Gambling Participation: Experiences From Norway*, 12 FRONTIERS PSYCHIATRY 1, 2 (2021) (Norway's 2007 slot machine ban significantly reduced participation); see also Angela Rintoul, *Universal Registration Is Key to Preventing Gambling Harm*, UNIV. OF QUEENSL.: CENTRE FOR POLICY

The regulatory insight is that industries can engineer experiences that systematically defeat users' temporal self-governance, or in other words, the capacity to notice time passing and evaluate whether continued participation serves larger goals. For developing adolescents, this defeat occurs during the neurobiological window when temporal self-governance itself is forming.¹⁴⁵ Reward sensitivity peaks in mid-adolescence while prefrontal regulation continues maturing into young adulthood,¹⁴⁶ creating extended vulnerability that current age restrictions (eighteen in most jurisdictions, twenty-one for U.S. casinos) do not actually address.¹⁴⁷ Gambling regulation thus reveals a principle directly applicable to gaming: when activities are engineered to extract time through mechanisms that suspend temporal awareness, and when that extraction occurs during windows critical to developing the very capacity to make autonomous time-allocation choices, intervention becomes necessary.

3. Pornography: From Content Scrutiny to Platform Design

Where gambling regulation eventually identified temporal extraction as the harm requiring intervention, pornography regulation struggled to identify a coherent mechanism. The Comstock Act of 1873 criminalized mailing "obscene, lewd, or lascivious" materials without defining those terms, delegating enforcement to a special postal agent and conflating all sexual expression with moral depravity.¹⁴⁸ Courts spent the next century attempting to supply the definitions Congress had omitted. *Roth v. United States*¹⁴⁹ first held obscenity categorically unprotected by the First Amendment, establishing that material was obscene if "the average person, applying contemporary community standards" would find the dominant theme

FUTURES (Nov. 29, 2022), <https://stories.uq.edu.au/policy-futures/2022/universal-registration-is-key-to-preventing-gambling-harm/index.html> [https://perma.cc/M92G-6HRA] (advocating a centralized universal account-registration system to support pre-commitment and binding loss limits).

145. See Casey, Jones & Hare, *supra* note 9, at 113, 117–18, 121–22.

146. See Galván et al., *supra* note 49; Steinberg, *supra* note 9, at 93. See generally Casey, Jones & Hare, *supra* note 9 (protracted prefrontal maturation through young adulthood).

147. On arbitrary age cutoffs and possible but imperfect solutions, see Laurence Steinberg, *Should the Science of Adolescent Brain Development Inform Public Policy?*, 28 ISSUES SCI. & TECH. 67, 76–78 (2012); see also Rachel Volberg et al., *An International Perspective on Youth Gambling Prevalence Studies*, 27 INT'L J. ADOLESCENT MED. & HEALTH 3, 5–12 (2010) (finding that youth migrate toward age-restricted gambling activities only as they approach the legal age threshold).

148. Comstock Act of 1873 § 2, ch. 258, 17 Stat. 598 (codified as amended at 18 U.S.C. § 1461).

149. 354 U.S. 476 (1957).

“utterly without redeeming social importance.”¹⁵⁰ *A Book Named “John Cleland’s Memoirs of a Woman of Pleasure” v. Attorney General of Massachusetts*¹⁵¹ tightened the social value prong, effectively decriminalized most adult content, and fractured the Court.¹⁵² *Miller v. California* replaced *Memoirs*’s near-absolute protection with a workable standard for state prosecution.¹⁵³ *Ginsberg v. New York* established the parallel doctrine of variable obscenity, permitting stricter regulation of material distributed to minors even when constitutionally protected for adults, laying the doctrinal foundation for age-differentiated access regimes.¹⁵⁴

Across a century of doctrine, however, every framework asked the same question: *what* did the material depict? None examined how distribution mechanisms structured consumption, who profited from sustained engagement, or whether platform design could manufacture compulsive use independent of content. When the Seventh Circuit struck down the Indianapolis ordinance in *American Booksellers Ass’n v. Hudnut* on viewpoint-discrimination grounds, it confirmed what the entire regulatory tradition had assumed: pornography regulation was a question of what images showed, not how platforms delivered them.¹⁵⁵

The Internet demolished that assumption. Prior distribution channels—VHS rentals, cable pay-per-view—had required commercial intermediaries who created friction and enabled some age enforcement; Pornhub’s launch in May 2007 eliminated all of it.¹⁵⁶ Free, advertising-supported streaming with algorithmic recommendation and autoplay transformed the business model from selling access to content into selling attention to advertisers: session duration, not content quality, now drove revenue. MindGeek (later renamed Aylo) systematically acquired competitors to build a near-monopoly portfolio generating 4.5 billion monthly visits by the early

150. See *id.* at 484, 489 (holding obscenity “utterly without redeeming social importance” and unprotected by First Amendment).

151. 383 U.S. 413 (1966) (plurality opinion).

152. See *id.* at 418–21 (applying the “utterly without redeeming social value” test to protect sexually explicit material).

153. See 413 U.S. 15, 24 (1973).

154. See 390 U.S. 629, 636–41 (1968).

155. See 771 F.2d 323, 325, 328–29 (7th Cir. 1985), *aff’d mem.*, 475 U.S. 1001 (1986).

156. Pornhub launched May 25, 2007. On the transition from physical distribution to streaming and the elimination of age-enforcement intermediaries, see Amy Adler, *Arousal by Algorithm*, 109 CORNELL L. REV. 787, 789–91 (2024); GAIL DINES, *PORNLAND: HOW PORN HAS HIJACKED OUR SEXUALITY* 42–51 (2010).

2020s.¹⁵⁷ It deploys autoplay and real-time behavioral optimization to maximize dwell time. Amy Adler draws the parallel directly, arguing that “as Facebook, X, and YouTube are to democratic speech, Aylo/MindGeek is to sexual speech,” and that like those platforms these sites “make their money from advertising and the data mining that supports it.”¹⁵⁸

All three conditions for regulatory salience are simultaneously visible. First, Ince et al.’s network analysis of 2,300 male users documented platform-enabled consumption patterns, connecting design-facilitated behaviors to established indicators of problematic use and establishing systematic harm traceable to platform architecture rather than individual pathology.¹⁵⁹ Second, pornography platforms share the same algorithmic designs as mainstream streaming services, and are technically auditable and regulable without restricting the underlying material.¹⁶⁰ Third, as for vulnerable populations, children averaging first exposure at age twelve, with fifty-eight to sixty-three percent of first exposures occurring accidentally through recommendation and autoplay rather than deliberate search, faced harm that arrived before any ex post remedy could intervene.¹⁶¹

When regulators finally responded, the initial approach targeted access—age verification laws across twenty-seven American states since 2022,¹⁶² mandatory age assurance under the United Kingdom’s Online Safety Act,¹⁶³ and Supreme Court endorsement of age verification in *Free Speech*

157. See Adler, *supra* note 156, at 787–90; Press Release, Fed. Trade Comm’n, Statement from FTC Chairman Andrew N. Ferguson, Comm’r Melissa Holyoak & Comm’r Mark R. Meador Regarding FTC & Utah Div. of Consumer Prot. v. Aylo Grp. Ltd. et al. Matter No. 2123033 (Sep. 3, 2025) https://www.ftc.gov/system/files/ftc_gov/pdf/2025.09.03-2123033-pornhub-mindgeek-ferguson-holyoak-meador-statement.pdf [<https://perma.cc/S4VT-VFUR>] (describing Aylo’s business model as “more content, more money”).

158. Adler, *supra* note 156, at 787, 793–94.

159. See Campbell Ince et al., *Problematic Pornography Use and Novel Patterns of Escalating Use: A Cross-Sectional Network Analysis with Two Independent Samples*, 156 ADDICT. BEHAVS. (Sep. 2024), <https://www.sciencedirect.com/science/article/pii/S0306460324000972?via%3Dihub> (on file with the *Fordham Urban Law Journal*).

160. See Carlos A. Gomez-Urbe & Neil Hunt, *The Netflix Recommender System: Algorithms, Business Value, and Innovation*, 6 ACM TRANSACTIONS ON MGMT. INFO. SYS., no. 4, Dec. 2015, at 13:1, 13:5–7 (noting that Netflix’s recommendation engine reduces churn by \$1 billion annually, with eighty percent of views driven by algorithms).

161. See Pranujan Pathmendra et al., *Exposure to Pornography and Adolescent Sexual Behavior: Systematic Review*, 25 J. MED. INTERNET RSCH. Feb. 28, 2023, at 15–17 (finding online pornography exposure among U.S. adolescents is associated with earlier sexual initiation).

162. See *Frequently Asked Questions: About Age Verification*, FREE SPEECH COAL., <https://www.freespeechcoalition.com/faq> [<https://perma.cc/X2UC-2CFF>] (last updated July 8, 2026) (reporting that twenty-seven states had passed laws requiring age verification for adult websites since 2022).

163. See Online Safety Act 2023, c. 50, §§ 79–81 (UK).

Coalition, Inc. v. Paxton,¹⁶⁴ which cleared the constitutional space for stricter platform obligations to follow. Access control addresses a real harm but leaves the architecture intact. Regulators have begun targeting that architecture directly. The United Kingdom’s Protection of Children Codes require platforms to configure their recommender algorithms to filter harmful content from children’s feeds¹⁶⁵—an obligation directed at design, not access. The European Commission’s Article 28 Digital Services Act guidelines require a non-profiling recommender default for minors and direct platforms to ensure that minors are not exposed to “persuasive design features that are aimed predominantly at engagement and that may lead to extensive use or overuse of the platform or problematic or compulsive behavioural habits.”¹⁶⁶ The Commission’s formal proceedings against Pornhub and other pornography platforms extend further still, scrutinizing not whether platforms verify age but whether their design choices systematically harm users’ mental and physical wellbeing¹⁶⁷—directing regulatory attention at the business model itself. Pornography regulation has arrived, within two decades of the tube-site model’s emergence, at the question gaming regulation must answer from the outset: not who accesses the platform, but how the platform engineers the experience.

4. Gaming as Paradigmatic Attention Extraction

The three preceding vice histories trace a single analytical progression, each step of which progressively sharpens the conditions for regulatory intervention that the preceding sections have identified. Together, the three histories describe a movement from physical substance to physical venue to digital platform, and from regulatory frameworks preoccupied with product prohibition toward frameworks increasingly attentive to the mechanisms through which platforms engineer compulsive engagement. We argue in

164. See 606 U.S. 461, 482 (2025) (upholding Texas Health and Safety Code Section 129B under intermediate scrutiny as a valid “obscene as to minors” regulation that only incidentally burdens adult speech).

165. See OFCOM, PROTECTION OF CHILDREN CODES OF PRACTICE FOR USER-TO-USER SERVICES 47–51 (July 4, 2025) (UK); see also *Online Safety Industry Bulletin*, OFCOM (Sep. 9, 2025), <https://www.ofcom.org.uk/online-safety/illegal-and-harmful-content/online-safety-industry-bulletins/online-safety-industry-bulletin-september-2025> [<https://perma.cc/U9WW-9CUP>] (confirming age check implementation and prioritization of recommender systems for enforcement).

166. *Communication from the Commission, Guidelines on Measures to Ensure a High Level of Privacy, Safety and Security for Minors Online, Pursuant to Article 28(4) of Regulation (EU) 2022/2065*, at 19, C (2025) 6826 final (Oct. 10, 2025).

167. See Anna Pingen, *Overview of the Latest Developments on the DSA: May – Mid-October 2025*, EUCRIM (Oct. 28, 2025), <https://eucrim.eu/news/overview-of-the-latest-developments-on-the-dsa-may-mid-october-2025/> [<https://perma.cc/L3T8-HK33>].

what follows that gaming occupies the terminus of this progression as the paradigmatic case rather than as one more instance of a recognizable regulatory category. It meets the three conditions more completely, more continuously, and more deliberately than any vice that preceded it.

The first condition—systematic harm traceable to identifiable commercial practices—is met by the structure of the gaming business model itself. Platforms generate revenue by maximizing session duration and return frequency, which means that harm to children’s developing capacity for self-regulation is constitutive of their revenue logic,¹⁶⁸ since the platform earns more the longer it holds them. Unlike alcohol-related harm, which the industry long attributed to individual weakness, or gambling-related harm, which was for decades framed as a consequence of personal recklessness, the mechanisms of gaming harm are documented in the industry’s own design records, patent applications, and internal communications disclosed through litigation.¹⁶⁹ The second condition—identifiable and modifiable design mechanisms—is satisfied by the mechanisms cataloged in Part I: ¹⁷⁰variable-ratio reinforcement schedules,¹⁷¹ social obligation architectures,¹⁷² login streak systems,¹⁷³ progress-loss aversion triggers,¹⁷⁴ and loot-box incentive structures are engineering choices,¹⁷⁵ each of which can be identified, audited, and redesigned without prohibiting gaming as such. The third condition—a vulnerable population for whom ex post remedies are inadequate—is met by the distinctive character of the developmental harm. Adolescence represents a sensitive period during which self-governance capacities develop through characteristically self-directed, unstructured

168. Roblox Corporation, for example, reports “Hours Engaged” as a primary Key Performance Indicator, recording 17.4 billion hours in Q2 2024. *See* Press Release, Roblox Corp., Roblox Reports Second Quarter 2024 Financial Results (Aug. 1, 2024), <https://ir.roblox.com/news/news-details/2024/Roblox-Reports-Second-Quarter-2024-Financial-Results/default.aspx> [<https://perma.cc/MSX6-NMYP>]; *see also* Hamari et al., *supra* note 25, at 543–44; Calo, *supra* note 16, at 1034.

169. *See* Fed. Trade Comm’n, Analysis of Proposed Consent Order to Aid Public Comment, *In the Matter of Epic Games, Inc.*, FTC File No. 1923203 (Dec. 19, 2022), https://www.ftc.gov/system/files/ftc_gov/pdf/1923203EpicGamesAAPC.pdf [<https://perma.cc/UEE9-JHYP>] (noting Epic’s internal awareness of harmful design practices and decision to ignore over one million user complaints about unwanted charges).

170. *See generally supra* Part I.B (Three Mechanisms of Attention-Extraction).

171. *See generally* Clark & Zack, *supra* note 50 (identifying engineered reward variability and frequency as design features that may increase the addictive potential of gaming).

172. *See* Hsu, Wen & Wu, *supra* note 52, at 996; Klemm & Pieters, *supra* note 52, at 85–86.

173. *See* sources cited *supra* notes 58–60.

174. *See* SCHÜLL, *supra* note 14, at 92; Zeigarnik, *supra* note 68, at 313.

175. *See generally* sources cited *supra* note 53.

experience.¹⁷⁶ When attention is systematically extracted during this developmental window, children are deprived of formative experiences that compensatory interventions may not adequately replace.

Gaming satisfies the three conditions in their purest form, and that is what distinguishes it from the preceding vice precedents. Alcohol and gambling required physical presence at designed environments—the saloon, the casino floor—and consequently the mechanisms of compulsion were bounded by the practicalities of access, transport, and operating hours.¹⁷⁷ Gaming eliminates those constraints entirely: the compulsion architecture is embedded in the device children already carry, available continuously, requiring no intermediary and no physical threshold. Pornography platforms adopted attention-extraction mechanisms—recommendation algorithms, autoplay, infinite scroll—as a later business model innovation, retrofitting engagement-optimization onto infrastructure initially designed for passive content access.¹⁷⁸ Gaming platforms, by contrast, were engineered for sustained attention extraction from inception. This distinction means that attention-extraction mechanisms are, in significant measure, the product. The regulatory question is accordingly how to constrain these design choices themselves, rather than how to strip harmful features from an otherwise acceptable platform.

The deployment of artificial intelligence in gaming platform design has intensified, not altered, each mechanism examined in Part I. This is achieved in three main ways. First, AI-powered mechanisms continuously monitor player performance to calibrate challenge levels in real-time, maintaining users in a “flow state” between frustration and boredom while preventing churn.¹⁷⁹ Second, behavioral analytics engines process session data to construct individual psychological profiles, enabling platforms to predict with increasing accuracy the precise moments when users are most

176. See Schapiro, *What Is a Child?*, *supra* note 9, at 735–36; Steinberg, *supra* note 9, at 83–84.

177. See generally Levine & Reinerman, *supra* note 107 (discussing alcohol regulation through controls on production, distribution, and sale); SCHÜLL, *supra* note 14 (explaining how gambling environments are structured through physical design and controlled access).

178. See generally Ilir Rama et al., *The Platformization of Gender and Sexual Identities: An Algorithmic Analysis of Pornhub*, 10 PORN STUD. 154 (2023) (showing that Pornhub distributes and recommends content through algorithmic profiling and personalized recommendation systems); Shilpa Kalyan, Devadas Menon & Saravanan Velakutty Mariyappan, *The Infinite Scroll . . . Exploring the Motivations and Individual Differences in Binge-Watching Behavior on Porn Tube Sites*, 11 SOC. SCI. & HUMANS. OPEN, no. 101279, 2025 (describing porn tube sites as YouTube-like platforms employing algorithmically curated content and continuous browsing interfaces).

179. See Qingwei Mi & Tianhan Gao, *Engagement-Oriented Dynamic Difficulty Adjustment*, 15 APPLIED SCIS. 5610, at 1–3 (2025).

susceptible to monetization prompts.¹⁸⁰ Third, these systems adaptively refine variable-ratio reward structures based on each user's response patterns, personalizing the very mechanisms that behavioral psychology identifies as most resistant to extinction.¹⁸¹ That AI enables these mechanisms to operate with unprecedented granularity does not alter their fundamental character; it renders the regulatory question—whether platforms should be permitted to engineer compulsive engagement in children—more urgent, not less relevant.

III. THE DEVELOPMENTAL NECESSITY OF ATTENTION REGULATION

The thesis advanced in the preceding section establishes regulatory salience but not regulatory necessity. An additional step is required to demonstrate why the designed capture of children's attention necessitates duties of a qualitatively different kind. The normative foundation for such duties lies not in the analogy to traditional vices, but in the developmental conditions that attention regulation would protect: the temporal, deliberative, and experiential conditions under which children's capacity for self-governance emerges.

Gaming platforms inflict harm not merely to children's *present* interests but to the conditions through which children's capacity for self-governance is formed.¹⁸² These capacities, the ability to form stable preferences, deliberate rationally, exercise impulse control, and critically reflect on their own desires,¹⁸³ are not innate, but developmental.¹⁸⁴ They must be built progressively through specific environmental conditions during a limited

180. See *AI-Driven Game Monetization: How Mobile Games Are Earning Smarter, Not Harder*, GIANTY (May 8, 2025), <https://www.gianty.com/ai-driven-game-monetization/> [<https://perma.cc/DMZ3-ZMFH>]; *Personalization in iGaming: Why AI Is Your Best Bet*, INTELLIAS, <https://intellias.com/role-of-personalization-in-igaming/> [<https://perma.cc/V3E3-ZDYJ>] (last visited Sep. 4, 2026).

181. See *Predictive Gameplay Mechanics: AI That Adapts Games to Player Behavior in Real-Time*, SMARTICO (July 17, 2025), <https://www.smartico.ai/blog-post/predictive-gameplay-mechanics-ai-that-adapts-games-to-player-behavior-in-real-time> [<https://perma.cc/PZ5B-Q3BL>] (personalization engines adjust rewards to maximize engagement).

182. See Anca Gheaus, *Unfinished Adults and Defective Children: On the Nature and Value of Childhood*, 9 J. ETHICS & SOC. PHIL. 1, 1–5 (2015) (childhood is a process of “becoming themselves”).

183. See MARINA OSHANA, PERSONAL AUTONOMY IN SOCIETY 9–20 (2006) (autonomy requires developed capacities for rational deliberation and critical reflection).

184. See Adele Diamond, *Executive Functions*, 64 ANN. REV. PSYCH. 135, 137–41 (2013) (executive functions, including cognitive control and inhibitory control, emerge early but undergo substantial development throughout childhood and adolescence). See generally Steinberg, *supra* note 9 (neural capacities for impulse control and long-term planning undergo protracted maturation well into early adulthood).

temporal window.¹⁸⁵ When platforms engineer compulsive patterns of attention extraction during this precise developmental window,¹⁸⁶ they undermine the preconditions for autonomous adulthood itself and foreclose the possibility of its future emergence.¹⁸⁷ This developmental reality transforms attention regulation from a permissive intervention into a duty-based imperative: the state regulates because it disrupts the normative conditions under which the capacity for self-governance emerges.

A. The Developmental Necessity of Self-Governance

The standard justification for restricting children's online activity rests on a claim about deliberative competence: children choose badly, so adults must choose for them. This section establishes what we term the *developmental necessity thesis*: that children occupy a unique legal and moral status that independently justifies protective regulation based on developmental reality.¹⁸⁸ The argument proceeds in three steps. First, we ground children's legal incapacity in both doctrinal tradition and contemporary neuroscience,¹⁸⁹ showing that the law's longstanding treatment of children as categorically different from adults¹⁹⁰ reflects recognition of their developmental reality. Second, we identify self-governance as the central developmental task of childhood, theorizing it not as a static trait that children either possess or lack, but as a dynamic capacity requiring supportive social conditions and diverse formative experiences. We identify the specific conditions this developmental process requires, such as supportive social scaffolding, diverse formative experiences, unmonopolized attention allocation, and progressive exercise of autonomy. Third, we demonstrate how gaming platforms' monopolization of attention during developmental windows forecloses access to these necessary conditions.

185. Casey, Jones & Hare, *supra* note 9, at 112–18.

186. Steinberg, *supra* note 9, at 83–84; Casey, Jones & Hare, *supra* note 9, at 117–18.

187. See generally *supra* note 184 and accompanying text (explaining that self-regulatory and decision-making capacities continue to develop throughout childhood and adolescence, and that these developmental processes contribute to the formation of later autonomous agency and meaningful choice).

188. See, e.g., *Prince v. Massachusetts*, 321 U.S. 158, 168 (1944) (linking democratic “continuance” to the “healthy, well-rounded growth” of youth); Gheaus, *supra* note 182, at 5 (arguing biological underdevelopment necessitates adult supervision).

189. See, e.g., Spear, *supra* note 111, at 439–40.

190. See, e.g., *Bellotti v. Baird*, 443 U.S. 622, 633–39 (1979) (describing children's constitutional incapacities); RESTATEMENT (SECOND) OF CONTRACTS § 14 (A.L.I. 1981) (addressing minors' incapacity to contract).

1. From Proficiency to Attributability: The Developmental Logic of Self-Governance

The dominant framework for protecting children online rests on a premise so familiar that it rarely attracts scrutiny: children lack the judgment to navigate harmful digital environments, so responsible adults must restrict their access.¹⁹¹ The philosophical pedigree of this claim runs deep. From Mill's exclusion of children from the harm principle¹⁹² to Feinberg's grounding of children's diminished liberty in their deliberative incapacity,¹⁹³ the standard justification for adult authority over children has been that children make choices that are imprudent, uninformed, or dangerous. Regulation built on this logic targets inputs and outputs. It restricts the content children encounter and manages the behavioral consequences of what slips through.¹⁹⁴ This is what Schapiro has termed the "proficiency" rationale for children's diminished status, theorizing that children are not yet skilled enough to exercise sound deliberative judgment.¹⁹⁵

But a fundamentally different account of what distinguishes children from adults has been consistently obscured by the proficiency framing, thereby generating an entirely different regulatory architecture. In two influential articles, Schapiro has drawn a distinction between proficiency and what she calls "attributability."¹⁹⁶ The proficiency argument says that children deliberate poorly. The attributability argument says children are not yet

191. See, e.g., Children's Online Privacy Protection Act of 1998 (COPPA), 15 U.S.C. §§ 6501–6506; Kids Online Safety Act, S. 1409, 118th Cong. (as reported to Senate, Dec. 13, 2024) (imposing a duty of care to mitigate harms to minors). Both legislative measures focus on shielding children from harmful content rather than addressing how online environments disrupt the developmental process toward self-governance.

192. See JOHN STUART MILL, ON LIBERTY 80–81 (David Bromwich & George Kateb eds., Yale Univ. Press 2003) (exempting children from the harm principle).

193. Feinberg, *supra* note 17, at 145–47.

194. SONIA LIVINGSTONE & ALICIA BLUM-ROSS, PARENTING FOR A DIGITAL FUTURE: HOW HOPES AND FEARS ABOUT TECHNOLOGY SHAPE CHILDREN'S LIVES 1–28 (2020) (describing child-protection approaches that focus on limiting children's exposure to harmful content and managing associated risks); DANAH BOYD, IT'S COMPLICATED: THE SOCIAL LIVES OF NETWORKED TEENS 14–25, 118–27 (2014) (discussing how parental fears and anxieties about digital risks shape child-protection approaches, which often lead parents and policymakers to focus on controlling children's exposure to harmful content and managing perceived risks).

195. Schapiro, *Childhood and Personhood*, *supra* note 17, at 579 (noting the routine conflation of "proficiency" and "attributability" arguments); see also Samantha Brennan, *Children's Choices or Children's Interests: Which Do Their Rights Protect?*, in THE MORAL AND POLITICAL STATUS OF CHILDREN 53, 58–62 (David Archard & Colin M. Macleod eds., 2002) (shifting between the two arguments without marking the transition).

196. Schapiro, *Childhood and Personhood*, *supra* note 17, at 579, 591 (distinguishing "attributability," which justifies the existence of adult authority, from "proficiency," which dictates its exercise in specific domains); see also *id.* at 585–86 (analogizing a child's action to property held without ownership: produced by deliberation but not "authored" by the child).

capable of making choices that are genuinely their own.¹⁹⁷ A child deliberates, and a child acts. But she has not yet authored her actions. She has not yet constituted the deliberative perspective, consisting of the stable structure of values, commitments, and practical principles, from which those actions could count as exercises of her own will.¹⁹⁸ What it means to be a child, on this account, is to be an “emerging person,” or someone who has not yet completed the constitutive project of becoming a self-governing agent.¹⁹⁹ Feinberg’s influential concept of “rights-in-trust”—anticipatory autonomy rights held on behalf of the future adult the child will become—captures part of this insight, but it remains oriented toward preserving options for a future self rather than protecting the process through which that self is constituted.²⁰⁰

The distinction determines the shape of the regulatory response. If adult authority over children is justified by the attributability argument, then that authority is legitimate only insofar as it serves the project of self-constitution to “establish the most propitious environment for the child further to develop the personality growing within him or her.”²⁰¹ The regulatory implication follows directly. If the problem with children’s online engagement were one of proficiency, or an inability to choose wisely, the appropriate response would be precisely what current regulation provides: content filtration, access restrictions, and behavioral guardrails. But if the problem is one of attributability, the regulatory target must shift from the content of children’s digital experience to the conditions under which self-constitution occurs.²⁰²

Self-governance does not arrive as a threshold capacity at the age of majority. It is constituted progressively through the exercise of expanding discretionary authority. As the United Nations Committee on the Rights of

197. Schapiro, *What Is a Child?*, *supra* note 9, at 716–18, 728–35 (distinguishing children’s forms of agency from mature self-governance and explaining why children lack the kind of practical authority over themselves characteristic of adults).

198. Schapiro, *Childhood and Personhood*, *supra* note 17, at 577–91 (explaining that children’s lack of full authority over themselves explains their distinctive moral status and the justification for adult authority).

199. Schapiro, *Childhood and Personhood*, *supra* note 17, at 589 (defining childhood as a “condition of as-yet-incomplete liberation from nature’s rule” rather than a mere deficit in skill).

200. *See generally* Feinberg, *supra* note 17 (rights-in-trust and open future).

201. John Eekelaar, *The Interests of the Child and the Child’s Wishes: The Role of Dynamic Self-Determinism*, 8 INT’L J.L. & FAM. 42, 54 (1994) [hereinafter Eekelaar, *The Interests of the Child*]; *see also* Lucinda Ferguson, *An Argument for Treating Children as a ‘Special Case’*, in PHILOSOPHICAL FOUNDATIONS OF CHILDREN’S AND FAMILY LAW 228–42 (Elizabeth Brake & Lucinda Ferguson eds., 2018) (children’s interests are distinct due to their developmental nature rather than inherent vulnerability).

202. *See* Schapiro, *Childhood and Personhood*, *supra* note 17, at 585–87.

the Child has recognized, children “progressively acquire competencies, understanding and increasing levels of agency,” and it is through this progressive acquisition, not through the crossing of an age threshold, that self-governance is constituted.²⁰³ Schapiro describes children as acquiring “authority with respect to particular domains of discretion in a piecemeal fashion,” beginning with narrow spheres (which pajamas to wear, which game to play) and widening as the child demonstrates the capacity to govern herself within them.²⁰⁴ Mullin reaches a convergent conclusion through a different route, arguing that children’s autonomy is not a binary capacity but a progressive exercise through which self-governance is constituted rather than merely revealed.²⁰⁵

Eekelaar’s concept of “dynamic self-determinism” translates the same developmental insight into legal-doctrinal language: a child’s welfare is best understood not as a fixed state to be optimized by adults but as a process through which the child progressively determines her own interests by exercising expanding agency.²⁰⁶

2. Procedural Conditions of Self-Governance

But the process of self-constitution does not unfold in a vacuum. The child’s developing sense of what it means to direct her own activity is shaped by the structure of the systems she inhabits. The child is “placed in an environment which is reasonably secure, but which exposes it to a wide range of influences,” and it is “for the adults to decide what that environment might be, and their responsibility to seek to realize it.”²⁰⁷ Schapiro imposes a procedural constraint on the exercise of adult authority that goes beyond the requirement of benevolence.

Adult rule is preferable to a child’s instinct only under one condition. Adults must govern in a form the child can eventually recognize as her own.²⁰⁸ “The invocation of adult authority must be presented not as an appeal to the authority of an arbitrary individual, but as an appeal to a principle that could come to be the law of a free human being.”²⁰⁹ As

203. U.N. Comm. on the Rts. of the Child, General Comment No. 20 on the Implementation of the Rights of the Child During Adolescence, ¶ 18, U.N. Doc. CRC/C/GC/20 (Dec. 6, 2016).

204. Schapiro, *What Is a Child?*, *supra* note 9, at 733–34 (distinguishing “attributability,” which justifies the existence of adult authority, from “proficiency,” which dictates its exercise in specific domains); *see also* Schapiro, *Childhood and Personhood*, *supra* note 17, at 591.

205. *See* Amy Mullin, *Children, Paternalism and the Development of Autonomy*, 17 ETHICAL THEORY & MORAL PRAC. 413, 415–18 (2014).

206. Eekelaar, *The Interests of the Child*, *supra* note 201, at 53–56; *see also* John Eekelaar, *Beyond the Welfare Principle*, 14 CHILD & FAM. L.Q. 237, 243–45 (2002).

207. Eekelaar, *The Interests of the Child*, *supra* note 201, at 47–54.

208. *See* Schapiro, *Childhood and Personhood*, *supra* note 17, at 593.

209. *See* Schapiro, *Childhood and Personhood*, *supra* note 17, at 593.

“representatives and executors of the laws with which children will come to identify their own authority,” an adult who explains why a rule exists, enforces it consistently, and relaxes it as the child demonstrates self-governance, models the structure of autonomous agency the child is learning to exercise.²¹⁰ The child must be able to experience adult governance as principled if that governance is to serve its developmental function rather than merely substituting one form of alien rule²¹¹ for another.

Rawls’s account of moral development supplies the jurisprudential basis for this procedural requirement. In his “morality of authority,” or the first stage of the child’s acquisition of a sense of justice, Rawls specifies that adults must “enunciate clear and intelligible (and of course justifiable) rules adapted to the child’s level of comprehension”; they should “set out the reasons for these injunctions” and “follow these precepts insofar as they apply to them as well.”²¹² The child who acquires a genuine morality of authority is “disposed without the prospect of reward or punishment to follow certain precepts” not because external incentives compel compliance, but because she has come to see these precepts as expressing “forms of action that characterize the sort of person [she] should want to be.”²¹³ Where these conditions are absent, “moral development fails to take place.”²¹⁴

O’Neill’s obligations-first framework explains why these procedural requirements generate regulatory duties, rather than mere aspirational ideals.²¹⁵ Because children’s agency is “incomplete, mutually vulnerable and socially produced,” those who exercise power over children’s lives bear imperfect obligations not merely to refrain from harm but to actively produce the conditions under which autonomous agency can develop.²¹⁶ These obligations extend beyond what any specific right can capture: parents and teachers “who meet only their perfect obligations would fail as parents or teachers,” since they would neglect the developmental conditions that no child is positioned to claim as an enforceable entitlement.²¹⁷

210. Schapiro, *Childhood and Personhood*, *supra* note 17, at 593; *see also* Schapiro, *What Is a Child?*, *supra* note 9, at 735–36 (describing how children develop toward self-governance through a process in which adult authority gradually gives way to the child’s own practical authority).

211. *See* Schapiro, *Childhood and Personhood*, *supra* note 17, at 592 (contrasting instinct and adult authority as “[two] forms of alien rule”).

212. JOHN RAWLS, *A THEORY OF JUSTICE* 407–08 (rev. ed. 1999).

213. *Id.* at 408.

214. *Id.*

215. *See* Onora O’Neill, *Children’s Rights and Children’s Lives*, 98 *ETHICS* 445, 448–49 (1988) (arguing obligation-based accounts provide a more “direct, perspicuous and complete view” than rights-based models).

216. *Id.* at 446–47, 457–58.

217. *Id.* at 449.

This obligation extends beyond individual adults to the designed environments that increasingly structure children's discretionary experience. Ferguson has argued that a duty-based framework captures adult obligations to children more accurately than either a rights-based or welfare-based approach, precisely because duties direct attention to the conditions adults must maintain rather than to the interests children must vindicate.²¹⁸ The distinction is significant. A welfare framework asks whether this outcome is good for the child. A duty framework asks whether the adults are maintaining the conditions under which the child can constitute herself as a self-governing agent. The former is compatible with any mechanism that produces favorable outcomes, including algorithmic optimization. The latter is not.

3. *Why Does the Developmental Necessity Thesis Matter?*

Consider two systems a child might inhabit. The first operates through transparent, principled rules even restrictive ones: a game with fixed rules, a school with consistent expectations, a household with clearly defined boundaries. Whatever their other limitations, these systems model governance on reason. The child can observe the rules, understand (or come to understand) their rationale, and practice conforming her activity to principles she progressively internalizes. The second system operates through dynamic optimization. It adjusts difficulty, selects content, calibrates reward timing, and sequences activities not according to any principle the child could identify and endorse, but according to a behavioral metric that the child cannot observe and did not choose. The child's experience within such a system is one of responsiveness to external incentive rather than practice in self-direction.²¹⁹ A child navigating an AI-personalized gaming platform experiences herself as choosing what to play, when to continue, and whether to accept a new challenge. She is not coerced, but the principle directing her activity is not hers. It is the platform's engagement-optimization algorithm, which selects the next game, calibrates difficulty, times reward delivery, and sequences content according to a

218. See generally Lucinda Ferguson, *The Jurisprudence of Making Decisions Affecting Children: An Argument to Prefer Duty to Children's Rights and Welfare*, in LAW IN SOCIETY: REFLECTIONS ON CHILDREN, FAMILY, CULTURE AND PHILOSOPHY 141, 151–63 (Alison Diduck, Noam Peleg & Helen Reece eds., 2015) (arguing a duty-based framework shifts the inquiry from optimizing child interests to the environmental and institutional conditions adults must sustain).

219. In Kantian terms, this is the structure of heteronomy: a condition in which the will is determined not by a law it gives itself but by an external object or incentive. Heteronomy, governance by factors other than one's rational principle, is central to Schapiro's Kantian account. See IMMANUEL KANT, GROUNDWORK OF THE METAPHYSICS OF MORALS 47–48 (Mary Gregor ed. & trans., 1998) (contrasting autonomy with heteronomy).

behavioral metric the child cannot observe, did not choose, and could not evaluate if she tried. She feels free, but the locus of governance has shifted from anything she could recognize as her own to a system engineered to sustain her attention.

The significance of this distinction for emerging persons²²⁰ is that the child's developing conception of what it means to direct her own activity is shaped by the governance structures she inhabits. A child whose primary discretionary experience consists of algorithmically optimized engagement is learning something categorically different. She is learning what it feels like to have her activity directed by an opaque external agent whose purposes are not her own. Similarly, Brighthouse has argued that treating children's expressed preferences as authoritative abdicates adult responsibility for their development.²²¹ The platform that optimizes for a child's revealed behavioral preferences commits precisely this error at industrial scale: it treats as authoritative the signals of a will not yet constituted.

This is the structure that Schapiro's account identifies as a form of alien rule: governance that the child cannot recognize as principled and therefore cannot internalize as her own.²²² But where a conventional case may be the arbitrary or capricious parent, the AI-personalized gaming platform represents alien rule of a categorically different order. The parent who governs capriciously at least operates through commands the child can identify, resist, and evaluate against articulated reasons. The platform's optimization algorithm governs through an architecture the child cannot observe, pursuant to objectives she did not choose, and by means she could not evaluate even if she knew they existed. It is alien rule that does not present itself as rule at all.

If self-governance develops through progressive self-direction within expanding domains, and if the environments in which that self-direction occurs shape the emerging person's understanding of agency, then an

220. The conception of children as persons-in-information draws on a substantial body of work. See Schapiro, *Childhood and Personhood*, *supra* note 17, at 575, 585, 588–89 (describing childhood as a “liminal condition” where a person is “not yet herself”); see also Anne C. Dailey, *Children's Constitutional Rights*, 95 MINN. L. REV. 2099, 2103, 2144–76 (2011) (proposing “developmental rights” oriented toward children's future autonomy); GERISON LANSDOWN, *THE EVOLVING CAPACITIES OF THE CHILD* 15–17 (2005) (demonstrating an “emerging personal autonomy”).

221. See Harry Brighthouse, *How Should Children Be Heard?*, 45 ARIZ. L. REV. 691, 698–702 (2003) (arguing that in the context of custody, schooling and child-policy decisions, children's expressed views should be treated as consultative rather than authoritative, since children hold welfare rights but not agency rights).

222. See Schapiro, *Childhood and Personhood*, *supra* note 17, at 592–93 (arguing that legitimate adult authority should facilitate children's gradual development toward self-governance).

environment that systematically substitutes external optimization for self-direction is not merely occupying the child's time. It is operating on the developmental process itself. The next Section examines how existing legal frameworks already recognize this developmental interest, and how AI-personalized gaming platforms specifically threaten it.

B. The Developmental Gap: The Limits of Existing Law

The law has long treated children through the lens of categorical exclusion—denying capacity, withholding authority, and suspending legal agency until an arbitrary age threshold is crossed.²²³ However, doctrine has moved toward recognizing that children are persons undergoing a developmental process, not static subjects awaiting full agency at adulthood. The question is whether the law has followed that recognition to its necessary conclusion. Acknowledging that self-governance capacity emerges over time is one thing, specifying the obligations that designed environments bear toward that emergence is another. Using the infancy doctrine and constitutional jurisprudence, the sections that follow trace this distinction across these two domains and find, in each, a developmental gap where the law recognizes children's emerging capacity for self-governance but imposes no obligation on designed environments to protect the conditions under which it emerges.

1. *The Infancy Doctrine under Contract Law*

The infancy doctrine, which is rooted in common law and has existed since at least the fifteenth century,²²⁴ treats minority status as a legal disability.²²⁵ Contracts entered by minors are voidable at the minor's election, regardless of fairness, sophistication, or whether the minor actually lacked understanding.²²⁶ The doctrine disregards whether this particular minor made a bad deal or suffered harm, but rather, it categorically excludes

223. See Elizabeth S. Scott, *The Legal Construction of Adolescence*, 29 HOFSTRA L. REV. 547, 547, 550–57 (2000) (explaining that traditional legal doctrine uses age boundaries to deny legal capacity and defer full rights until adulthood); see, e.g., *Bellotti v. Baird*, 443 U.S. 622, 633–39 (1979) (plurality opinion) (reasoning that the law limits the legal capacity and autonomy of minors due to their peculiar vulnerability, inability to make mature decisions, and the importance of the parental role).

224. See 5 RICHARD A. LORD, *WILLISTON ON CONTRACTS* § 9:2 (4th ed. 2010).

225. See RESTATEMENT (SECOND) OF CONTRACTS § 14 (A.L.I. 1981) (“Unless a statute provides otherwise, a natural person has the capacity to incur only voidable contractual duties until the beginning of the day before the person’s eighteenth birthday.”).

226. See C.G. ADDISON, *TREATISE ON THE LAW OF CONTRACTS* 408–13 (William E. Gordon & John Ritchie eds., 1911) (describing the common law infancy doctrine); RESTATEMENT (SECOND) OF CONTRACTS § 14 (A.L.I. 1981).

all minors from binding contractual obligation based on age alone.²²⁷ Age operates as “the sole demarcation” between capacity and incapacity and draws a bright-line rule that admits no individualized inquiry.²²⁸ A minor can disaffirm even where she fully understood the transaction, benefited from it, and demonstrated judgment exceeding that of many adults.²²⁹ The rationale courts have given for this rule is protective: the infancy doctrine exists to shield minors from “foolishly squandering their wealth through improvident contracts with crafty adults who would take advantage of them in the marketplace.”²³⁰ Preston, the leading contemporary scholar on the doctrine, frames it as a safeguard against the legal disability of infants who are “universally considered to be lacking in judgment.”²³¹ Similarly, Farnsworth describes it as a “legal disability” attaching to status rather than to demonstrated incapacity.²³² The logic is paternalistic, and it mirrors the proficiency account, discussed above in Part III.A.1,²³³ in doctrinal form: children choose badly, so the law removes the choice entirely.

However, courts have developed a series of exceptions for events such as necessities, emancipation, misrepresentation of age, and retained benefits.²³⁴ These exceptions effectively introduce the individualized assessment the doctrine’s categorical structure was designed to avoid.²³⁵ In *Dodson v. Shrader*, the Tennessee Supreme Court departed from the traditional rule that permitted a minor to disaffirm and recover the full purchase price regardless of circumstances, holding instead that where a contract is “fair and reasonable” and the seller has not taken “unfair advantage,” the minor’s

227. See ADDISON, *supra* note 226, at 411–12 (explaining that the common law infancy doctrine allowed minors to avoid contracts based on age rather than individual capacity); *Dodson ex rel. Dodson v. Shrader*, 824 S.W.2d 545, 547–48 (Tenn. 1992) (explaining that the infancy doctrine is based on the law’s presumption that minors lack full contractual capacity).

228. Juanda Lowder Daniel, *Virtually Mature: Examining the Policy of Minors’ Incapacity to Contract Through the Cyberscope*, 43 GONZ. L. REV. 239, 242 (2007–08) (noting the “all or nothing bright line rule” of age as the demarcation of capacity).

229. See generally *supra* notes 226–27 and accompanying text.

230. *Halbman v. Lemke*, 298 N.W.2d 562, 564 (Wis. 1980).

231. Cheryl B. Preston & Brandon T. Crowther, *Infancy Doctrine Inquiries*, 52 SANTA CLARA L. REV. 47, 71–74 (2012) (framing the doctrine as protection to minors’ imprudent contracts); see also E. ALLAN FARNSWORTH, FARNSWORTH ON CONTRACTS § 4.3 (2d ed. 1998) (describing immaturity as a legal disability attaching to status).

232. FARNSWORTH, *supra* note 231, § 4.3.

233. See *supra* Part III.A.1; see also *supra* notes 191–95 and accompanying text (discussing the proficiency rationale for children’s diminished status).

234. See RESTATEMENT (SECOND) OF CONTRACTS § 14 cmt. c (A.L.I. 1981) (necessities exception).

235. See, e.g., *id.*; *Dodson*, 824 S.W.2d at 548, 549–50 (benefit rule); Preston & Crowther, *supra* note 231, at 51–62 (surveying exceptions).

recovery should be reduced to account for depreciation and use.²³⁶ DiMatteo has argued that this trajectory represents a shift “from incapacity to accountability” and an evolution in which the law increasingly treats the minor not as categorically disabled but as occupying a developmental position that generates differentiated obligations depending on context.²³⁷ Cunningham has pushed further, observing that the law “imposes a categorical rule” in some domains and “requires an examination of the particular child” in others, and has called for a comprehensive framework grounded in developmental psychology.²³⁸

Zimring’s influential concept of adolescence as a “learner’s permit” captures the logic underlying this doctrinal shift: the law’s treatment of minors is best understood not as protecting the incompetent from the consequences of their incompetence, but as structuring a supervised transition toward full participation—a period in which developing persons are granted expanding domains of discretionary activity precisely because such activity is constitutive of the capacities they are acquiring.²³⁹ Read in this light, the infancy doctrine’s categorical structure implies that what the law is tracking, however crudely, is a developmental process and that the minor’s exclusion from binding self-commitment reflects a recognition that she has not yet constituted the capacity for self-governance that contractual obligation presupposes.

But even this doctrinal evolution remains confined to a single register: the *transactional*. The infancy doctrine protects the minor’s interest in not being bound to a *disadvantageous exchange*. It undoes bad bargains. What it does not protect, because its conceptual apparatus cannot reach it, is the minor’s *constitutive interest*, or in other words, the interest in the environmental conditions necessary for self-governance capacity to emerge.²⁴⁰ The transactional interest is retrospective, asking whether this contract should be enforced against this minor.²⁴¹ The constitutive interest is prospective and

236. *Dodson*, 824 S.W.2d at 549–50.

237. Larry A. DiMatteo, *Deconstructing the Myth of the “Infancy Law Doctrine”*: From Incapacity to Accountability, 21 OHIO N.U. L. REV. 481, 510–25 (1994).

238. Larry Cunningham, *A Question of Capacity: Towards a Comprehensive and Consistent Vision of Children and Their Status Under Law*, 10 U.C. DAVIS J. JUV. L. & POL’Y 275, 286–87 (2006).

239. FRANKLIN E. ZIMRING, THE CHANGING LEGAL WORLD OF ADOLESCENCE 89–92 (1982). Zimring’s metaphor has been widely adopted. See, e.g., Elizabeth S. Scott & Thomas Grisso, *The Evolution of Adolescence: A Developmental Perspective on Juvenile Justice Reform*, 88 J. CRIM. L. & CRIMINOLOGY 137, 175 (1997).

240. On the distinction between transactional and constitutive interests in children’s law, see Feinberg, *supra* note 17, at 146–47 (distinguishing present welfare interests from “anticipatory autonomy rights” held in trust).

241. See ADDISON, *supra* note 226, at 411–12 (the infancy doctrine operates by determining whether a minor’s existing contractual obligations are enforceable).

structural; it instead asks whether the designed environment the minor inhabits is organized in a way that supports or undermines the developmental process through which she becomes capable of binding self-commitment in the first place.²⁴²

Consider a child who spends money on loot boxes within an AI-personalized gaming platform.²⁴³ The infancy doctrine provides a remedy: the child can disaffirm the purchase and recover her expenditure. In its categorical form, this protection is robust, requiring no showing of harm, exploitation, or impaired judgment. But the transactional remedy, even where it operates, leaves untouched the developmental harm that preceded and gave rise to the purchase. However, the child did not arrive at the loot box transaction in a vacuum. She arrived after weeks or months inside a system that calibrated variable-ratio reinforcement schedules to her behavioral profile, selected and sequenced content to sustain her engagement, and progressively shifted the locus of decisional control from anything she could recognize as her own to an optimization algorithm pursuing a metric she could neither observe nor evaluate.²⁴⁴ A legal framework that can void an unfair contract but cannot address the developmental conditions under which the minor exercises discretion leaves the deeper interest entirely unprotected. And it is the constitutive interest, not the transactional one, that the developmental necessity thesis identifies as the central regulatory concern.

2. Constitutional Jurisprudence: The Framework and Its Developmental Limits

Constitutional law tells a divergent story. The Supreme Court has never taken a unified approach to adolescent development. Instead, it has adjusted the adult baseline doctrine by doctrine, recognizing childhood in each context only for that doctrine's own purposes. The Supreme Court's foundational treatment of children is structured around the allocation of

242. See Schapiro, *What Is a Child?*, *supra* note 9, at 728–34 (children lack the capacity for self-government that enables actions to be attributable to their own practical identities).

243. See *A.V. ex rel. Vanderhye v. iParadigms, L.L.C.*, 562 F.3d 630, 635–36 (4th Cir. 2009) (refusing to permit minors to disaffirm an online contract while “retaining the benefits”); Preston & Crowther, *supra* note 231, at 77–79 (documenting the erosion of the infancy doctrine in online contracting).

244. See generally David Zendle & Paul Cairns, *Loot Boxes Are Again Linked to Problem Gambling: Results of a Replication Study*, 14 PLOS ONE, Mar. 7, 2019, <https://doi.org/10.1371/journal.pone.0213194> [<https://perma.cc/GY7A-H5KZ>]; DIGITAL, CULTURE, MEDIA & SPORT COMM., IMMERSIVE AND ADDICTIVE TECHNOLOGIES, 2017–19, HC 1846, at 29–30 (UK).

governance authority among adults. In *Meyer v. Nebraska*²⁴⁵ and *Pierce v. Society of Sisters*,²⁴⁶ the Court elevated to constitutional protection what it called the “liberty of parents and guardians to direct the upbringing and education of children under their control”²⁴⁷—a substantive due process right held by parents, not by the children whose lives it governs. By “constitutionalizing a patriarchal notion of parental rights,” *Meyer* and *Pierce* “interrupted the trend of family law moving toward children’s rights,” by treating the child less as an emerging person than as an extension of the parental estate.²⁴⁸ Although these cases did not rest on a theory of adolescent development, they constitutionalized adult authority over children. In *Bellotti v. Baird*,²⁴⁹ the Court’s justifications for the differential constitutional treatment of children—their “peculiar vulnerability,” their “inability to make critical decisions in an informed, mature manner,” and “the importance of the parental role in child rearing”—justify governance over children.²⁵⁰ But they do so differently: the first two by reference to what children lack, and the third by reference to what parents hold. These earlier cases contrast with the Court’s later jurisprudence, where its language becomes genuinely temporal for the first time.²⁵¹ Dailey and Rosenbury have termed this the “authorities framework.”²⁵² Constitutional childhood, on this account, is a jurisdictional contest between parent and state over the scope of permissible governance, in which the child appears not as a subject but as an object.²⁵³

This framework remained doctrinally stable until the Court’s Eighth Amendment jurisprudence introduced developmental science into constitutional reasoning. In *Roper v. Simmons*, the Court identified three characteristics that categorically distinguish juveniles from adults for purposes of capital punishment: their “lack of maturity and an

245. *Meyer v. Nebraska*, 262 U.S. 390, 400 (1923).

246. *Pierce v. Soc’y of Sisters*, 268 U.S. 510, 534–35 (1925).

247. *Id.*

248. Barbara Bennett Woodhouse, “Who Owns the Child?”: *Meyer and Pierce and the Child as Property*, 33 WM. & MARY L. REV. 995, 997, 1112–22 (1992).

249. 443 U.S. 622 (1979) (plurality opinion).

250. *Id.* at 634.

251. For the later cases, the most direct passages are *Roper v. Simmons*, 543 U.S. 551, 570 (2005) (the Court stated that the character of a juvenile “is not as well formed” and that personality traits are “more transitory, less fixed”); *Graham v. Florida*, 560 U.S. 48, 74 (2010) (the Court held that “juveniles are more capable of change than are adults, and their actions are less likely to be evidence of irretrievably depraved character”); and *Miller v. Alabama*, 567 U.S. 460, 471 (2012) (describing children’s traits as “less fixed” and the “signature qualities” of youth as “transient”).

252. Anne C. Dailey & Laura A. Rosenbury, *The New Law of the Child*, 127 YALE L.J. 1448, 1457, 1459–61, 1470 (2018).

253. *Id.* at 1471.

underdeveloped sense of responsibility,” their “vulnerability to negative influences and outside pressures,” and the fact that their “character is not as well formed.”²⁵⁴ *Graham v. Florida* extended this reasoning to prohibit life without parole for nonhomicide offenses, holding that a “juvenile should not be deprived of the opportunity to achieve maturity of judgment and self-recognition of human worth and potential.”²⁵⁵ And in *Miller v. Alabama*, Justice Kagan wrote that “children are constitutionally different from adults for purposes of sentencing,”²⁵⁶ holding that mandatory schemes impermissibly prevent sentencers from considering a juvenile’s “lessened culpability” and greater “capacity for change.”²⁵⁷

The Court’s reliance on developmental science was express rather than merely congruent. *Roper* described the “scientific and sociological studies” cited by the respondent and his amici as confirming what “any parent knows”; *Graham* invoked “developments in psychology and brain science” showing that “parts of the brain involved in behavior control continue to mature through late adolescence”; and *Miller* stated that those decisions rested “not only on common sense . . . but on science and social science as well.”²⁵⁸ The Court’s language across these decisions is explicitly temporal, reasoning that character is “not as well formed” because it is *being* formed, and that responsibility is “underdeveloped” because it is *developing*. But the purpose to which the Court puts this developmental recognition is specific and narrow. It constrains what the state may do *to* children through its punitive apparatus.²⁵⁹ Developmental science enters constitutional law as a limit on state coercion, not as an affirmative account of what the developmental process requires.²⁶⁰

A structural feature of American constitutional law reinforces this limitation. Since *DeShaney v. Winnebago County Department of Social Services*, the Due Process Clause has been understood to impose no affirmative duty on the state or its officers to protect a citizen’s life or liberty

254. *Roper*, 543 U.S. 551, 569–70 (2005).

255. *Graham*, 560 U.S. 48, 79 (2010).

256. *Miller*, 567 U.S. 460, 471 (2012).

257. *Id.* at 465 (quoting *Graham*, 560 U.S. at 68, 74).

258. *Roper*, 543 U.S. at 569; *Graham*, 560 U.S. at 68; *Miller*, 567 U.S. at 471.

259. See, e.g., *Roper*, 543 U.S. at 578–79 (barring capital punishment for offenders under eighteen); see also *Graham*, 560 U.S. at 74–75 (barring life without parole for juveniles who did not commit homicide).

260. See Laurence Steinberg, *The Influence of Neuroscience on U.S. Supreme Court Decisions Involving Adolescents’ Criminal Culpability*, 14 NATURE REV. NEUROSCIENCE 513, 513–15 (2013) (the Court used science to limit sanctions rather than articulate obligations); see also ELIZABETH S. SCOTT & LAURENCE STEINBERG, RETHINKING JUVENILE JUSTICE 16–18 (2008).

against private persons' invasions.²⁶¹ The Constitution, on this reading, is a charter of negative liberties: it constrains what the state may do, but does not require the state to provide the conditions under which development occurs.²⁶² Even *Roper's* progeny's recognition that children are developmentally different operates within this negative-rights architecture. The Court forbids the state from executing a juvenile because his character is not yet formed; however, it does not say that any institutional actor bears an obligation to protect the process of formation itself.²⁶³ The result is a doctrinal asymmetry in which constitutional law can recognize that children are developing, but has no doctrinal route for converting that recognition into positive obligations to protect adolescents' development.²⁶⁴ However, even

261. See 489 U.S. 189, 195–96 (1989).

262. See *id.* at 195 (describing the Due Process Clause as “a limitation on the State’s power to act, not as a guarantee of certain minimal levels of safety and security”); see also *Bowers v. DeVito*, 686 F.2d 616, 618 (7th Cir. 1982) (Posner, J.) (“The Constitution is a charter of negative liberties; it tells the state to let people alone; it does not require the federal government or the state to provide services, even so elementary a service as maintaining law and order.”).

263. Cf. Dailey, *supra* note 220, at 2144–78 (proposing affirmative constitutional rights to caregiving); Tamar Ezer, *A Positive Right to Protection for Children*, 7 YALE HUM. RTS. & DEV. L.J. 1, 22–28 (2004) (arguing for positive constitutional obligations).

264. The doctrinal architecture reveals a tension distributed across amendments: children are developmentally immature under the Eighth Amendment and autonomously capable under the First Amendment. The First Amendment jurisprudence governing children’s access to media shows this asymmetry. In *Ginsberg v. New York*, the Court upheld a state prohibition on selling sexually explicit material to minors, recognizing that the state’s regulatory authority over children’s wellbeing is broader than its authority over adults. See 390 U.S. 629, 638–40 (1968). *Ginsberg* thus permitted content restriction premised on children’s differential vulnerability. A concession, however limited, that the state may act on the recognition that children are not yet fully formed recipients of expressive material. Yet when California enacted a structurally parallel restriction on the sale of violent video games to minors, the Court in *Brown v. Entertainment Merchants Ass’n* struck it down, holding that “this country has no tradition of specially restricting children’s access to depictions of violence” and that minors possess a First Amendment right to receive speech absent parental objection. 564 U.S. 786, 795 (2011). This decision treats children as autonomous speech-receiving agents and as rights-holders whose access to content the state may not restrict. The distinction between *Ginsberg* and *Brown* is formalist, turning on the historical pedigree of the content category, not on what the child’s developmental process requires. The *Brown* majority distinguished *Ginsberg* on categorical rather than developmental grounds, prioritizing historical tradition over the requirements of child development. See 564 U.S. at 794–96. Meanwhile, the same Court that in *Brown* attributed to children the autonomous capacity to receive any violent content the market offers had, just six years earlier in *Roper*, attributed to children a developmental vulnerability so pronounced as to categorically exclude them from the most severe criminal sanction. On the tension between the Court’s simultaneous attribution of developmental vulnerability and autonomous capacity to children across doctrinal domains, see Catherine E. Smith, *Brown’s Children’s Rights Jurisprudence and How It Was Lost*, 102 B.U. L. REV. 2297, 2300–01 (2022); see also Clare Huntington & Elizabeth S. Scott, *Conceptualizing Legal Childhood in the Twenty-First Century*, 118 MICH. L. REV. 1371, 1398–1401 (2020).

if the constitutional framework were read to impose affirmative duties, as some scholars have proposed, the obligations envisioned are mainly directed at protection from harm, not at the constitutive conditions under which self-governance capacity emerges.²⁶⁵

C. Grounding Design Obligations in the Developmental Process

The regulatory concern, this Article has argued, is the architecture through which those environments extract their attention. The preceding parts established the salience of that claim: designed environments configured to capture and sustain engagement have long attracted legal intervention directed at the architecture rather than the user. Existing law has registered the shift, moving from content regulation toward design regulation across three doctrinal domains, without arriving at the normative foundation the attention turn requires. Regulatory salience, however, is not regulatory necessity. The developmental necessity thesis supplies the additional step. Designed attention extraction disrupts the developmental process through which that capacity comes into being—the movement from proficiency toward attributability, from performing competently to choosing as one’s own. The interest in environments structured to permit the emergence of self-governance is what this Article has called the constitutive interest, and it is the normative foundation on which the design obligation rests. What remains is to show that this foundation compels an affirmative obligation, and to determine where that obligation falls.

Developing the claim that the constitutive interest compels an affirmative obligation requires two inquiries, one theoretical and one institutional. The theoretical question, addressed in Part III.C.1, is why the constitutive interest compels an *obligation* directed at the platform for the state to regulate rather than just a *permission*. Shue’s foundational analysis of basic rights demonstrates that this is not a binary choice.²⁶⁶ Every basic right, Shue argues, generates a structure of correlative duties. The conventional distinction between negative and positive obligations dissolves once that

265. Cf. Dailey, *Children’s Constitutional Rights*, *supra* note 220, at 2144–49; Dailey & Rosenbury, *supra* note 252, at 1453 (arguing for “affirmative rights as children” to essential goods). These proposals prioritize protection over the constitutive conditions of self-governance.

266. See HENRY SHUE, *BASIC RIGHTS: SUBSISTENCE, AFFLUENCE, AND U.S. FOREIGN POLICY* 52–64 (2d ed. 1996) (arguing that every basic right generates tripartite correlative duties: to avoid, protect, and aid). This framework was codified in international human rights law through the Commission on Human Rights. Resolution 1988/29, U.N. Doc. E/CN.4/RES/1988/29 (Mar. 7, 1988) (The Right to Adequate Food as a Human Right), and adopted by the Committee on Economic, Social and Cultural Rights in General Comment No. 12, U.N. Doc. E/C.12/1999/5, ¶ 15 (1999).

structure is understood: even paradigmatically negative rights require affirmative institutional arrangements for their realization.²⁶⁷

The institutional question, addressed in Parts III.C.2 and IV, is how that obligation should be allocated: whether through a state-directed mandate, parental delegation, or platform-facing design duty. These parts then answer whether and how the obligation reaches the platform as the entity that architects the environment children inhabit.²⁶⁸ Taken together, the developmental necessity thesis reorients platform regulation along three axes: the duty-bearer shifts from the entity that processes data to the entity that controls the attention architecture;²⁶⁹ the object shifts from informational practices to the constitutive conditions of the developmental process;²⁷⁰ and

267. The Committee on the Rights of the Child itself employs the respect-protect-fulfill framework to structure state obligations toward children in digital environments. *See* SANDRA FREDMAN, HUMAN RIGHTS TRANSFORMED: POSITIVE RIGHTS AND POSITIVE DUTIES 65–91 (2008) (detailing that all rights require positive action for their realization); *see also* ROBERT ALEXY, A THEORY OF CONSTITUTIONAL RIGHTS 300–14 (Julian Rivers trans., 2002) (distinguishing defensive rights from rights to positive action).

268. *See generally* ANU BRADFORD, DIGITAL EMPIRES: THE GLOBAL BATTLE TO REGULATE TECHNOLOGY (2023). Bradford’s tripartite typology—American market-driven, European rights-driven, Chinese state-driven—captures geopolitical dimensions but lacks normative foundations for duty attribution. Part IV shares Bradford’s jurisdictional range but asks a different question: not which geopolitical vision animates regulation, but whether and how each institutional architecture attributes the design obligation to the platform as the entity that controls the attention environment children inhabit. On the infrastructural character of platforms, *see* JOSÉ VAN DIJCK, THOMAS POELL & MARIJN DE WAAL, THE PLATFORM SOCIETY: PUBLIC VALUES IN A CONNECTIVE WORLD 1–32 (2018).

269. The dominant framework for platform obligations grounds duties in information asymmetry. *See* Jack M. Balkin, *Information Fiduciaries and the First Amendment*, 49 U.C. DAVIS L. REV. 1183, 1186–98 (2016) [hereinafter Balkin, *Information Fiduciaries and the First Amendment*]; *see also* Jack M. Balkin, *The Fiduciary Model of Privacy*, 134 HARV. L. REV. F. 11 (2020) [hereinafter Balkin, *The Fiduciary Model of Privacy*]. For the critique that this framework cannot reach the structural power platforms exercise through design, *see* Lina M. Khan & David E. Pozen, *A Skeptical View of Information Fiduciaries*, 133 HARV. L. REV. 497, 520–41 (2019). On the distinctive character of architectural power, e.g., self-executing, defining possibility rather than sanctioning prohibition, *see* LAWRENCE LESSIG, CODE: VERSION 2.0 121–37, 341–45 (2006); *see also* James Grimmelman, *Regulation by Software*, 114 YALE L.J. 1719, 1723–35 (2005).

270. Existing platform governance scholarship has addressed the power platforms exercise through content moderation rather than through the design of the attentional environment. *See* TARLETON GILLESPIE, CUSTODIANS OF THE INTERNET: PLATFORMS, CONTENT MODERATION, AND THE HIDDEN DECISIONS THAT SHAPE SOCIAL MEDIA 15–23 (2018); *see also* Kate Klonick, *The New Governors: The People, Rules, and Processes Governing Online Speech*, 131 HARV. L. REV. 1598 (2018). Design duties currently ground in privacy or consumer protection rather than development. *See* WOODROW HARTZOG, PRIVACY’S BLUEPRINT: THE BATTLE TO CONTROL THE DESIGN OF NEW TECHNOLOGIES 6–30 (2018); *see also* Olivier Sylvain, *Intermediary Design Duties*, 50 CONN. L. REV. 203, 210–40 (2018).

the normative foundation shifts from the user's interest in her existing data to the child's interest in becoming capable of self-governance.²⁷¹

1. *The Character of the Obligation*

This Article has argued that children hold an interest in environments structured to permit the emergence of self-governance capacity, which is placed at risk by the architectural extraction of their attention. The question now is whether that interest merely justifies regulation or compels it. One possibility is modest. The constitutive interest supplies a normative justification for regulation, authorizing the state to impose design requirements on platforms if it chooses to do so. On this view, the interest grounds a permission—a reason the state may act, not a duty any actor must discharge. The permission is contingent on political will; if the regulator declines to act, no obligation exists, and no right is violated. Another possibility is that the interest generates an obligation, or a correlative duty directed at a specific bearer, enforceable as a matter of right rather than dependent on regulatory discretion.²⁷²

Applied to the constitutive interest, if children hold a basic interest in the conditions under which self-governance capacity emerges, that interest requires an obligation.²⁷³ This theoretical argument turns on what kind of interest the constitutive interest is. Some interests children hold are interests in particular goods, fundamental in the sense Shue identified: basic interests without which no other interests can be enjoyed.²⁷⁴ The constitutive interest is different in kind but equivalently fundamental. It is an interest not in a particular good but in the conditions under which the capacity to identify, evaluate, and pursue goods emerges at all—the capacity Schapiro identified as attributability, the condition in which one's choices become genuinely

271. See WILLIAMS, *supra* note 5, at 24 (“[a]utonomy is developmentally dependent upon the environment” and requires a structure to “reward self-control”) (citing NEIL LEVY, *NEUROETHICS* (2007)). Williams identifies the developmental stake but lacks a specific duty framework for children. On the underlying economic logic, see SHOSHANA ZUBOFF, *THE AGE OF SURVEILLANCE CAPITALISM* 293–328 (2019).

272. See Wesley Newcomb Hohfeld, *Some Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 23 *YALE L.J.* 16, 30–32 (1913) (distinguishing privilege from claim-right); see also JOSEPH RAZ, *THE MORALITY OF FREEDOM* 166–86 (1986) (explaining that rights are grounds for duties).

273. See RAZ, *supra* note 272, at 165–92 (providing an interest-based account of rights, under which important interests may justify imposing duties on others); see also Schapiro, *What Is a Child?*, *supra* note 9, at 729–33 (explaining that childhood is a developmental stage in which the capacities for self-government emerge).

274. See SHUE, *supra* note 266, at 18–20 (arguing that a basic right is a precondition for all others); see also Feinberg, *supra* note 17, at 145–47.

one's own.²⁷⁵ Alan Gewirth's hierarchy of generic rights supplies the formal bridge: "basic goods," defined as the necessary preconditions of action, generate the strongest obligations, while "nonsubtractive" and "additive" goods generate progressively weaker claims.²⁷⁶ The constitutive interest meets this threshold because it occupies a different normative position. It is the condition under which the capacity to hold and exercise interests comes into being. An interest of this character cannot be left to regulatory discretion. To treat it as one policy consideration among many is, in Dworkin's terms, to confuse a right with a policy goal—to make the precondition of self-governing agency contingent on the output of the political process it is supposed to ground.²⁷⁷

Shue's foundational analysis of basic rights provides the framework for specifying what the obligation demands.²⁷⁸ Shue demonstrates that every basic right generates three types of correlative duty: a duty to *respect* (to refrain from directly depriving the right-holder), a duty to *protect* (to prevent deprivation by third parties), and a duty to *fulfill* (to create the institutional conditions necessary for the right's realization).²⁷⁹ The distinction between negative and positive obligations dissolves once this structure is in view. Even the right to physical security—paradigmatically "negative"—requires

275. See Schapiro, *Childhood and Personhood*, *supra* note 17, at 579, 585–91. While a child may be capable of a task (proficiency), her actions may not yet be expressions of a will she has "made her own" (attributability). This Article extends Schapiro's framework to the environmental conditions necessary for this transition. See also RAZ, *supra* note 272, at 369–99 (explaining that autonomy requires non-interference and adequate options).

276. See ALAN GEWIRTH, *REASON AND MORALITY* 53–63 (1978) (categorizing conditions of agency into basic, nonsubtractive, and additive goods). This hierarchy generates a corresponding hierarchy of obligation, with basic goods commanding the strongest duties. See also JAMES GRIFFIN, *ON HUMAN RIGHTS* 33–55 (2008) (grounding human rights in "normative agency").

277. See RONALD DWORKIN, *TAKING RIGHTS SERIOUSLY* 81–92, 184–95 (1977) (distinguishing "arguments of principle" from "arguments of policy"); see also Ronald Dworkin, *Rights as Trumps*, in *THEORIES OF RIGHTS* 153 (Jeremy Waldron ed., 1984) (describing a right as a "trump" over aggregative policy reasoning). For the threshold at which interests generate rights, see John Tasioulas, *On the Foundations of Human Rights*, in *PHILOSOPHICAL FOUNDATIONS OF HUMAN RIGHTS* 45, 60–68 (Rowan Cruft, S. Matthew Liao & Massimo Renzo eds., 2015) (distinguishing human rights from universal human interests).

278. See SHUE, *supra* note 266, at 52–64 (arguing the negative/positive distinction rests on the conceptual error that negative rights require only forbearance). In fact, even the right to physical security requires institutions of prevention, detection, and remedy. See also STEPHEN HOLMES & CASS R. SUNSTEIN, *THE COST OF RIGHTS: WHY LIBERTY DEPENDS ON TAXES* 35–58 (1999) (arguing all rights are "positive" as they require affirmative government expenditure for enforcement).

279. The tripartite framework was codified in international human rights law. See U.N. Comm. on the Rts. of the Child, General Comment No. 25 (2021) on Children's Rights in Relation to the Digital Environment, ¶¶ 9–21, U.N. Doc. CRC/C/GC/25 (Mar. 2, 2021) [hereinafter General Comment No. 25] (discussing states' obligations to respect, protect, and fulfill children's rights in digital contexts).

not merely forbearance but institutions of prevention, detection, and remedy. A right that generated only a duty to respect would be a right without infrastructure, formally recognized and practically unenforceable.²⁸⁰

No existing framework for platform obligations captures this full structure, though each captures a dimension of it. Consider the duty to *respect* the constitutive interest—in other words, the obligation to refrain from directly undermining the conditions of developmental emergence. The most developed framework of these, Balkin’s information fiduciary model, operates squarely in this register.²⁸¹ Platforms, Balkin argues, receive confidential information in circumstances of trust and therefore owe duties of confidentiality, loyalty, and care analogous to those borne by doctors and lawyers.²⁸² But Khan and Pozen’s critique identifies a structural limitation that no extension of the fiduciary model can overcome.²⁸³ The fiduciary’s duties run to how the platform handles the data it has received, or rather, to *information*, not to how it architects the *environment* in which the user acts. A platform could scrupulously respect its users’ data while engineering an attention architecture that systematically forecloses children’s developmental conditions.²⁸⁴ It would satisfy every duty the fiduciary model generates. However, the constitutive interest demands are different: that platforms refrain from designing environments whose temporal and deliberative structure overrides the child’s developing capacity for self-

280. See FREDMAN, *supra* note 267, at 65–91 (arguing that traditional rights dichotomies should be abandoned); see also ALEXY, *supra* note 267, at 300–14 (distinguishing “defensive rights” (*Abwehrrechte*) from rights to positive action).

281. See generally Balkin, *Information Fiduciaries and the First Amendment*, *supra* note 269 (grounding fiduciary duties in users’ trust, dependence, and vulnerability); see also Balkin, *The Fiduciary Model of Privacy*, *supra* note 269 (describing fiduciary duties against manipulation and addiction-promoting design). Balkin’s framework has been influential in policy debates. See Neil Richards & Woodrow Hartzog, *A Duty of Loyalty for Privacy Law*, 99 WASH. U. L. REV. 961 (2021); cf. Claudia E. Haupt, *Platforms as Trustees: Information Fiduciaries and the Value of Analogy*, 134 HARV. L. REV. F. 34 (2020).

282. Balkin, *Information Fiduciaries and the First Amendment*, *supra* note 269, at 1207–08 (detailing that digital platforms may owe fiduciary duties when they receive personal information in relationships of trust).

283. See generally Khan & Pozen, *supra* note 269 (identifying four structural failures: dyadic limitations, shareholder conflicts, misaligned business models, and inability to reach design-based structural power).

284. See, e.g., Press Release, Fed. Trade Comm’n, Google and YouTube Will Pay Record \$170 Million for Alleged Violations of Children’s Privacy Law (Sep. 4, 2019), <https://www.ftc.gov/news-events/news/press-releases/2019/09/google-youtube-will-pay-record-170-million-alleged-violations-childrens-privacy-law> (privacy compliance concerns the collection and use of children’s data); see also U.S. SURGEON GEN., SOCIAL MEDIA AND YOUTH MENTAL HEALTH: THE U.S. SURGEON GENERAL’S ADVISORY 6–17 (2023) (discussing that platform design features aimed at maximizing engagement may shape children’s developmental environments).

direction. That is an obligation regarding architectural design, rather than that of informational practice.

The duty to *protect*, or to prevent deprivation by the foreseeable effects of design choices, requires attending to the consequences of the environment's architecture, not merely its most egregious features. Platform governance scholarship has clarified this structural dimension. Gillespie's account of platforms as "custodians of the Internet," Klonick's analysis of content-moderation as quasi-governmental rule-making, and Suzor's evaluation of platform governance against rule-of-law principles have established that platforms exercise governance power constitutive of what they are.²⁸⁵

These insights recognize that platforms bear responsibility for the environments they create. However, a platform that moderates content with exquisite procedural fairness while deploying infinite scroll, autoplay, and variable-ratio reinforcement to capture children's attention indefinitely would satisfy every obligation the content-governance framework generates. Rather than focusing solely on what appears within the environment, the protect dimension of the constitutive interest requires attending to how the environment's design structures the temporal, attentional, and deliberative conditions of engagement. Yeung's analysis of "hypernudges" echoes this point with precision: algorithmic systems constitute a mode of regulation by design, profoundly shaping the architecture of individual choice.²⁸⁶ The protect obligation asks whether the platform has guarded against design features whose foreseeable effect is to disrupt developmental conditions, even where that disruption is not the primary commercial purpose.

The duty to *fulfill* is the most demanding and the least developed in the existing literature. It requires avoiding harm or guarding against foreseeable disruption while also affirmatively structuring the environment to support the developmental process. Two proposals in the legal literature approach this register. Hartzog has argued that design is "an exercise of power" and that privacy law should regulate design choices rather than merely information practices; Sylvain has proposed affirmative "intermediary design duties" requiring platforms to structure their environments in ways

285. GILLESPIE, *supra* note 270; Klonick, *supra* note 270, at 1662–64; Nicolas Suzor, *Digital Constitutionalism: Using the Rule of Law to Evaluate the Legitimacy of Governance by Platforms*, 4 SOC. MEDIA & SOC'Y 1, 1–9 (2018); see also Evelyn Douek, *Governing Online Speech: From 'Posts-as-Trumps' to Proportionality and Probability*, 121 COLUM. L. REV. 759 (2021).

286. See Karen Yeung, *'Hypernudge': Big Data as a Mode of Regulation by Design*, 20 INFO., COMM'N & SOC'Y 118, 121–35 (2017) (algorithmic systems constitute "hypernudges" operating dynamically and opaquely on individual choice); see also JULIE E. COHEN, BETWEEN TRUTH AND POWER: THE LEGAL CONSTRUCTIONS OF INFORMATIONAL CAPITALISM 57–74 (2019) (describing the legal construction of personal data as a freely appropriable "biopolitical public domain").

that protect users.²⁸⁷ Both proposals represent a genuine advance and shift the object of regulation from data handling and content moderation to the design of the environment itself.²⁸⁸

Their rationale is harm prevention, seeing platforms as having a responsibility to try to prevent harms they can reasonably anticipate.²⁸⁹ What is imposed on the platform are negative constraints on what the platform must *not* do.²⁹⁰ Accordingly, platforms owe a duty to their users not to deceive them, not to manipulate their decision-making, and not to deploy design features that may foreseeably injure their interests.

The duty to fulfill the constitutive interest demands something further. The obligation is to refrain from harmful design while building a platform environment where the developmental interests of children are nurtured. As Helen Nissenbaum shows, duties in digital environments need not depend solely on showing a clear, tangible harm; they can also arise from the broader social norms that mediate how information flows.²⁹¹ This conceptual distinction is analogous to what we argue here. Harm-based regulations are thin and defensive.²⁹² Their approach is to begin with the harmful outcomes, trace them back to the product or platform features that caused it or are likely to cause it, and regulate those features accordingly.²⁹³ The developmental necessity thesis, in contrast, can also be proactive. It reasons forward from process to condition. It asks what the developmental process requires and obligates the platform to maintain those conditions. A harm-based framework does not oblige platforms where no specific injury

287. HARTZOG, *supra* note 270, at 15 (“privacy law currently ignores one of the most important ways power is distributed and exercised in our world”); Sylvain, *supra* note 270, at 266–73.

288. See HARTZOG, *supra* note 270, at 6–30 (arguing that privacy law should not focus solely on information practices but should also address the design of technologies); see also Sylvain, *supra* note 270, at 210–40 (proposing intermediary design duties based on the role of platform architecture in shaping user interactions).

289. See Sylvain, *supra* note 270, at 210–40 (intermediary design duties based on the role of platform design in producing and shaping user harms).

290. HARTZOG, *supra* note 270, at 93–94 (noting that privacy law should establish boundaries and constraints that shape technology design); see generally Sylvain, *supra* note 270 (intermediary liability doctrine as imposing legal boundaries based on providers’ contribution to harmful user conduct).

291. See HELEN NISSENBAUM, *PRIVACY IN CONTEXT: TECHNOLOGY, POLICY, AND THE INTEGRITY OF SOCIAL LIFE* 129–57 (2010).

292. See HARTZOG, *supra* note 270, at 56–60 (arguing that traditional privacy regimes fail to adequately account for the role of technology design in creating privacy risks). See generally Sylvain, *supra* note 270 (intermediary liability doctrines fail to account for how platform design choices shape online interactions).

293. See HARTZOG, *supra* note 270, at 70–71 (describing privacy law’s insistence on concrete, usually financial, harm).

has been proved, but the conditions of developmental emergence have never been provided. The developmental necessity thesis and its duty to fulfill does.

To sum up, the constitutive interest gives rise to a bundle of obligations that operate together. Because children rely on certain conditions to grow, platforms cannot shape spaces that undermine these conditions—this defines their responsibility to respect. Where design features might foreseeably disrupt their development, platforms must still act to remove those features. This is so even without an intended purpose, reflecting the duty to protect. Yet both these two duties concern only what platforms must avoid doing. The constitutive interest demands more than restraint alone. Cultivating children's development requires more than removing obstacles from their paths. Platforms have to build up and maintain the conditions upon which healthy development of children can take root. This entails the duty to fulfill.

2. The Architectural Power of Platforms

Lessig's foundational insight is that code operates as "built environment" and "architecture" in cyberspace.²⁹⁴ "Software or hardware that makes cyberspace what it is" thus regulates "social life in cyberspace"²⁹⁵ because it defines what is possible, what is visible, and what is rewarded within a digital environment, and it does so independently of any individual user's choice. This self-regulatory function of digital space was also made explicit by Reidenberg's parallel concept of "Lex Informatica."²⁹⁶ He describes how these default rules control how information flows, functioning as a regulatory instrument parallel to—and in many contexts more effective than—law.²⁹⁷ Grimmelmann, too, characterizes software as a distinctive regulatory form that is "automated," "immediate," and "plastic."²⁹⁸

In this way, the user of a digital platform cannot step around its deliberate design choices the way a pedestrian steps around a physical barrier. She acts within a digital space whose parameters have been predetermined.²⁹⁹ These decisions, including but not limited to feed composition, recommendation

294. LESSIG, *supra* note 269, at 121.

295. LESSIG, *supra* note 269, at 121.

296. See Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rules Through Technology*, 76 TEX. L. REV. 553, 553–70 (1998) (coining the term "Lex Informatica" to describe how technological configurations impose default rules parallel to law).

297. *Id.*

298. Grimmelmann, *supra* note 269, at 1723.

299. See ROGER BROWNSWORD, LAW, TECHNOLOGY AND SOCIETY: REIMAGINING THE REGULATORY ENVIRONMENT 18–52 (2019); see also Andrew D. Murray & Colin T. Scott, *Controlling the New Media: Hybrid Responses to New Forms of Power*, 65 MOD. L. REV. 491, 500–15 (2002).

algorithms, notification schedules, reinforcement mechanics, scroll design, and autoplay sequences, are specific and consequential. Each determines the temporal and attentional structure of the digital environment a child inhabits. Platforms making these decisions do not merely mediate a child's activity within a pre-existing space. These design choices *constitute* the space.

This architectural power is pivotal to the platform's commercial operations. Zuboff's analysis of surveillance capitalism demonstrates that the platform architecture serves the extraction of data harvested from user behavior beyond what is needed to improve the service, repurposed as prediction products sold to third parties, termed "behavioral surplus."³⁰⁰ The design choices that capture and sustain engagement are the same mechanisms through which the business model operates. Gaming platforms have both the capacity and the structural incentive to engineer environments that maximize engagement regardless of the developmental consequences for children who inhabit them. Nor can the child simply leave. Platforms have become infrastructural in social life rather than optional services a user may take or leave.³⁰¹ The child denied access is excluded from the social world her peers inhabit. The child granted access enters an environment designed by an entity whose commercial interests are structurally misaligned with her developmental needs.

Yet regulating gaming addiction confronts three persistent controversies that any workable framework must navigate. First, there is fundamental tension over whether children require *protection from harm or respect for autonomy*: child-rights advocates invoke the United Nations Convention on the Rights of the Child to argue that heavy-handed design restrictions infantilize young people and deny them agency,³⁰² while child-protection advocates respond that children's developing brains and limited self-

300. ZUBOFF, *supra* note 271, at 63–98. Zuboff's "behavioral surplus" explains that attention architecture is commercially dictated to maximize engagement, which is a prerequisite for surplus extraction.

301. See VAN DIJCK, POELL & DE WAAL, *supra* note 268, at 15–16; see also Jean-Christophe Plantin et al., *Infrastructure Studies Meet Platform Studies in the Age of Google and Facebook*, 20 NEW MEDIA & SOC'Y 293, 294–95 (2018).

302. See Eva Lievens, *Growing Up with Digital Technologies: How the Precautionary Principle Might Contribute to Addressing Potential Serious Harm to Children's Rights*, 39 NORDIC J. HUM. RTS. 128, 129, 136–40 (2021) (applying the precautionary principle to balance protection with children's digital opportunities); Conrad Nyamutata, *Childhood in the Digital Age: Socio-Cultural and Legal Analysis of the UK's Proposed Virtual Legal Duty of Care*, 27 INT'L J.L. & INFO. TECH. 311, 313–14, 338 (2019) (vulnerability-based models may undermine participation rights); see also Danial Kamal Shahreen, *'Won't Somebody Please Think of the Children!' Online Content Promoting/Encouraging Self-Harm and the Law: Socio-Legal Study*, 3 YORK L. REV. 51, 80–83 (2022) (arguing that a rights-based perspective provides a less restrictive justification for intervention than traditional paternalism).

regulation capacity justify paternalistic intervention when platforms engineer compulsion.³⁰³ Second, even where intervention is accepted as legitimate, there is deep disagreement over the proper *allocation of responsibility*—whether accountability should rest primarily with the state (through binding mandates) or with families (through parental control and choice)—with libertarian critics warning that direct state regulation displaces parental authority and imposes a single model of “appropriate” childhood across diverse family values.³⁰⁴ Third, platform accountability is contested on grounds of *constitutional protection and innovation policy*: industry groups argue that regulating game mechanics constitutes content-based restriction of creative expression, and that ex ante design duties will chill experimentation, stifle pro-social features, and burden small developers who lack compliance capacity.³⁰⁵

This subsection argues that the harm gaming platforms inflict on children through attention extraction is not merely harm to their present interests but harm to the developmental conditions through which their capacity for future self-determination is formed, which is a category of harm that generates correspondingly stronger duties on those who produce it.

IV. THREE MODELS OF DUTY ATTRIBUTION

The theoretical case for the platform as duty-bearer has been made. But how and to whom that obligation is allocated in reality is a different matter. Over time, three models have emerged across major jurisdictions globally: state-centered, family-centered, and platform-centered. Each of these frameworks relies on a different institution as the primary duty-bearer. Under the first model, with China and Vietnam as the representatives, state lawmakers set legislative limits within which platforms operate; governments formulate regulatory standards to protect the developmental interests of children. The United States, South Korea, and Japan are notable examples of the second model. These countries delegate the duty to the family, allowing children’s engagement with digital environments to be primarily governed by parental authority. The third model is seen mostly in the European Union and the United Kingdom. Under this platform-centered

303. Matthew B. Lawrence, *Addiction and Liberty*, 108 CORNELL L. REV. 259, 291–305 (2023) (arguing algorithmic design exploits cognitive vulnerabilities, justifying intervention to protect autonomy).

304. See Martha Minow, *What Ever Happened to Children’s Rights?*, 80 MINN. L. REV. 267, 268–78 (1995); see also Woodhouse, *supra* note 248, at 1001–02.

305. See *Brown v. Ent. Merchs. Ass’n*, 564 U.S. 786, 790, 799–804 (2011) (recognizing video games as protected expressive works under the First Amendment); see also Moritz Büchi et al., *The Chilling Effects of Algorithmic Profiling: Mapping the Issues*, 36 COMPUT. L. & SEC. REV., Apr. 2020, at 4.

duty model, the platform itself makes decisions on how to regulate its own online environment. All three models are explained and evaluated in this section along three axes: who the duty-bearer is, the policy object of regulation, and the normative foundation on which the obligation rests.

A. State-Directed Mandate: China and Vietnam

China's regulatory trajectory represents the starkest example of direct state intervention in the governance of children's digital engagement. Concerns about gaming addiction emerged as early as the early 2000s, when the state newspaper *Guangming Daily* described computer games popular among children as "electronic heroin"—a framing that established the normative tone of state regulation for the next two decades.³⁰⁶ The initial regulatory instruments were blunt: the 2002 Regulations on Internet Access Services prohibited minors from entering internet cafés³⁰⁷ and the 2005 joint opinions of the Ministry of Culture and the Ministry of Information Industry restricted certain game genres for younger players.³⁰⁸ The 2007 Anti-Addiction System Development Standards introduced the temporal vocabulary to govern the field, defining "healthy gaming time" as under three hours of continuous play per day, "fatigue gaming time" as three-to-five hours, and "unhealthy gaming time" as anything beyond five hours.³⁰⁹

By 2019, national authorities had tightened the framework considerably. The National Press and Publication Administration imposed granular restrictions on minors' access to online games that year.³¹⁰ The new rules

306. Xia Fei, *Diannao Youxi Miaozhun Haizi de "Dianzi Hailuoyin"* [Computer Games Targeting Children Are "Electronic Heroin"], *GUANGMING DAILY*, May 9, 2000.

307. See Hulanwang Shangwang Fuwu Yingye Changsu Guanli Tiaoli [Regulations on the Administration of Business Premises for Internet Access Services] (promulgated by the State Council, Sep. 29, 2002, effective Nov. 15, 2002), art. 21 (China).

308. Wenhua Bu, Xinxu Chanye Bu Guanyu Wangluo Youxi Fazhan he Guanli de Ruogan Yijian [Opinions on the Development and Administration of Online Games] (promulgated by the Ministry of Culture and the Ministry of Information Industry, July 12, 2005), art. 12 (China).

309. Xinwen Chuban Zongshu, Wangluo Youxi Fangchenmi Xitong Kaifa Biaozhun [Development Standards for the Online Game Anti-Addiction System] (promulgated by the Gen. Admin. of Press & Publ'n, Apr. 15, 2007) (China); Xinwen Chuban Zongshu Deng Guanyu Baohu Weichengnianren Shenxin Jiankang Shishi Wangluo Youxi Fangchenmi Xitong de Tongzhi [Notice on Protecting the Mental and Physical Health of Minors and Implementing the Anti-Addiction System of Online Games] (promulgated by the Gen. Admin. of Press & Publ'n et al., Apr. 4, 2007, effective July 16, 2007) (mandating state-standardized anti-addiction systems and real-name verification for minors).

310. See Guojia Xinwen Chuban Shu Guanyu Fangzhi Weichengnianren Chenmi Wangluo Youxi de Tongzhi [Notice on Preventing Minors from Indulging in Online Games] (promulgated by the Nat'l Press & Pub. Admin., Oct. 25, 2019, effective Nov. 1, 2019) (China).

limited both when minors could play and how much they could spend.³¹¹ The state regulation imposed a nightly curfew from 22:00 to 8:00. Playtime was capped at 1.5 hours on ordinary days and three hours on holidays. In addition, the rules set single-purchase spending limits of fifty yuan for users aged eight to sixteen and 100 yuan for those aged sixteen to eighteen, with cumulative monthly caps of 200 and 400 yuan respectively.³¹² The 2021 “830 New Rules” tightened these restrictions even further.³¹³ Under the new regime, minors may play only between 20:00 and 21:00. Even then, access is limited to Fridays, Saturdays, Sundays, and public holidays.³¹⁴ Compliance with the temporal and spending restrictions is enforced through real-name verification and, on some platforms, facial recognition technologies.³¹⁵ Tencent’s *Honour of Kings* had already begun using facial recognition for age verification in 2018.³¹⁶

The regulatory apparatus continued to expand in multiple directions. The revised Law on the Protection of Minors and the 2024 Regulations on the Protection of Minors in Cyberspace laid a multi-faceted regulatory framework.³¹⁷ Across four dimensions, platforms today need to implement state policies in the domains of content management, time management, spending management, and personal information protection.³¹⁸ Most

311. *See id.* pts. 1–3 (establishing a real-name registration system, restricting minors’ gameplay time, and limiting in-game purchases by minors).

312. *See id.* pt. 3.

313. *See* Guojia Xinwen Chuban Shu Guanyu Jinyibu Yangge Guanli Qieshi Fangzhi Weichengnianren Chenmi Wangluo Youxi de Tongzhi [Notice on Further Imposing Strict Administrative Measures to Effectively Prevent Minors from Becoming Addicted to Online Games] (promulgated by the Nat’l Press & Pub. Admin., Aug. 30, 2021, effective Sep. 1, 2021) (China) (known as “the 830 New Rules”).

314. *Id.* pt. 1.

315. *See* sources cited *supra* notes 309–11 (requiring real-name registration and login for minors’ accounts); *see also* China’s ‘Midnight Patrol’ Cracks Down on Young Gamers, BBC NEWS (July 7, 2021), <https://www.bbc.com/news/technology-57752782> [<https://perma.cc/7FK4-M6JL>] (describing Tencent’s facial-recognition checks on accounts active at night).

316. *See* *Honour of Kings Uses Facial Recognition to Check Ages*, BBC NEWS (Oct. 1, 2018), <https://www.bbc.com/news/technology-45707469> [<https://perma.cc/9LCZ-VR9B>].

317. *See* Weichengnianren Baohu Fa [Law of the People’s Republic of China on the Protection of Minors (2024 Amendment)], chs. II–VII (promulgated by the Standing Comm. Nat’l People’s Cong., Sep. 4, 1991, last revised Apr. 26, 2024) (China); *see also* Weichengnianren Wangluo Baohu Tiaoli [Regulations on the Protection of Minors in Cyberspace] chs. II–V (promulgated by the State Council, Oct. 16, 2023, effective Jan. 1, 2024) (China).

318. *See* Weichengnianren Baohu Fa [Law on the Protection of Minors] (promulgated by the Standing Comm. Nat’l People’s Cong., Sep. 4, 1991, last revised Apr. 26, 2024) (China); *see also* Weichengnianren Wangluo Baohu Tiaoli [Regulations on the Protection of Minors in Cyberspace] (promulgated by the State Council, Oct. 16, 2023, effective Jan. 1, 2024) (China).

recently, state-mandated guidelines requested gaming platforms to implement a “minor mode” across devices.³¹⁹ Gaming platforms thereafter integrated new approaches into this mode, including, but not limited to, age-differentiated content, restricted functionality, and parental controls.³²⁰

Vietnam followed a similar path.³²¹ Decree No. 147/2024 adopts a dual classification framework for online games.³²² The first sorting is structural, dividing games into four categories, G1 through G4, by how players interact with one another and the enterprise’s service models.³²³ The second is developmental, requiring every game to carry an age label according to its content and its likely effect on players.³²⁴ But age-appropriate content classification is only the beginning.³²⁵ The decree also governs how long children may play, working through technical limits and behavioral nudges together.³²⁶ For players under eighteen, an enterprise must build in technical measures capping play at sixty minutes for a single game and 180 minutes a day across every game it offers that age group.³²⁷ It must also display on the player’s screen, every thirty minutes, a warning that reads: “Playing more than 180 minutes a day will negatively affect health.”³²⁸

Vietnam’s regulatory regime is built from the top down. The state makes almost every decision about how children meet games: who may play which tier, for how long, and what they are told when the time runs out. The platforms have no say in determining what kind of content should be made accessible to each age group of players. Nor did they choose the time-based

319. See Yidong Huijianwang Weichengnianren Moshi Jianshe Zhinan [Guidelines for the Construction of a Minor Mode for the Mobile Internet] (promulgated by the Cyberspace Admin. of China, Nov. 15, 2024) (China).

320. See *id.* pt. 4.

321. See Nghị Định 147/2024/NĐ-CP [Decree No. 147/2024/ND-CP on the Management, Provision, and Use of Internet Services and Cyber Information] (Nov. 9, 2024), art. 54(3)(b) (Viet.) (requiring online game providers to verify player information, provide age-appropriate content, warn users of excessive playtime, and implement measures to limit playtime for children and persons under eighteen).

322. See *id.* arts. 37–38.

323. See *id.* art. 37(1) (classifying online video games into G1–G4 categories based on the nature of interactions among players and between players and enterprise game servers).

324. See *id.* art. 38(1) (classifying online video games by players’ age).

325. Decree No. 147/2024 does not equate the G1–G4 categories with age restrictions. Instead, the two classifications serve different regulatory functions: G1–G4 categories determine the type of game service subject to regulatory oversight, while age ratings determine the suitability of the game for different groups of players.

326. See Decree No. 147/2024/ND-CP, arts. 39(1)(e)–(g), 48(1)(e)–(g) (Viet.) (requiring online game providers to implement gameplay-time restrictions for players under eighteen and to display recurring warnings concerning excessive gaming).

327. See *id.*

328. See *id.*

thresholds.³²⁹ Platforms play a role of execution. They implement regulatory frameworks that arrived fully developed by government regulators. In essence, platforms exercise little judgment about how to adapt their online environment to fit the developmental needs of their youngest users. They merely comply with state-directed instructions. The obligation to safeguard children's developmental interests belongs primarily to the state.³³⁰ Even the family's part is state-scripted. Parents and guardians of players under sixteen register and supervise their children's accounts because the decree directs them to.³³¹ The platform is the instrument through which the state discharges it.

At the heart of these centralized frameworks is access control to online gaming. Temporal management is a convenient approach. How long does a child spend on a game, and at what hour? These access control measures put these frameworks ahead of laissez-faire regimes focused on content alone. The potential benefit is real and, at least judging from its appearance, very likely to be effective.³³² However, the tools remain blunt and even arbitrary. Why cap gaming play at three hours rather than two? Why would a curfew be placed at 21:00 but not 22:00? It seems that these thresholds are more likely to be prompted by administrative considerations than supported by scientific evidence.

The allocation of duty is clear: the *duty-bearer* is the state. State regulators prescribed time limits and other access control regimes. Gaming platforms must comply with these numerical caps in a mechanical manner. In contrast, these regimes have little interest in restructuring design features that are the real cause of attention capture. This Article discussed these mechanisms at length in its earlier sections: infinite scroll, variable-ratio reinforcement, and autoplay.³³³ Alas, state regulators, due to their lack of

329. See *id.* arts. 38(2)(a), 39(1)(e)–(g) (requiring enterprises to classify games according to prescribed age categories and implement technical systems for gameplay-time limits and warnings).

330. See generally Phan Quang Anh, *Media Governance: Managing Online Games Seen from the Perspective of the State in Vietnam*, 7 HELIYON, Jan. 2021 (characterizing Vietnam's online game governance as a state-centered regulatory model).

331. See Decree No. 147/2024/ND-CP, art. 56(1) (requiring parents or legal guardians of players under sixteen to register accounts and supervise their gameplay and game content).

332. See, e.g., Qiongyao Yang et al., *Effect of Online Game Policy on Smartphone Game Play Time, Addiction, and Emotion in Rural Adolescents of China*, 23 BMC PSYCHIATRY 814 (2023) (finding that China's online game regulation significantly reduced online game play time and addiction scores among rural adolescents); see also Pei-Jie Chen, *The Game Industry Committee: Minors' Addiction to Games Basically Resolved, Refund Channels Should Be Strengthened*, S. METROPOLIS DAILY (Nov. 22, 2022), <https://m.mp.oeeee.com/a/BAAFRD000020221122742244.html> [https://perma.cc/5D2F-FW8M] (reporting the Chinese Game Industry Committee's assessment that regulatory interventions had addressed minors' gaming addiction).

333. See generally *supra* Part I.

technical expertise and industrial-insider insights, scratch the surface of the symptom but not the roots of the illness. Under this model, the platform executes the state's orders but does not independently or directly bear the obligation of regulation. The underlying *normative foundation*, like with state intervention in other social spheres, remains regime legitimacy and social order.³³⁴ The platform responds to the state commands from the top, not because the child's constitutive interest requires their affirmative actions. This being said, the developmental interest of the child may be incidentally served by these measures and may well form part of the incentives behind state regulation.

B. Family Delegation: South Korea, Japan and the United States

Jurisdictions in this category share a common feature: the obligation to govern children's digital engagement is delegated to the family. We must begin the analysis of this model with a major caveat. Across these jurisdictions, the so-called family-centered model is better understood not as a neat or unified type but as a residual regulatory approach that emerges when direct state regulation proves difficult to sustain or is still under development. South Korea serves as a pertinent example of this dynamic: after a decade of state-centered control under the mandatory shutdown law, it shifted in 2021 toward a "choice system" that places greater responsibility on minors and their parents or guardians.³³⁵ Japan, in contrast, demonstrated a longstanding emphasis on parental controls, education, and community efforts rather than state-directed prohibitions.³³⁶ The United States, too, has largely adopted a family-based model through Entertainment Software Rating Board (ESRB) ratings and parental delegation.³³⁷ It does so, however, partly because stronger state-centered approaches have been

334. See Dailey & Rosenbury, *supra* note 252, at 1473–1502; see also *Don't Ban Teenagers from Social Media*, ECONOMIST (Feb. 12, 2026), <https://www.economist.com/leaders/2026/02/12/dont-ban-teenagers-from-social-media> (on file with the *Fordham Urban Law Journal*).

335. See Geim Saneop Jinheung-e Gwanhan Beopnyul [Game Industry Promotion Act], Act No. 15859, Dec. 11, 2018, art. 12-3 ("choice permit system" transfers time-management responsibility to parents) (S. Kor.).

336. See, e.g., Kagawa-ken Netto Gēmu Izonshō Taisaku Jōrei [Kagawa Prefecture Ordinance on Measures Against Internet and Game Addiction], Kagawa Prefectural Ordinance No. 24, 2020, art. 18 (Japan) (imposing on guardians a *doryoku gimu*, or duty to endeavor, without sanctions for non-observance).

337. See Russell N. Laczniak et al., *Parental Restrictive Mediation and Children's Violent Video Game Play: The Effectiveness of the Entertainment Software Rating Board (ESRB) Rating System*, 36 J. PUB. POL'Y & MKTG. 70 (2017) (finding that parental restrictive mediation reduces children's violent video game play and that the effect is enhanced when parents use the ESRB system).

constitutionally constrained.³³⁸ At the same time, recent developments in the United States point toward a more platform-centered turn. The United States' course, therefore, shows how a system based on family authority may gravitate toward platform-centered governance without yet becoming a fully unified state-regulatory model.³³⁹

South Korea's trajectory illustrates the default duty placed on parents and family when state intervention is rolled back. In 2011, the Youth Protection Act introduced a mandatory "shutdown law."³⁴⁰ Widely known as the "Cinderella Law," this Act prohibited internet gaming platforms from providing access to minors under sixteen between midnight and 6:00.³⁴¹ The law was soon challenged on paternalistic grounds.³⁴² Critics found the regulation both incomplete and ineffective.³⁴³ The restrictions applied only to PC games, leaving mobile games entirely unregulated.³⁴⁴ Minors routinely bypassed its age-verification restrictions by using the identities of

338. See *Brown v. Ent. Merchs. Ass'n*, 564 U.S. 786, 790, 799–805 (2011) (holding that video games are protected under the First Amendment and that the government may not restrict minors' access to video games based on content concerns alone).

339. See Children's Online Privacy Protection Act of 1998, 15 U.S.C. §§ 6501–6506 (requiring verifiable parental consent before the collection of personal information from children under thirteen).

340. Case on Prohibition of Nighttime Access to Online Games by Juveniles, 26-1(B) KCCR 176, 2011Hun-Ma659-683 (consol.), at 46–47 (Const. Ct. Apr. 24, 2014) (S. Kor.) (explaining that the "mandatory shutdown system" was first introduced by amendment to the Juvenile Protection Act on May 19, 2011).

341. See Cheongsongyeon Bohobeop [Youth Protection Act], Act No. 11048, Sep. 15, 2011, art. 26 para. 1 (S. Kor.).

342. See, e.g., *Case on Prohibition of Nighttime Access to Online Games by Juveniles*, 26-1(B) KCCR 176, 2011Hun-Ma659-683 (consol.) (upholding the constitutionality of the mandatory shutdown system); see also Yoonmo Sang, Sora Park & Hogeun Seo, *Mobile Game Regulation in South Korea: A Case Study of the Shutdown Law*, in *MOBILE GAMING IN ASIA: POLITICS, CULTURE AND EMERGING TECHNOLOGIES* 68 (Dal Yong Jin ed., 2017) (arguing that "the Shutdown Law's paternalistic approach could generate psychological resistance and backlash to the current legal regime").

343. See, e.g., Il Hwan Kim et al., *Status and Problems of Online Game Regulations for Juvenile Protection—Centered on the Online Game Shutdown System of Korea*, 9 KSII TRANSACTIONS ON INTERNET & INFO. SYS. 1548, 1548–49 (2015); Jiyun Choi et al., *Effect of the Online Game Shutdown Policy on Internet Use, Internet Addiction, and Sleeping Hours in Korean Adolescents*, 62 J. ADOLESCENT HEALTH 548 (2018).

344. See Sang, Park & Seo, *supra* note 342, at 61.

their adult family members.³⁴⁵ As a result, no empirical studies could show meaningful changes in their sleep duration or gaming behavior.³⁴⁶

In 2021, the controversial shutdown provisions were repealed. The Minister of Culture, Sports and Tourism announced its replacement with a “choice permit system” under the Game Industry Promotion Act.³⁴⁷ This led to a transfer of responsibility for managing children’s gaming time from the state to parents.³⁴⁸ The Youth Protection Act retains Article 27, which authorizes the Minister of Gender Equality and Family to provide counseling, education, and treatment for youth suffering from “internet game addiction and excessive immersion,” but the operative obligation has shifted from state command to parental choice.³⁴⁹ The transition was political rather than regulatory. Despite being framed as a move from paternalistic regulation to family autonomy, the repeal reflects a deeper political settlement at a moment when direct government control had become both unpopular and difficult to justify.³⁵⁰ The burden of regulating children’s gaming was thus offloaded onto households. This was, however, old wine in a new bottle. Parents now decide when to impose the curfew that the state used to impose on their behalf. The regime still imposes time-based restrictions and access controls. What neither the old law nor the new system was ever designed to do is confront the attention-capturing architecture that makes those restrictions necessary in the first place.

Japan’s approach is the most emblematic of the family-centered model. In 2008, the Ministry of Education issued guidance recommending that schools and parents restrict children’s mobile phone use.³⁵¹ These

345. See Changjun Lee, Hongbum Kim & Ahreum Hong, *Ex-Post Evaluation of Illegalizing Juvenile Online Game After Midnight: A Case of Shutdown Policy in South Korea*, 34 *TELEMATICS & INFORMATICS* 1597 (2017) (noting that minors could circumvent time limitations by using adult identities to bypass age-verification protocols).

346. See Choi et al., *supra* note 343; see also Wook Joon Sung, 게임 셧다운(shutdown)제 정책이 청소년의 게임사용시간에 미치는 효과 연구 [*A Study on the Effect of the Policy of Online Game Shutdown on the Game Time of Youth*], 30 *SOC. SCI. RSCH. REV.* 233 (2014) (S. Kor.) (finding that the shutdown policies had no effect on adolescents’ gaming time).

347. See Seonmee Lim, Nara Park & Ian Roberge, *Wrong Now, Right Then: Policy Salience in the Termination of the South Korean Shutdown Act*, 45 *POL’Y & SOC’Y* 178, 178–94 (2026) (discussing the termination of the Shutdown Act and the resulting shift in South Korea’s approach to regulating adolescent gaming).

348. See Cheongsongyeon Bohobeop [Youth Protection Act], Act No. 18550, Dec. 7, 2021, art. 26 (S. Kor.); see also Geim Saneop Jinheung-e Gwanhan Beopnyul [Game Industry Promotion Act], Act No. 20909, Apr. 8, 2025, art. 12-3 (S. Kor.) (as amended).

349. See Youth Protection Act, Act No. 18550, art. 27, para. 1 (S. Kor.).

350. See Lim, Park & Roberge, *supra* note 347, at 182–83.

351. See Monbu Kagakushō [Ministry of Education, Culture, Sports, Science and Technology], Jidō Seito ga Riyō Suru Keitai Denwa nado o Meguru Mondai e no Torikumi

recommendations materialized into local initiatives. Kariya City in Aichi Prefecture implemented a voluntary smartphone ban that recommended no use after 9 PM for children who had not completed compulsory education.³⁵² This represents a “domestic agreement” extended to the community rather than a formal regulation.³⁵³ In 2020, Kagawa Prefecture enacted the first local ordinance targeting internet game addiction.³⁵⁴ Article 18 of the ordinance sets sixty-minute daily limits on gaming, ninety minutes on non-school days, and nighttime cutoffs on smartphone use at 9 PM for children who have not completed compulsory education and 10 PM for all other minors.³⁵⁵ But the ordinance imposes a *doryoku gimu* (duty to endeavor) rather than a mandatory obligation.³⁵⁶ The distinction is legally significant. The ordinance articulates a statutory expectation without sanctions for non-compliance, functioning as “a rough guide for household rules, or a non-

no Tettei ni Tsuite [Thorough Implementation of Measures Regarding Problems Associated with Mobile Phones Used by Children and Students], 20 Monka-Shō [Ministry of Ed., Sports, Sci. & Tech.] No. 49 (July 25, 2008) (Japan).

352. See Kazuo Takeuchi, “Yoru 9-ji Ikō Kētai Sumaho Kinshi!” *Kariya-shi Gakkō no Hogosha e no Yōsei no Imi to Kadai* [“Ban on Cell Phones and Smartphones After 9 PM!” *The Meaning and Challenges of the Request to Parents by Kariya City Schools*], YAHOO! JAPAN NEWS (Mar. 18, 2014), <https://news.yahoo.co.jp/expert/articles/63f5a20363437476afad5a9508f02f4dc6d56a56> [https://perma.cc/G2V9-8QQ2].

353. See Nagayuki Saito, *Kariya-shi no Sumaho Riyō Seigen ga Kō o Sōshita Riyū* [The Reasons Why Kariya City’s Smartphone Use Restrictions Succeeded: From Domestic Agreements to Regional Expansion], NIKKEI xTECH (Aug. 8, 2014), <https://xtech.nikkei.com/it/atcl/column/14/073100032/080100002/> [https://perma.cc/VAR7-5ZL4].

354. See Kagawa-ken Netto Gēmu Izonshō Taisaku Jōrei [Kagawa Prefecture Ordinance on Measures Against Internet and Game Addiction], Kagawa Prefectural Ordinance No. 24, 2020, art. 18 (Japan).

355. See *id.* arts. 4–6, 11, 18(2).

356. *Doryoku gimu* (努力義務) in Article 18 is expressed through language requiring an actor to “endeavor to” (*tsutomenakereba naranai*), imposing an obligation to make reasonable efforts rather than a mandatory legal duty and generally lacking direct sanctions for noncompliance. See Shunsuke Koseki, *Doryoku Gimu to wa? Hōtekina Imi ya Bassoku, Jigyōsha ni Motomerareru Taiō o Kaisetsu* [What Is a Best-Efforts Obligation? Explanation of Legal Meaning, Penalties, and Required Actions for Businesses], MONEY FORWARD (Mar. 27, 2026), <https://biz.moneyforward.com/contract/basic/3655/> [https://perma.cc/N6R4-8PRB].

binding guideline.”³⁵⁷ A legal challenge was dismissed.³⁵⁸ The ordinance, however, remains highly contested.³⁵⁹

In the United States, major efforts to impose direct obligations on platforms have largely fallen short. Past endeavors faced many obstacles, including legal and institutional ones. In the early days, content regulation relied substantially on the industry’s strategic self-regulation.³⁶⁰ In the aftermath of congressional hearings on violent computer games such as *Mortal Kombat* and *Night Trap*, the ESRB was created in 1994.³⁶¹ The ESRB implemented a model of labeling plus parental guidance. These regulatory initiatives, however, were meant to inform household choice rather than directly instruct platforms to redesign their content or architecture.³⁶² It is therefore unsurprising that these regulatory measures resulted in little practical efficacy. According to the Federal Trade Commission’s 2000 undercover survey, adult-rated games were widely marketed to, and in many cases, purchased by minors.³⁶³ In fact, teenagers successfully purchased violent content without parental supervision at a rate as high as eighty-five percent.³⁶⁴

State legislatures attempted to fill the gap. Illinois’s 2005 Safe Games Act sought to prohibit the sale of sexually explicit or violent games to

357. *Id.*; see also Yukinao Kin, *1st Local Ordinance in Japan Seeking 1 Hour Per Day Limit on Video Games Passed*, MAINICHI JAPAN (Mar. 18, 2020), <https://mainichi.jp/english/articles/20200318/p2a/00m/0na/002000c> [<https://perma.cc/3UVC-AUVM>] (describing the ordinance as a non-binding guideline that did not directly restrict children’s use of games or smartphones).

358. See Takamatsu Chihō Saibansho [Takamatsu District Court], Aug. 30, 2022, Reiwa 2 (Wa) No. 339 (rejecting the constitutional challenge; because the Ordinance imposed only an obligation to endeavor to comply and did not directly restrict individual rights, its validity was left largely to the realm of policy rather than strict constitutional review).

359. See Tucker Craven, *Kids, No Phones at the Dinner Table: Analyzing the People’s Republic of China’s Proposed “Minor Mode” Regulation and an International Right to the Internet*, 25 CHI. J. INT’L L. 219, 227 (2024).

360. See Jeffrey O’Holleran, *Blood Code: The History and Future of Video Game Censorship*, 8 COLO. TECH. L.J. 571, 583–84 (2010) (discussing the video game industry creating its ratings system (the ESRB) under congressional pressure and to preempt mandatory government regulation).

361. See *id.* at 580–83 (discussing the congressional controversy surrounding *Mortal Kombat* and *Night Trap* and their role in prompting the creation of the ESRB rating system).

362. See *id.* at 580–93, 609–12; see also Lacznia et al., *supra* note 337, at 70–78.

363. See Press Release, Fed. Trade Comm’n, *FTC Releases Report on the Marketing of Violent Entertainment to Children* (Sep. 11, 2000), <https://www.ftc.gov/news-events/news/press-releases/2000/09/ftc-releases-report-marketing-violent-entertainment-children> [<https://perma.cc/Z5CY-4CM9>] (reporting that the marketing plans for 60 of the 118 Mature-rated electronic games studied expressly included children under 17 in the target audience).

364. See *id.* (85% of teenage shoppers were able to purchase M-rated games without parental involvement).

minors.³⁶⁵ California, Michigan, and other states enacted similar legislation, but those efforts were repeatedly invalidated in court.³⁶⁶ The pivotal decision was *Brown v. Entertainment Merchants Ass’n*, in which the Supreme Court held that video games are protected speech and that California’s content-based restriction on the sale or rental of violent games to minors failed strict scrutiny.³⁶⁷ *Brown* significantly limited the state’s ability to regulate minors’ access through content-based sales restrictions. Meanwhile, it reinforced a system centered on parental control.

Subsequent reform efforts mostly targeted platform architecture indirectly. The 2019 Social Media Addiction Reduction Technology (SMART) Act proposed to curb manipulative platform features such as auto-refreshing feeds and other compulsive design mechanisms, but it did not advance.³⁶⁸ The Kids Online Safety Act (KOSA) proposal likewise attempted to impose platform-facing duties, including safeguards related to compulsive use, parental tools, and mitigation of harms to minors.³⁶⁹ Through successive iterations in 2023, 2024, and 2025, the duty-of-care language was progressively diluted and narrowed to exclude viewpoint-based content moderation, supplemented with parental-tools requirements, and reframed around “predatory features” rather than architectural design.³⁷⁰ KOSA has not been enacted, and its design obligations have remained politically contested. At the state level, New York has moved further than the federal government. The Stop Addictive Feeds Exploitation (SAFE) for Kids Act restricts platforms from providing algorithmically personalized “addictive feeds” to minors without age determination or verifiable parental consent, and it also limits overnight notifications absent parental consent.³⁷¹

What has emerged alongside the legislation is litigation. Regulators and private plaintiffs have increasingly framed platform and game design as a

365. See Safe Games Illinois Act, Pub. Act No. 94-315, 2005 Ill. Legis. Serv. 2147 (West) (codified at 720 ILL. COMP. STAT. 5/12A, 5/12B), *invalidated by* Ent. Software Ass’n v. Blagojevich, 469 F.3d 641 (7th Cir. 2006).

366. See Clay Calvert & Robert D. Richards, *Precedent Be Damned—It’s All About Good Politics & Sensational Soundbites: The Video Game Censorship Saga of 2005*, 6 TEX. REV. ENT. & SPORTS L. 79, 98–128 (2004–2006).

367. See 564 U.S. 786 (2011).

368. See Social Media Addiction Reduction Technology (SMART) Act, S. 2314, 116th Cong. (2019).

369. See Kids Online Safety Act, S. 3663, 117th Cong. (2022).

370. See *KOSA Is Back and Still Controversial*, KELLER & HECKMAN (June 4, 2025), <https://www.khlaw.com/insights/kosa-back-and-still-controversial> [<https://perma.cc/Z924-RJRF>].

371. See Stop Addictive Feeds Exploitation (SAFE) for Kids Act, N.Y. GEN. BUS. LAW §§ 1501–1502 (McKinney 2024) (prohibiting addictive feeds for minors absent verifiable parental consent and barring overnight notifications between 12:00 and 6:00 absent such consent).

problem of manipulation, dark patterns, and product architecture rather than merely objectionable content.³⁷² The Federal Trade Commission's action against Epic Games, which resulted in a \$245 million settlement over alleged dark-pattern billing and unauthorized charges, illustrates that shift.³⁷³ Broader youth-addiction litigation against major platforms reflects the same movement toward design-based accountability. This includes a wave of lawsuits filed between 2024 and 2026 against Roblox, Activision Blizzard, Meta, and TikTok.³⁷⁴ More companies are set to stand trial on youth addiction claims in 2026.³⁷⁵ Similarly, New York's 2025 warning-label law³⁷⁶ requires warning labels on platforms deploying "addictive feed, autoplay, infinite scroll, like counts, and/or push notifications."³⁷⁷ The result is a regulatory landscape that oscillates between parental delegation and platform accountability. The current framework is contested under the First Amendment wherever it reaches past content into design, reliant on parents

372. See, e.g., *In re Videogame Addiction Cases*, JCCP No. 5363 (Cal. Super. Ct. 2025); *Courtright v. Epic Games, Inc.*, 795 F. Supp. 3d 1156, 1162–66 (W.D. Mo. 2025) (addressing claims alleging that video games were designed to create and sustain addiction, including defective-design, negligent-design, failure-to-warn, and deceptive-practices claims); *Orellana v. Roblox Corp.*, 769 F. Supp. 3d 1273, 1276–78 (M.D. Fla. 2025) (addressing claims concerning allegedly addictive features and design of the Roblox platform).

373. See Press Release, Fed. Trade Comm'n, *Fortnite Video Game Maker Epic Games to Pay More Than Half a Billion Dollars over FTC Allegations of Privacy Violations and Unwanted Charges* (Dec. 19, 2022), <https://www.ftc.gov/news-events/news/press-releases/2022/12/fortnite-video-game-maker-epic-games-pay-more-half-billion-dollars-over-ftc-allegations> (on file with the *Fordham Urban Law Journal*).

374. See, e.g., *Sawyer v. Epic Games, Inc.*, No. 25STCV10619 (Cal. Super. Ct. L.A. Cnty. filed Apr. 9, 2025); *Gibson v. Roblox Corp.*, No. 24STCV32897 (Cal. Super. Ct. L.A. Cnty. filed Dec. 13, 2024); *In re Videogame Addiction Cases*, JCCP No. 5363 (Cal. Super. Ct. L.A. Cnty. filed Jan. 13, 2025); *Angelilli v. Activision Blizzard, Inc.*, No. 1:23-cv-16566 (N.D. Ill. filed Dec. 6, 2023, voluntarily dismissed May 15, 2025).

375. See, e.g., *P.F. v. Meta Platforms, Inc.*, No. 23SMCV03371 (Cal. Super. Ct. L.A. Cnty. filed June 9, 2026); *Gonzalez v. Google LLC*, No. 3:23-cv-01938 (N.D. Cal. remanded Apr. 6, 2023); *Complaint, C.M. v. Meta Platforms, Inc.*, No. 4:23-cv-05495 (N.D. Cal.); *Sawyer v. Epic Games, Inc.*, No. 25STCV10619 (Cal. Super. Ct. L.A. Cnty. filed Apr. 8, 2025). Specifically, video game addiction litigation continued to expand into 2026, with plaintiffs alleging that major game companies designed their products to foster addictive use among youth.

376. Act of Dec. 19, 2025, ch. 689, 2025 N.Y. Laws (S. 4505) (requiring warning labels on covered social media platforms).

377. Courtney Rozen, *Meta, TikTok, YouTube to Stand Trial on Youth Addiction Claims*, REUTERS (Jan. 26, 2026), <https://www.reuters.com/legal/litigation/meta-tiktok-youtube-stand-trial-youth-addiction-claims-2026-01-26/> (on file with the *Fordham Urban Law Journal*); S.4505, 2025–2026 Leg. (N.Y. 2025) (enacted).

who lack architectural power, and increasingly turning to tort as a substitute for regulation.³⁷⁸

Measured against these three dimensions, the family-delegation model, to a certain extent, harbors a structural gap. The *duty-bearer* under this model is the parent. This is the result of either conscious policy transition or latent cultural norms expressed as soft law.³⁷⁹ The *object* of regulation, however, remains access and time, as in the state-directed model. ESRB ratings control what content children encounter; shutdown laws and ordinances prescribe when and how long they may play. Neither reaches the design of the environment itself. The regulation is driven by parental authority: the right and responsibility to govern the child's life and development. This model cannot extend to the root cause of attention extraction. Parents can restrict access, limit screen time, and supervise use. However, the platform's architecture comprises decisions no individual user, adult or child, has the power to alter.

C. Platform-Facing Design Duty: The European Union and the United Kingdom

The third model directs the obligation at the platform itself since the platform is the entity whose design choices constitute the child's digital environment. Both the European Union and the United Kingdom have arrived at this position, though through different institutional paths and at different speeds. Europe's route has been incremental. The 2012 European Strategy for a Better Internet for Kids (BIK) was largely about empowerment, providing children with digital literacy, positive content, and online participation.³⁸⁰ Its 2021 successor, BIK+, shifted the emphasis. Safety moved to the foreground, and for the first time the framework

378. See *NetChoice, LLC v. Bonta*, 113 F.4th 1101 (9th Cir. 2024) (affirming the injunction of the data protection impact assessment requirement as compelled speech while vacating the injunction of the Act's remaining provisions); *NetChoice, LLC v. Bonta*, 170 F.4th 744, 770 No. 25-2366 (9th Cir. 2026) (vacating the injunction of the age estimation and default privacy settings provisions on the ground that they do not on their face restrict speech, and affirming the injunction of the materially detrimental use and dark patterns provisions on vagueness grounds); *Angelilli*, 2025 WL 1181000, at *6–8 (holding that Roblox's own content, including characters, skins, and game-creation tools, constituted protected expression under the First Amendment and dismissing addiction-related claims predicated on that expressive content); *P.F.*, No. 23SMCV03371 (Cal. Super. Ct. L.A. Cnty. June 9, 2026) (rejecting Meta's argument that addictive design features were protected editorial expression).

379. "Soft law" refers to norms or legal arrangements that lack one or more of the dimensions of obligation, precision, or delegation characteristic of hard law. See Gregory C. Shaffer & Mark A. Pollack, *Hard vs. Soft Law: Alternatives, Complements, and Antagonists in International Governance*, 94 MINN. L. REV. 706, 712–13 (2010).

380. European Commission, European Strategy for a Better Internet for Children, COM (2012) 196 final, at 2–4, annex (May 2, 2012).

acknowledged that children should have a voice in shaping the digital environments they inhabit.³⁸¹ But the real regulatory teeth came with the European Union Digital Services Act. Its recitals name the problem with unusual directness for EU legislation, recognizing that risks to minors “may arise, for example, in relation to the design of online interfaces which intentionally or unintentionally exploit the weaknesses and inexperience of minors or which may cause addictive behaviour.”³⁸² Article 25 goes further, prohibiting platforms from designing interfaces that “materially distort or impair the ability of the recipients of their service to make free and informed decisions.”³⁸³ Articles 34 and 35 then impose systemic-risk obligations on very large platforms, requiring them to identify and mitigate design-level risks to minors.³⁸⁴

The European Union AI Act opened a different front. Article 5 targets AI systems deploying “purposefully manipulative or deceptive techniques” that are likely to cause “significant harm.”³⁸⁵ The recitals add a phrase that matters enormously for our analysis here: “harms that may be accumulated over time.”³⁸⁶ This inclusion is important because the effects of many gaming features and architectures that extract attention are individually imperceptible yet progressively consequential over time.³⁸⁷ Enforcement has already begun. In February 2026, the European Commission directed TikTok to modify its rewards-based engagement features for minors.³⁸⁸ This stands as a direct regulatory strike at the design of the attention architecture itself. The European Parliament has signaled that the forthcoming Digital Fairness Act should address “persuasive technologies, such as targeted ads, influencer marketing, addictive design, loot boxes and dark patterns” and

381. European Commission, *A Digital Decade for Children and Youth: The New European Strategy for a Better Internet for Kids (BIK+)*, COM (2022) 212 final (May 11, 2022).

382. Digital Services Act, art. 28, 2022 O.J. (L 277) 27, recital 81 (EU).

383. *Id.* art. 25.

384. *See id.* arts. 34, 35.

385. Regulation 2024/1689 of the European Parliament and of the Council of June 13, 2024 (Artificial Intelligence Act), art. 5, 2024 O.J. (L 1689) 1 [hereinafter Artificial Intelligence Act] (EU).

386. *Id.*

387. *See generally supra* Part III.C; *see also* Eni Purwaningsih & Ira Nurmala, *The Impact of Online Game Addiction on Adolescent Mental Health: A Systematic Review and Meta-Analysis*, 9 OPEN ACCESS MACED. J. MED. SCI. 260 (2021) (linking online gaming addiction to adverse mental-health outcomes among adolescents).

388. *See* Press Release, European Comm’n, Commission Preliminarily Finds TikTok’s Addictive Design in Breach of the Digital Services Act (Feb. 6, 2026), https://ec.europa.eu/commission/presscorner/detail/en/ip_26_312 [<https://perma.cc/A4SM-VRC7>] (finding that TikTok’s design features, including infinite scroll, recommender systems, and continuous content rewards, may foster compulsive use, reduce self-control, and pose risks to users’ physical and mental wellbeing, particularly among minors).

“manipulative features like infinite scrolling, autoplay, disappearing stories, and harmful gamification practices that deliberately exploit minors’ behaviour to boost engagement and spending.”³⁸⁹

The United Kingdom has constructed the most developed platform-facing framework. The Age-Appropriate Design Code, effective since 2021, did something no previous instrument had attempted. It made the platform’s design choices, not just its content decisions, the direct object of regulatory obligation.³⁹⁰ Services likely to be accessed by children must adopt a risk-control approach to data and user experience, building protection into the architecture rather than outsourcing it to parents.³⁹¹ The 2023 Online Safety Act (OSA) then extended that logic beyond data protection into harm prevention, imposing on platforms statutory “duties of care” and requiring “proportionate measures relating to the design or operation of the service” to mitigate and manage “risks of harm to children in different age groups.”³⁹² Notice-and-takedown gave way to something more demanding. Platforms could no longer wait for harm to surface and then respond. They had to anticipate it in the design itself. The Act gave Ofcom, the designated regulator, teeth, which included the authority to compel design modifications.³⁹³

Of the three models, this one comes closest to the desirable model of obligation described above. The obligation runs to the platform, the entity controlling the design environment, while the regulatory object extends to the root causes of attention extraction. The DSA targets dark patterns, manipulative interfaces, and addictive design,³⁹⁴ the AI Act tackles algorithmically driven behavioral manipulation³⁹⁵; the OSA reaches the systemic design of the service.³⁹⁶ That is a remarkable regulatory achievement, broader in scope and more relevant to platform architecture

389. Laura Cress, *TikTok Told to Change ‘Addictive Design’ by EU or Face Massive Fines*, BBC NEWS (Feb. 6, 2026), <https://www.bbc.com/news/articles/cr7j7n315lmo> [<https://perma.cc/BJM8-HTYF>]; Yasmina Yakimova, *New EU Measures Needed to Make Online Services Safer for Minors*, EUR. PARLIAMENT (Oct. 16, 2025), <https://www.europarl.europa.eu/news/en/press-room/20251013IPR30892/new-eu-measures-needed-to-make-online-services-safer-for-minors> [<https://perma.cc/6VBM-76NB>].

390. See U.K. Info. Comm’n’s Off., *Age Appropriate Design: A Code of Practice for Online Services* (Sep. 2, 2020) (enforceable Sep. 2, 2021) (requiring providers to incorporate the Code’s standards into their design processes from the outset).

391. See *id.*

392. Online Safety Act 2023, c. 50, pt. 3, ch. 3, § 29(2) (UK).

393. See *UK Online Safety Act 2023*, LATHAM & WATKINS LLP (2023), <https://www.lw.com/en/insights-landing/admin/upload/SiteAttachments/UK-Online-Safety-Act-2023.pdf> [<https://perma.cc/X7B2-KB9R>].

394. See Digital Services Act, arts. 28, 34–35, 2022 O.J. (L 277) 27 (EU).

395. See Artificial Intelligence Act, art. 5(1)(a)–(b), 2024 O.J. (L 1689) 12 (EU).

396. See Online Safety Act 2023, c. 50, §§ 12, 29–30.

than anything the state-directed or family-delegation models have produced. But the normative foundation underneath all of it remains thin. The DSA grounds its obligations in consumer protection and the integrity of autonomous decision-making.³⁹⁷ The AI Act grounds them in the prevention of manipulative harm.³⁹⁸ The OSA grounds them in a duty of care—the obligation to prevent foreseeable injury.³⁹⁹ Each of these registers captures something real about how platforms protect children.

However, these acts do not capture what the constitutive interest demands. The OSA asks what harms the platform must prevent;⁴⁰⁰ the developmental necessity thesis asks what conditions the platform must protect.⁴⁰¹ The difference between harm prevention and developmental fulfillment is the normative gap this Article has identified.

None of the three models gets the whole picture right. A state-directed model identified that the temporal structure of engagement matters, that when and how long a child plays bears on her development. But it attributes the obligation to the state, an actor who commands rather than designs. It also grounds that duty in social order rather than the child's own developmental stake. The family-delegation model has a different problem. Parental authority over children's digital lives is structurally bounded. A parent can restrict access, set time limits, choose which apps to allow, but she cannot redesign the feed algorithm or reprogram the reinforcement schedule. The platform-facing model, for its part, stops short at grounding the obligation in harm prevention rather than developmental protection.

Where does that leave us? It has been persuasively argued that the realization of public values in platform-based activities cannot be adequately achieved by allocating responsibility to one central actor, and should instead be the result of “dynamic interaction between platforms, users, and public institutions.”⁴⁰² The developmental obligation described in this Article confirms that insight. The state, the family, and the platform each bear obligations the others cannot discharge. The state sets the normative standards and enforces compliance; the family mediates the child's relationship with the digital environment; the platform structures the environment itself. Each role matters. These roles are complementary, not

397. See Digital Services Act, arts. 1(1), recital 67, 2022 O.J. (L 277) 27.

398. See Artificial Intelligence Act, art. 5(1)(a)–(b), 2024 O.J. (L 1689) 12.

399. See Online Safety Act 2023, c. 50, §§ 12, 29–30 (establishing statutory duties to assess and mitigate risks of harm to children).

400. See *id.*

401. See generally *supra* Parts III.A, III.C.

402. Natali Helberger, Jo Pierson & Thomas Poell, *Governing Online Platforms: From Contested to Cooperative Responsibility*, 34 INFO. SOC'Y 1 (2018).

mutually exclusive. But the complementarity is asymmetric. As its architects put it, the UK's Age-Appropriate Design Code was built on the recognition that parents and children were "outmatched by complex and innovative technological systems."⁴⁰³ The information and power asymmetry between the platform and the family renders parental delegation structurally inadequate.⁴⁰⁴ A mother who limits her daughter's screen time to ninety minutes a day can do nothing to change the temporal, attentional, and deliberative conditions of the digital environment. The obligation required is the restructuring of an architecture only its architect controls.

1. Toward a Constitutive-First Model

Central to the definition of addiction are two elements: compulsion and harm. For centuries, alcohol, pornography, and gambling have been subject to regulation. This is because their design exploits vulnerabilities that certain populations cannot be expected to manage on their own. We regulate the slot machine's near-miss algorithm, the brewer-owned saloon that turned the drinking environment into a sales instrument, and the autoplay sequence on a pornography site that eliminates every decision point between one video and the next. In each case, the law recognizes that manipulation of engagement leads to persistent, compulsive dependencies that individual choice cannot adequately address. Rather than relying on the user's capacity to resist, it intervenes at the level of design. Thus, addiction regulation has been, at every turn, a problem of engineering. Alcohol, gambling, and pornography took decades to teach regulators the same lesson. Once regulators stopped asking what users consumed and started asking how industries kept them consuming, effective intervention became possible.

This Article has argued that digital platforms belong squarely in that regulatory tradition. The object of concern is not content, but the extraction of children's attention through architectures designed to override their capacity to stop. Online gaming, on its face, differs from traditional vices. Platform design is far easier to mistake for a neutral product. But the commercial logic points in exactly the same direction. Gaming captures the user, holds her past the point where she would otherwise stop, and monetizes every additional second. When the targets are children, engagement optimization is a polite term for addiction. And what addiction does to a

403. Elizabeth Denham & Steve Wood, *Children's Privacy Laws and Freedom of Expression: Lessons from the UK Age-Appropriate Design Code*, IAPP (Nov. 13, 2023), <https://iapp.org/news/a/childrens-privacy-laws-and-freedom-of-expression-lessons-from-the-uk-age-appropriate-design-code> [<https://perma.cc/5GR2-6WXE>].

404. See generally Francisco A. Gallego et al., *Parental Monitoring and Children's Internet Use: The Role of Information, Control, and Cues* (Nat'l Bureau of Econ. Rsch., Working Paper No. 23982, 2020).

child during the years when self-governance capacity is still forming cannot be remedied later. The child loses the once-in-a-lifetime conditions under which she becomes the kind of person who can choose.

The design of engagement is the design of addiction. Children hold a constitutive interest in the environmental conditions under which the capacity for self-governance comes into being.⁴⁰⁵ Platform attention extraction, as this Article has shown, places that interest in jeopardy. And the interest is fundamental enough to generate an obligation that no existing scholarly framework fully captures. Across major jurisdictions, three distinct regulatory responses have taken shape. None of them is adequate to the full structure of the obligation as this Article has described.⁴⁰⁶

Consider a platform that conducts age verification, removes violent content, disables direct messaging from strangers, and limits play to the hours a regulator has approved. Under every existing regime that this Article has surveyed, that platform is compliant. Under the developmental necessity thesis, it is not, because compliance leaves the core architecture untouched. The reinforcement schedule still overrides the child's developing capacity to disengage. The recommendation system still substitutes algorithmic curation for autonomous exploration. The platform has met every obligation the law currently recognizes, and the child still loses the conditions under which she learns to choose for herself. What follows is that we need to bridge the gap between designing *against* injury and designing *for* the capacity that makes autonomous choice possible for children.

What would it mean to design for the emergence of self-governance? It would mean three dimensions of obligations for the platform, each grounded in what the developmental process requires. The first concerns the child's *capacity to disengage*. Self-governance begins with the ability to stop and withdraw from an activity by one's own decision rather than be held by a reinforcement schedule that makes stopping feel like loss.⁴⁰⁷ A platform that satisfies this obligation designs genuine interruption into the user experience. There will be moments where the architecture deliberately pauses and requires a deliberate choice to continue. This structural feature gives the child's still-forming deliberative capacity room to operate. For younger children, these interruptions should be frequent and firm. For older

405. See generally *supra* Part III.C (the developmental necessity thesis and constitutive interest framework).

406. See *supra* Part IV.

407. See Schapiro, *Childhood and Personhood*, *supra* note 17, at 584 (defining self-governance as choice authorship and children as self-constituting agents); see also Schapiro, *What Is a Child?*, *supra* note 9, at 729–32 (analogizing an emerging person to an emerging polity).

adolescents, they can be lighter given that the child, by then, should have the capacity to do it without scaffolding.

The second concerns the child's *capacity to direct her own attention*. A child whose every session is shaped by algorithmic recommendation has never practiced the act of selecting. She does not have the opportunity to survey a range of options, weigh them, and commit to one. Schapiro's account of self-governance as authorship implies that the child must do more than receive curated experience; she must learn to direct her own.⁴⁰⁸ The platform satisfies this obligation by creating spaces where the recommendation engine recedes, and the child encounters content, activities, or choices the algorithm did not preselect.⁴⁰⁹ The difference, in Feinberg's terms, is between an environment that preserves the child's future options and one that narrows them before she knows what she has lost.⁴¹⁰

The third is the most demanding. The child must develop the *capacity to understand what is acting on her*. She needs to recognize when her behavior is being shaped by a system she did not choose. Frankfurt's insight that autonomous agency requires second-order reflection—the ability to evaluate one's own desires, not merely act on them—applies with particular force here.⁴¹¹ A child who does not know that a reinforcement schedule is driving her engagement cannot reflectively endorse or resist it. Her continued play is not a choice; it is a response. The platform satisfies this obligation by making its own mechanisms legible. These mechanisms should not be buried in a terms-of-service document. Rather, they need to be explicitly present in the interface and expressed in accessible language appropriate to the child's age. Only in this way, can a fifteen-year-old understand why she is being engaged and decide whether to accept it.⁴¹²

408. See Schapiro, *Childhood and Personhood*, *supra* note 17 at 589.

409. See LANSDOWN, *supra* note 220, at 17; see also Brighouse, *supra* note 221, at 703–07 (distinguishing consultative from authoritative voice and arguing that children develop agency by exercising it in graduated settings); see also Mullin, *supra* note 205, at 418–22 (children exercise self-governance in particular domains before acquiring it globally).

410. See Feinberg, *supra* note 17, at 158.

411. See Harry Frankfurt, *Freedom of the Will and the Concept of a Person*, 68 J. PHIL. 5, 7–11 (1971); see also Robert Noggle, *Special Agents: Children's Autonomy and Parental Authority*, in THE MORAL AND POLITICAL STATUS OF CHILDREN 97, 103–07 (David Archard & Colin M. Macleod eds., 2002) (children's autonomy develops through reflective capacity).

412. See HARTZOG, *supra* note 270, at 6–12 (design is an exercise of power; legibility of design is a condition of the subject's agency within a designed environment); see also General Comment No. 25, ¶¶ 9–21, U.N. Doc. CRC/C/GC/25 (Mar. 2, 2021) (requiring age-appropriate information on digital services operations).

CONCLUSION

The argument this Article has made requires a shift in how we think about regulating children's engagement with digital platforms at three levels. The first is a shift in the object of concern. The prevailing view treats the problem as addiction, namely as a clinical condition located in the child, diagnosable by symptoms, treatable by restriction. This Article has reframed it as attention extraction—an architectural practice located in the platform, identifiable by design, addressable by standard-setting. The second is a shift in what regulation targets. Content regulation asks what the child sees. Conduct regulation asks what the child does. The developmental necessity thesis asks what the environment does to the child's capacity to become someone who sees and does for herself. The third is a shift in how the obligation is discharged. Prohibition removes the child from the environment. Parental delegation supervises her within it. Developmental standards restructure the environment itself so that a child who enters it can learn to stop, to choose, and to understand what is acting on her. What a child becomes is not separate from where she spends her attention. Regulate the attention architecture, and you shape her emerging capacity for self-governance.