

No. 23-1122

IN THE
Supreme Court of the United States

FREE SPEECH COALITION, INC., *et al.*,

Petitioners,

v.

KEN PAXTON, ATTORNEY GENERAL OF TEXAS,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES
COURT OF APPEALS FOR THE FIFTH CIRCUIT

**BRIEF OF *AMICI CURIAE*
SCHOLARS ON THE NEUROLOGICAL
EFFECTS OF PORNOGRAPHY
ON ADOLESCENTS
IN SUPPORT OF RESPONDENT**

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Statutes, Rules and Regulations	
Supreme Court Rule 37.6	1
TEX. HEALTH & SAFETY CODE § 161.086(2)	29
Other Authorities	
Arain M, et al., <i>Maturation of the adolescent brain</i> , <i>Neuropsychiatr Dis Treat.</i> 2013;9:449-61. doi: 10.2147/NDT.S39776. Epub 2013 Apr 3. PMID: 23579318; PMCID: PMC3621648	27
Berridge & Robinson, <i>BIOLOGICAL RESEARCH IN ADDICTION</i> , edited by Peter Miller, 2013	25
Bõthe B, et al., <i>The development of the Compulsive Sexual Behavior Disorder Scale (CSBD-19): An ICD-11 based screening measure across three languages</i> , <i>J BEHAV ADDICT.</i> , 2020 Jun 16;9(2):247- 258. doi: 10.1556/2006.2020.00034. PMID: 32609629; PMCID: PMC8939427	10

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Brand M, Snagowski J, Laier C, & Maderwald S., <i>Ventral striatum activity when watching preferred pornographic pictures is correlated with symptoms of Internet pornography addiction</i> , NEUROIMAGE. 2016 Apr 1;129:224-232. doi: 10.1016/j.neuroimage.2016.01.033. Epub 2016 Jan 21. PMID: 26803060	14
Catherine Caruso, <i>A New Field of Neuroscience Aims to Map Connections in the Brain</i> , NEWS AND RESEARCH, HARVARD MEDICAL SCHOOL (Jan. 19, 2023), available at https://hms.harvard.edu/news/new-field-neuroscience-aims-map-connections-brain#:~:text=In%20the%20human%20brain%2C%20some,the%20human%20brain%20to%20fathom	4
Dadi AF, Dachew, BA, & Tessema, GA, <i>Problematic internet use: A growing concern for adolescent health and well-being in a digital era</i> , JOURNAL OF GLOBAL HEALTH, Aug. 30, 2024.	30
Diagnostic and Statistical Manual of Mental Disorders 4	9
Diagnostic and Statistical Manual of Mental Disorders 5	9

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Draps M, et al., <i>White matter microstructural and Compulsive Sexual Behaviors—Diffusion Tensor Imaging Study</i> . JOURNAL OF BEHAVIORAL ADDICTIONS, Volume 10, Issue 1, Apr. 16, 2021	21
Elber, T., Pantev, C, Wienbruch, C., et al., <i>Increased cortical representation of the fingers of the left hand in string players</i> , SCIENCE 270 (1995)	8
Golec, K., Draps, M., Stark, R., Pluta, A., & Gola, M., <i>Aberrant orbitofrontal cortex reactivity to erotic cues in Compulsive Sexual Behavior Disorder</i> , JOURNAL OF BEHAVIORAL ADDICTIONS, 10(3), 646–56 (2021), available at https://doi.org/10.1556/2006.2021.00051	21, 22
Gómez-Apo E, Mondragón-Maya A, Ferrari-Díaz M, & Silva-Pereyra J., <i>Structural Brain Changes Associated with Overweight and Obesity</i> , J OBES. 2021 Jul 16;2021:6613385. doi: 10.1155/2021/6613385. PMID: 34327017; PMCID: PMC8302366	8
Görts, P., et al., <i>Structural brain differences related to compulsive sexual behavior disorder</i> , JOURNAL OF BEHAVIORAL ADDICTIONS, 12(1), 278–87 (2023), available at https://doi.org/10.1556/2006.2023.00008	23

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Grubbs JB, et al., <i>Assessing compulsive sexual behavior disorder: The development and international validation of the compulsive sexual behavior disorder-diagnostic inventory (CSBD-DI)</i> , J BEHAV ADDICT. 2023 March 13;12(1):242-260. doi: 10.1556/2006.2023.00005. PMID: 36913189; PMCID: PMC10260208	10, 11
Guidd, J., <i>The Amazing Teen Brain</i> , SCIENTIFIC AMERICAN, May 1, 2016	27
Healy-Cullen, S., Taylor, K., & Morison, T., <i>Youth, Pornography and Addiction: A Critical Review</i> , CURR ADDICT REP 11, 265–74 (2024), available at https://doi.org/10.1007/s40429-024-00549-z	24
Hilton DL, Carnes S, and Love T, <i>The Neurobiology of Behavioral Addictions: Sexual Addiction</i> , chapter 8, in NEUROBIOLOGY OF ADDICTION, Editors Alan Swann & Gerard Moeller. Oxford University Press, May 2016	16
Hilton, D. L., <i>Pornography addiction—a supranormal stimulus considered in the context of neuroplasticity</i> , SOCIOAFFECTIVE NEUROSCIENCE & PSYCHOLOGY, 3(1), (2013), available at https://doi.org/10.3402/snp.v3i0.20767	28
The International Classification of Diseases 11th Edition.	6, 9, 10, 15, 25, 30

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Kauer JA & Malenka RC, Synaptic plasticity and addiction. NAT REV NEUROSCI, 2007 Nov; 8(11):844–58. doi: 10.1038/nrn2234. PMID: 17948030	8
Krikova, K., et al., <i>Appetitive conditioning with pornographic stimuli elicits stronger activation in reward regions than monetary and gaming-related stimuli</i> , HUMAN BRAIN MAPPING, 45(8) (2024), e26711, available at https://doi.org/10.1002/hbm.26711	23
Kühn S & Gallinat J., <i>Brain structure and functional connectivity associated with pornography consumption: the brain on porn</i> , JAMA PSYCHIATRY, 2014 Jul 1;71(7):827-34; doi: 10.1001/jamapsychiatry.2014.93. PMID: 24871202	8, 12
Chapter Three—Neurobiological Basis of Hypersexuality, Kuhn, S & Gallinat J. Editor(s): Natalie M. Zahr, Eric T. Peterson, INTERNATIONAL REVIEW OF NEUROBIOLOGY, Academic Press, Volume 129, 2016, Pages 67-83, ISSN 0074-7742.....	15
Liberg, B., et al., <i>Neural and behavioral correlates of sexual stimuli anticipation point to addiction-like mechanisms in compulsive sexual behavior disorder</i> , JOURNAL OF BEHAVIORAL ADDICTIONS, 11(2), 520–32 (2022), available at https://doi.org/10.1556/2006.2022.00035	22

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Małgorzata Draps, et al., <i>Gray Matter Volume Differences in Impulse Control and Addictive Disorders—An Evidence From a Sample of Heterosexual Males</i> , THE JOURNAL OF SEXUAL MEDICINE, Volume 17, Issue 9, September 2020, 1761–69, available at https://doi.org/10.1016/j.jsxm.2020.05.007	20
<i>Can pornography be addictive? An fMRI study of men seeking treatment for problematic pornography use</i> , Mateusz Gola PhD, Małgorzata Wordecha, Guillaume Sescousse PhD, Michał Lew-Starowicz MD, PhD, Bartosz Kossowski MSc, Marek Wypych PhD, Scott Makeig PhD, Marc N. Potenza MD, PhD, Artur Marchewka PhD. NEUROPSYCHOPHARMACOLOGY, bioRxiv 057083; doi:, available at https://doi.org/10.1101/057083	17
Mauer-Vakil, Dane BSc & Bahji, Anees MD, <i>The Addictive Nature of Compulsive Sexual Behaviours and Problematic Online Pornography Consumption: A Review</i> , THE CANADIAN JOURNAL OF ADDICTION 11(3):p 42-51, September 2020. DOI: 10.1097/CXA.0000000000000091	18
Mechelmans DJ, Irvine M, Banca P, Porter L, Mitchell S, Mole TB, et al., <i>Enhanced Attentional Bias towards Sexually Explicit Cues in Individuals with and without Compulsive Sexual Behaviours</i> . PLoS ONE 9(8) (2014), available at https://doi.org/10.1371/journal.pone.0105476	13

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Mestre-Bach, G., Fernández-Aranda, F., Jiménez-Murcia, S. et al., <i>Decision-Making in Gambling Disorder, Problematic Pornography Use, and Binge-Eating Disorder: Similarities and Differences</i> , CURR BEHAV NEUROSCI REP 7, 97–108 (2020), available at https://doi.org/10.1007/s40473-020-00212-7	19
Pekal J, Laier C, Snagowski J, Stark R, & Brand M., <i>Tendencias toward Internet-pornography-use disorder: Differences in men and women regarding attentional biases to pornographic stimuli</i> , J BEHAV ADDICT. 2018 Sep 1;7(3):574-583. doi: 10.1556/2006.7.2018.70. Epub 2018 Sep 11. PMID: 30203692; PMCID: PMC6426393.	17, 18
Perry, Cheryl L., <i>The Tobacco Industry and Underage Youth Smoking: Tobacco Industry Documents from the Minnesota Litigation</i> , JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION PEDIATRICS, September 1999, available at https://jamanetwork.com/journals/jamapediatrics/fullarticle/347724	30
Potenza MN, et al., <i>Gambling urges in pathological gambling: a functional magnetic resonance imaging study</i> , ARCH GEN PSYCHIATRY. 2003 Aug; 60(8):828-36. doi: 10.1001/archpsyc.60.8.828. PMID: 12912766	8

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Potenza, MN et al., <i>Is excessive sexual behaviour an addictive disorder?</i> , THE LANCET PSYCHIATRY, Volume 4, Issue 9, 663–6426
Robinson TE & Berridge KC., <i>The neural basis of drug craving: an incentive-sensitization theory of addiction</i> , BRAIN RES REV. 1993 Sep-Dec; 18(3):247-91. doi: 10.1016/0165-0173(93)90013-p. PMID: 840159525
Ji-woo Seok & Jin-Hun Sohn, <i>Gray matter deficits and altered resting-state connectivity in the superior temporal gyrus among individuals with problematic hypersexual behavior</i> , BRAIN RESEARCH, Volume 1684 (2018) 30–39, ISSN 0006-8993, available at https://doi.org/10.1016/j.brainres.2018.01.03519
Sklenarik S, Potenza M, Gola M, Kor A, Kraus SW, & Astur RS, <i>Approach bias for erotic stimuli in heterosexual male college students who use pornography</i> , JOURNAL OF BEHAVIORAL ADDICTION. Vol. 8, Issue 2, June 1, 2019, 234–4120
Snagowski J, Wegmann E, Pekal J, Laier C, & Brand M., <i>Implicit associations in cybersex addiction: Adaption of an Implicit Association Test with pornographic pictures</i> , ADDICT BEHAV. 2015 Oct;49:7-12. doi: 10.1016/j.addbeh.2015.05.009. Epub 2015 May 16. PMID: 2602638514

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Snagowski, J., Laier, C., Duka, T., & Brand, M. (2016). Subjective Craving for Pornography and Associative Learning Predict Tendencies Towards Cybersex Addiction in a Sample of Regular Cybersex Users. <i>SEXUAL ADDICTION & COMPULSIVITY</i> , 23(4), 342–60, <i>available at</i> https://doi.org/10.1080/10720162.2016.1151390	16
Toates F. A motivation model of sex addiction—Relevance to the controversy over the concept. <i>NEUROSCI BIOBEHAV REV.</i> 2022 Nov;142:104872. doi: 10.1016/j.neubiorev.2022.104872. Epub 2022 Sep 13. PMID: 36113783	25
Victor Cline, <i>PhD Witness Statement: Commission on Child Online Protection</i> , San Jose State University, 3 August 2000, <i>available at</i> https://govinfo.library.unt.edu/copacommission/meetings/hearing3/cline.test.pdf	28
Voon V, Mole TB, Banca P, Porter L, Morris L, Mitchell S, et al., Neural Correlates of Sexual Cue Reactivity in Individuals with and without Compulsive Sexual Behaviours. <i>PLoS ONE</i> 9(7): e102419 (2014), <i>available at</i> https://doi.org/10.1371/journal.pone.0102419	7

TABLE OF AUTHORITIES—Continued

	<i>Page</i>
Voon V, Mole TB, Banca P, Porter L, Morris L, Mitchell S, et al., <i>Neural Correlates of Sexual Cue Reactivity in Individuals with and without Compulsive Sexual Behaviours</i> . PLoS ONE 9(7) (2014), available at https://doi.org/10.1371/journal.pone.0102419	13
Wang, J. & Li, H., <i>Neural Correlates of the Attentional Bias Towards Subliminal Pornographic Cues in Individuals with Tendencies Toward Problematic Pornography Use: An ERP Study Using a Dot-Probe Task</i> , ARCH SEX BEHAV (2024), available at https://doi.org/10.1007/s10508-024-02965-8	24
Yaniv Efrati, <i>Risk and protective factor profiles predict addictive behavior among adolescents</i> , COMPREHENSIVE PSYCHIATRY, Volume 123, 2023, 152387, ISSN 0010-440X, https://doi.org/10.1016/j.comppsy.2023.152387	3

INTEREST OF *AMICI CURIAE*¹

Amici curiae are veteran scholars who are experts on the effects of pornography on the human brain; they represent perspectives from both the medical profession and the field of biological psychology. *Amici* have published and taught on the neuroscience relative to this subject for many years and can affirm that Texas's concern for the impact of pornography on children is strongly supported by the weight of medical scholarship related to the human brain. This knowledge motivates *Amici* to support the State's concern for limiting young people's access to pornography.

Healthy brain function is founded on the balancing of the brain's remarkable ability to notice, process, and enjoy pleasurable impulses together with its ability to provide the contextual guardrails of risk and consequence. With brain functioning, the hallmark of addiction is the disruption of this important balance. The result is that pleasure-related information receives disproportionate processing, while the ability to process judgment-related information is impaired. The signs of addiction—especially addiction to pornography—within brain function include disproportional cue reactivity, a dampening effect on the ability to receive and process pleasure, and structural changes to the brain itself.

Scholarship demonstrates conclusively that these effects—including the direct effects of pornography—are

1. Pursuant to Supreme Court Rule 37.6, no counsel for any party authored this brief, in whole or in part, and no person or entity other than *amici* contributed monetarily to its preparation or submission.

most acute in developing adolescent brains. *Amici* thus believe that age verification as a protective mechanism is neither a sanction nor a burden on free speech. The irreparable neurological harm otherwise caused to young people will only increase. *Amici* have a strong interest in seeing that Texas's protective measures for adolescents remain in place—the purpose of that law aligns with sound medical science and scholarship.

Amicus Donald L. Hilton Jr., MD is a board-certified neurosurgeon in San Antonio, Texas. He is a former adjunct associate professor and fellowship director at the University of Texas Medical School at San Antonio, and has published peer reviewed papers and book chapters on neurosurgery and pornography addiction.

Amicus Professor Frederick Toates is an emeritus professor of biological psychology at the Open University in England, and the president of the Open University Psychological Society. He is an internationally recognized pioneer in the conceptualization and study of incentive motivation, and has published numerous academic papers in this field. His books include *Motivational Systems*, *Biological Psychology*, *How Sexual Desire Works: The Enigmatic Urge*, and *Understanding Sexual Serial Killing*.

SUMMARY OF ARGUMENT

Developing brains have unique, life-shaping capabilities to absorb information as the brain builds capacity and moves toward adult formulation. This remarkable early flexibility of the maturing brains of children is known as neuroplasticity. (In adult brains, neuroplasticity occurs at diminished levels.) But this formative season of

adolescent brain development is also uniquely vulnerable to the pathologies of addiction. Specifically, the prefrontal cortex's capability to measure and contextualize pleasurable impulses is not fully formed until the time when an individual is in his or her early twenties. For children, then, exposure to sexually explicit images results in a primary indexing of their sexual framework. Childhood is thus the exact worst time for someone to be exposed to pornography. But sexually explicit materials are ubiquitous in our culture and more easily available to today's children than at any time in history.

The weight of medical evidence demonstrates pornography can become both addictive and compulsive. Numerous studies report a connection between pornography use and negative developmental responses. The compulsive and addictive potential of pornography is a serious public health issue—and it is most serious for young people, who are most susceptible to the harms of addiction.² That neurologically vulnerable population group thus requires protection of the highest order society can provide. Irreparable harm is being perpetrated on adolescents; not on the “free speech” rights of the pornography industry. A slight delay in accessing prurient materials online cannot be compared to the damage done to adolescent brains viewing pornography.

The judgment of the court of appeals should be affirmed.

2. Yaniv Efrati, *Risk and protective factor profiles predict addictive behavior among adolescents*, *COMPREHENSIVE PSYCHIATRY*, Volume 123, 2023, 152387, ISSN 0010-440X, <https://doi.org/10.1016/j.comppsy.2023.152387>.

ARGUMENT

Not all speech is created equal. And in this case, the literal brain development of the age group most threatened by pornography is at stake. Texas's attempt to protect adolescents through modest age verification measures is more than justified.

I. Healthy Brain Function Is Thwarted By Addiction.

A. Proper Brain Functioning Relies on a Balance of Pleasure and Reward.

The brain is a complex system of cells called neurons, which communicate with each other in mysterious ways to allow humans to experience love, hate, pleasure, and pain. The brain empowers us to reason, to create, to destroy, and to dream. There are over 80 billion neurons in the brain, with up to 100 trillion connections between these brain cells. Each neuron is connected to thousands of other neurons through wires called axons and dendrites.³

Collections of neurons in different areas of the brain work together to accomplish various tasks, such as vision, movement, emotion, sensation, pleasure, pain, and judgment. The connections between these areas allow the brain to coordinate and contextualize actions and events.

3. Catherine Caruso, *A New Field of Neuroscience Aims to Map Connections in the Brain*, NEWS AND RESEARCH, HARVARD MEDICAL SCHOOL (Jan. 19, 2023), available at <https://hms.harvard.edu/news/new-field-neuroscience-aims-map-connections-brain#:~:text=In%20the%20human%20brain%2C%20some,the%20human%20brain%20to%20fathom.>

The cerebral cortex is a shell of neurons on the surface of the entire brain. It is in the cortex that volitional thought occurs, movement is conceptualized, planned and initiated, vision is processed, speech is comprehended and produced, and emotion is processed. In the frontal areas, over the eyes and just behind the forehead, the prefrontal cortex is where judgment happens. In the back of the brain just above the spinal cord is the brainstem, which moderates breathing and basic vital processes. The brainstem has another function related to desire and pleasure. The ventral tegmental area (VTA) of the brainstem produces dopamine, and these cells send axons to the brain's reward center, located between the brainstem and the prefrontal cortex. An important message of the VTA, mediated through the neurotransmitter dopamine, is to notice and pursue pleasure rewards, which promote genetic perpetuation. These include food, sex, and success in any focused task, such as a well-taken move in a game of chess or a video game.

The reward center, located between the prefrontal cortex and from the brainstem, receives signals from both areas. It is also closely associated, both functionally and anatomically, with the limbic system, which processes emotional responses. The brainstem's dopamine-driven message is simply to act, eat, acquire—whereas the prefrontal cortex contextualizes the input from the reward-focused brainstem, with consequences of the pleasure reward being weighed and considered. We consider the sequelae of our choices with food, sex, and other pleasures, and modulate a pleasure stimulus based on possible consequences.

B. The Imbalance Created by Addiction Changes Brain Function and Even Structure.

In a healthy brain, there is a balance between the opposing inputs of the VTA (dopamine/desire) and the prefrontal cortex (contextualization). Addiction distorts the balance, though, with the pleasure driven brainstem overpowering the reward/limbic system. The prefrontal cortex is functionally and physically affected, and these changes can be seen in drug addiction studies with structural and functional MRI images.⁴ These same changes in the brain have also been well documented in studies focused on compulsive sexual behavior disorder (CSBD), recognized as a mental health disorder in the International Classification of Diseases-11 (ICD-11)⁵—the world’s most utilized classification system, used both internationally and in the United States by medical professionals across various fields of medicine.

Perhaps the most widely accepted model for understanding how the brain changes in addiction is the incentive-motivation model. Essentially, the brain learns to overvalue a pleasure reward to the exclusion of other rewards, and this results in a sensitization of the reward system to cues related to the addictive stimulus. Simply put, the brain reacts disproportionately to the cues it receives.

For instance, if a normal person is shown a photograph of a line of cocaine, and a functional MRI is performed to capture the reward system’s response, there will be little

4. See *infra* at 11–24 (presenting studies).

5. ICD-11, Compulsive Sexual Behavior Disorder (CSBD).

difference between the response to viewing the cocaine or to a photo of a beautiful scene of nature. If a person addicted to cocaine is shown the same photo, however, this person's reward center will 'light-up' in an accentuated response to this addictive cue, and yet their response to the nature scene would be unremarkable.

Another well-recognized characteristic of the incentive-motivation model of addiction is a wanting/liking mismatch. Consider a person who becomes severely addicted to alcohol. The *craving* (*i.e.*, wanting) for alcohol becomes the main event, and overrides pleasure (*i.e.*, liking) cues. In other words, the person is compelled to use the addictive medium even if the pleasure reward becomes successively dampened and blunted as their dopaminergic pathways are upgraded. Ironically, even though the individual is now hypersensitive to a cue heralding a pleasure reward based on their addictive medium, when an addict actually uses, he or she is desensitized to the actual stimulus and requires a much higher dose to achieve satiation. This causes the escalation in dose and/or frequency use with alcohol, heroin, and other drugs. Consistent with the incentive-motivation model, a preponderance of evidence demonstrates that compulsive pornography users manifested a wanting/liking mismatch consistent with those who engage in substance abuse.⁶

It is also well known that learning changes the actual structure of the brain. This has been seen in many models

6. See Voon V, Mole TB, Banca P, Porter L, Morris L, Mitchell S, et al., Neural Correlates of Sexual Cue Reactivity in Individuals with and without Compulsive Sexual Behaviours. PLoS ONE 9(7): e102419 (2014), *available at* <https://doi.org/10.1371/journal.pone.0102419>; see also *infra* at 11–24.

of learning. For example, playing the violin causes the motor cortex gray matter—which controls the string hand of the violinist—to enlarge, and this correlates with the age of onset of training and skill level.⁷ Not all structural changes are healthy, though. Addiction has been described as a powerful form of learning and memory,⁸ and structural changes in the brain have been well described for substance addiction and for natural addictions to behaviors such as overeating,⁹ gambling,¹⁰ and compulsive sexual behavior related to pornography use.¹¹ These changes with compulsive pornography use involve both gray matter and white matter abnormalities.

7. Elber, T., Pantev, C, Wienbruch, C., et al., *Increased cortical representation of the fingers of the left hand in string players*, SCIENCE 270, 305–09 (1995).

8. Kauer JA & Malenka RC, Synaptic plasticity and addiction. NAT REV NEUROSCI, 2007 Nov; 8(11):844–58. doi: 10.1038/nrn2234. PMID: 17948030.

9. Gómez-Apo E, Mondragón-Maya A, Ferrari-Díaz M, & Silva-Pereyra J., *Structural Brain Changes Associated with Overweight and Obesity*, J OBES. 2021 Jul 16;2021:6613385. doi: 10.1155/2021/6613385. PMID: 34327017; PMCID: PMC8302366.

10. Potenza MN, et al., *Gambling urges in pathological gambling: a functional magnetic resonance imaging study*, ARCH GEN PSYCHIATRY. 2003 Aug; 60(8):828-36. doi: 10.1001/archpsyc.60.8.828. PMID: 12912766.

11. Kühn S & Gallinat J., *Brain structure and functional connectivity associated with pornography consumption: the brain on porn*, JAMA PSYCHIATRY, 2014 Jul 1;71(7):827-34; doi: 10.1001/jamapsychiatry.2014.93. PMID: 24871202.

II. Pornography Creates Compulsive Sexual Behavior Disorder Exacerbated By Its Highly Addictive Nature.

A. Compulsive Pornography Use is a Recognized Mental Disorder.

The International Classification of Diseases 11th Edition (ICD-11), has classified compulsive pornography use as a mental health disorder, under the diagnosis of compulsive sexual behavior disorder (CSBD).¹² The diagnosis is under the umbrella of impulse control disorders, as compulsive gambling was termed in the Diagnostic and Statistical Manual of Mental Disorders (DSM) 4 before reclassifying it as a behavioral addiction in the DSM 5.

The language used to describe CSBD in the ICD-11 is direct and unambiguous in explaining this disorder:

Compulsive sexual behavior disorder is characterized by a persistent pattern of failure to control intense, repetitive sexual impulses or urges resulting in repetitive sexual behavior * * * The pattern of failure to control intense, sexual impulses or urges and resulting repetitive sexual behavior is manifested over an extended period of time (*e.g.*, 6 months or more), and causes marked distress or significant impairment in personal, family, social, educational, occupational, or other important areas of functioning.¹³

12. ICD-11.

13. *Ibid.*

Significantly, “extensive use of pornography” in adolescence or pre-adolescence is a predictor of this diagnosis later manifesting in adulthood, according to course features in the ICD-11 description of CSBD.¹⁴

As the scientific community’s understanding of behavioral addictions has grown, it is now understood that compulsive pornography use can be a serious mental health disorder, and can require the assistance of mental health care professionals. In fact, multiple academicians from multiple universities have developed two diagnostic instruments to define and quantify the diagnosis of CSBD in clinical practice. The first such clinical screening assessment instrument—the Compulsive Sexual Behavior Disorder-19—included academicians from Yale, University of Montreal, Nottingham Trent University, University of Nevada/Las Vegas, University Medical Center Hamburg, and Lorand University, Budapest; it had a sample size of 9,325 individuals across three countries.¹⁵

The second screening assessment study—termed the Compulsive Sexual Behavior Disorder Diagnostic Inventory (CSBD-DI)—involved 18 universities and 17 researchers, and contained 12,000 participants across 5 countries and 4 languages.¹⁶ It is shorter than the first

14. *Ibid.*

15. Bóthe B, et al., *The development of the Compulsive Sexual Behavior Disorder Scale (CSBD-19): An ICD-11 based screening measure across three languages*, *J BEHAV ADDICT.*, 2020 Jun 16;9(2):247-258. doi: 10.1556/2006.2020.00034. PMID: 32609629; PMCID: PMC8939427.

16. Grubbs JB, et al., *Assessing compulsive sexual behavior disorder: The development and international validation of*

assessment so as to be more facile in clinical settings for diagnosis and treatment.

These new instruments illustrate the broad acceptance of compulsive sexual behavior as a mental health condition, which includes compulsive pornography use. It is impossible for academic apologists sympathetic to the pornography industry to continue to deny that problematic compulsive pornography use is a mental health condition.

B. An Overwhelming Preponderance of Evidence Demonstrates the Addictive Nature of Pornography.

Numerous studies confirm both structural and metabolic changes associated with compulsive pornography use, which are similar to studies examining substance abuse. The studies presented here are by no means exhaustive, and are representative of other studies supporting a neurological basis for pornography addiction. At the risk of belaboring the point, *Amici* offer an extensive overview here of these studies in order to underscore the overwhelming weight of evidence indicating that pornography is, in fact, addictive—contrary to Petitioners’ contentions.

- In 2014, a study from the Max Plank Institute in Germany found an association with gray-matter variations in the reward centers in the brains

the compulsive sexual behavior disorder-diagnostic inventory (CSBD-DI), J BEHAV ADDICT. 2023 March 13;12(1):242-260. doi: 10.1556/2006.2023.00005. PMID: 36913189; PMCID: PMC10260208.

of adult male subjects. These changes were similar to studies examining substance addiction, and were more pronounced in heavier users. Specifically, the more hours per week the subject used pornography, the more pronounced were the changes. While the design of this study did not prospectively allow for a statement on causation, these results are consistent with a neuroplastic role in pornographic use changing the brain's reward center.¹⁷

- A 2014 study out of Cambridge University investigated the brain's reward system responses in male subjects who compulsively used pornography, and found that these areas responded similarly to studies of drug-cue reactivity. Functional connectivity and wanting/liking dissociation were all consistent with previous studies of drug addiction, thus strengthening the evidence for an addictive role for pornography. While calling for more research on this subject, the authors conclude: "The current and extant findings suggest that a common network exists for sexual-cue reactivity and drug-cue reactivity in groups with CSB and drug addictions, respectively. These findings suggest overlaps in networks underlying disorders of pathological consumption of drugs and natural rewards."¹⁸

17. Kühn S & Gallinat J., *Brain structure and functional connectivity associated with pornography consumption: the brain on porn*. JAMA PSYCHIATRY. 2014 Jul 1;71(7):827-34. doi: 10.1001/jamapsychiatry.2014.93. PMID: 24871202.

18. Voon V, Mole TB, Banca P, Porter L, Morris L, Mitchell S, et al., *Neural Correlates of Sexual Cue Reactivity in Individuals*

- A second follow up 2014 study from Cambridge University dovetailed with the first study in demonstrating that compulsive pornography use manifested an enhanced attentional bias similar to substance addiction, and they summarized: “This finding dovetails with our recent observation that sexually explicit videos were associated with greater activity in a neural network similar to that observed in drug-cue-reactivity studies. Greater desire or wanting rather than liking was further associated with activity in this neural network. These studies together provide support for an incentive motivation theory of addiction underlying the aberrant response towards sexual cues in CSBD.”¹⁹
- In 2015, a study published in the journal *ADDICTIVE BEHAVIORS* evaluating males manifesting compulsive pornography use with an Implicit Association Test supported an addictive role for this problem: “The findings suggest a potential role of positive implicit associations with pornographic pictures in the development and maintenance of cybersex addiction. Moreover, the results of the current study are comparable to findings from substance dependency research

with and without Compulsive Sexual Behaviours. PLoS ONE 9(7) (2014), available at <https://doi.org/10.1371/journal.pone.0102419>.

19. Mechelmans DJ, Irvine M, Banca P, Porter L, Mitchell S, Mole TB, et al., *Enhanced Attentional Bias towards Sexually Explicit Cues in Individuals with and without Compulsive Sexual Behaviours*. PLoS ONE 9(8) (2014), available at <https://doi.org/10.1371/journal.pone.0105476>.

and emphasize analogies between cybersex addiction and substance dependencies or other behavioral addictions.”²⁰

- A 2016, German study published in *NEUROIMAGE* found metabolic responses in the brain’s reward center in compulsive pornography users to be similar to other brain studies examining substance addiction. The authors found support for a biologic basis of pornography addiction: “The results support the role for the ventral striatum in processing reward anticipation and gratification linked to subjectively preferred pornographic material. Mechanisms for reward anticipation in ventral striatum may contribute to a neural explanation of why individuals with certain preferences and sexual fantasies are at-risk for losing their control over Internet pornography consumption.”²¹
- The Max Plank Institute published a 2016 follow up paper in the *INTERNATIONAL REVIEW OF NEUROBIOLOGY* on the reality of brain changes associated with compulsive pornography use. It summarized: “Taken together, the

20. Snagowski J, Wegmann E, Pekal J, Laier C, & Brand M., *Implicit associations in cybersex addiction: Adaption of an Implicit Association Test with pornographic pictures*, *ADDICT BEHAV.* 2015 Oct;49:7-12. doi: 10.1016/j.addbeh.2015.05.009. Epub 2015 May 16. PMID: 26026385.

21. Brand M, Snagowski J, Laier C, & Maderwald S., *Ventral striatum activity when watching preferred pornographic pictures is correlated with symptoms of Internet pornography addiction*, *NEUROIMAGE.* 2016 Apr 1;129:224-232. doi: 10.1016/j.neuroimage.2016.01.033. Epub 2016 Jan 21. PMID: 26803060.

evidence seems to imply that alterations in the frontal lobe, amygdala, hippocampus, hypothalamus, septum, and brain regions that process reward play a prominent role in the emergence of hypersexuality.²² Genetic studies and neuropharmacological treatment approaches point at an involvement of the dopaminergic system.”²³

- In a psychiatric textbook titled the NEUROBIOLOGY OF ADDICTION published in 2016 by Oxford University Press, pornography and sexual addiction are framed in the context of biology rather than simply a moralistic construction:

22. Some who sought to avoid using the term “sex addiction,” adopted the word “hypersexuality,” a term which emerged in the last two decades. It is now, however, considered a synonym for sexual addiction and for compulsive sexual behavior disorder (CSBD), and falls behaviorally under this diagnosis in the ICD-11. It is considered by many to be a confusing term, as compulsive behavior is not simply a function of frequency but more of focus. An alcoholic may avoid alcohol for long periods, then experience a harmful binge, just as a heroin addict may relapse with fatal effect after a period of abstinence. Similarly, a young couple on a honeymoon experiencing frequent sexual relations is considered normal behavior, whereas a person binging on pornography at work and losing multiple jobs doing so would be pathological. Thus, while the term hypersexuality is still used by some academics, it can be confusing, and therefore the terms “compulsive sexual behavior disorder” or “sexual addiction” are increasingly considered more descriptive.

23. Chapter Three—Neurobiological Basis of Hypersexuality, Kuhn, S & Gallinat J. Editor(s): Natalie M. Zahr, Eric T. Peterson, INTERNATIONAL REVIEW OF NEUROBIOLOGY, Academic Press, Volume 129, 2016, Pages 67-83, ISSN 0074-7742.

“It is clear that the current definition and understanding of addiction has changed based with the infusion of knowledge regarding how the brain learns and desires. Whereas sexual addiction was formerly defined based solely on behavioral criteria, it is now seen also through the lens of neuromodulation. Those who will not or cannot understand these concepts may continue to cling to a more neurologically naïve perspective, but for those who are able to comprehend the behavior in the context of the biology, this new paradigm provides an integrative and functional definition of sexual addiction which informs both the scientist and the clinician.”²⁴

- Another 2016 German study supported an associative learning model for cybersex addiction published in the journal *SEXUAL ADDICTION AND COMPULSIVITY*.²⁵
- A 2017 double-blind study from Poland, the Netherlands, UC San Diego, and Yale found

24. Hilton DL, Carnes S, & Love T, *The Neurobiology of Behavioral Addictions: Sexual Addiction*, chapter 8, in *NEUROBIOLOGY OF ADDICTION*, Editors Alan Swann & Gerard Moeller. Oxford University Press, May 2016.

25. Snagowski, J., Laier, C., Duka, T., & Brand, M. (2016). Subjective Craving for Pornography and Associative Learning Predict Tendencies Towards Cybersex Addiction in a Sample of Regular Cybersex Users. *SEXUAL ADDICTION & COMPULSIVITY*, 23(4), 342–60, available at <https://doi.org/10.1080/10720162.2016.1151390>.

functional MRI support for an addictive role for problematic pornography use. The findings suggested that, “similar to what is observed in substance and gambling addictions, the neural and behavioral mechanisms associated with the anticipatory processing of cues specifically predicting erotic rewards relate importantly to clinically relevant features of problematic pornography use (PPU). These findings suggest that PPU may represent a behavioral addiction and that interventions helpful in targeting behavioral and substance addictions warrant consideration for adaptation and use in helping men with PPU.”²⁶

- A 2018 study in the *JOURNAL OF BEHAVIORAL ADDICTIONS* on cue reactivity and craving supported an addictive role for problematic pornography use: “Several authors consider Internet-pornography-use disorder (IPD) as an addictive disorder * * * The results support theoretical assumptions of the I-PACE model regarding the incentive salience of addiction-related cues and are consistent with studies addressing cue-reactivity and craving in substance-use disorders.”²⁷

26. *Can pornography be addictive? An fMRI study of men seeking treatment for problematic pornography use*, Mateusz Gola PhD, Małgorzata Wordecha, Guillaume Sescousse PhD, Michał Lew-Starowicz MD, PhD, Bartosz Kossowski MSc, Marek Wypych PhD, Scott Makeig PhD, Marc N. Potenza MD, PhD, Artur Marchewka PhD. *NEUROPSYCHOPHARMACOLOGY*, bioRxiv 057083; doi:, available at <https://doi.org/10.1101/057083>.

27. Pekal J, Laier C, Snagowski J, Stark R, & Brand M., *Tendencies toward Internet-pornography-use disorder:*

- A review paper published in 2020 in the CANADIAN JOURNAL OF ADDICTION supports a biological addictive basis for compulsive sexual behavior disorder (CSBD) and problematic online pornography use (POPU): “The neurobiology of POPU and CSBD involves a number of shared neuroanatomical correlates with established substance use disorders, similar neuropsychological mechanisms, as well as common neurophysiological alterations in the dopamine reward system.”²⁸
- A 2020 paper published in the journal *Addictions* out of Spain and Yale University examined the similarity between three behavioral addictions; pathological gambling, problematic pornography use, and binge eating disorder. These disorders demonstrated deficits in decision making, with the authors summarizing, “Impairments in decision-making seem to be a shared transdiagnostic feature of these disorders. However, there is varying support for the degree to which different features may affect decision-making. Therefore, the study of decision-making processes can

Differences in men and women regarding attentional biases to pornographic stimuli, J BEHAV ADDICT. 2018 Sep 1;7(3):574-583. doi: 10.1556/2006.7.2018.70. Epub 2018 Sep 11. PMID: 30203692; PMCID: PMC6426393.

28. Mauer-Vakil, Dane BSc & Bahji, Anees MD, *The Addictive Nature of Compulsive Sexual Behaviours and Problematic Online Pornography Consumption: A Review*, THE CANADIAN JOURNAL OF ADDICTION 11(3):p 42-51, September 2020. | DOI: 10.1097/CXA.0000000000000091.

provide crucial evidence for understanding addictions and other disorders with addiction-like symptomatology.”²⁹

- A 2020 paper published in the journal BRAIN RESEARCH demonstrated gray matter changes and functional connectivity deficits in those with higher weekly rates of pornography consumption similar to the other studies previously mentioned, confirming a neurological basis for hypersexual behavior: “The gray matter volume of the left STG and its resting-state functional connectivity with the right caudate both showed significant negative correlations with the severity of PHB. The findings suggest that structural deficits and resting-state functional impairments in the left STG might be linked to PHB and provide new insights into the underlying neural mechanisms of PHB.”³⁰
- Approach bias is seen in addiction, where addicted individuals seek salient stimuli. This 2019 study in the JOURNAL OF BEHAVIOR ADDICTIONS confirms an approach bias consistent with addictive behavior

29. Mestre-Bach, G., Fernández-Aranda, F., Jiménez-Murcia, S. et al., *Decision-Making in Gambling Disorder, Problematic Pornography Use, and Binge-Eating Disorder: Similarities and Differences*, CURR BEHAV NEUROSCI REP 7, 97–108 (2020), available at <https://doi.org/10.1007/s40473-020-00212-7>.

30. Ji-woo Seok & Jin-Hun Sohn, *Gray matter deficits and altered resting-state connectivity in the superior temporal gyrus among individuals with problematic hypersexual behavior*, BRAIN RESEARCH, Volume 1684 (2018) 30–39, ISSN 0006-8993, available at <https://doi.org/10.1016/j.brainres.2018.01.035>.

for individuals with problematic pornography use. The authors conclude: “The observation of cognitive biases for erotic stimuli in individuals with problematic pornography use indicate similarities between behavioral and substance addictions.”³¹

- A study in 2020 correlated gray matter change in the brain’s reward center with the severity of compulsive sexual behavior. The study also examined similar changes in alcohol and gambling addiction. They summarize: “Our research extends prior findings in substance use disorders of lower GMV [grey matter volume] in prefrontal cortical volumes among 3 clinical groups of patients with specific impulse control and behavioral and substance addictive disorders. The negative correlation between GMVs and CSBD symptoms and right anterior cingulate gyrus suggests a link with clinical symptomatology.”³²
- This 2021 study published in the JOURNAL OF BEHAVIORAL ADDICTIONS compares white matter

31. Sklenarik S, Potenza M, Gola M, Kor A, Kraus SW, & Astur RS, *Approach bias for erotic stimuli in heterosexual male college students who use pornography*, JOURNAL OF BEHAVIORAL ADDICTION. Vol. 8, Issue 2, June 1, 2019, 234–41.

32. Małgorzata Draps, et al., *Gray Matter Volume Differences in Impulse Control and Addictive Disorders—An Evidence From a Sample of Heterosexual Males*, THE JOURNAL OF SEXUAL MEDICINE, Volume 17, Issue 9, September 2020, 1761–69, available at <https://doi.org/10.1016/j.jsxm.2020.05.007>.

changes in the brain of subjects manifesting CSBD with the brains of subjects experiencing substance addictions and obsessive-compulsive disorder. The CSBD subjects are similar to these in the structural abnormalities found, strengthening the evidence of a neurological basis for compulsive/addictive sexual behavior disorder. The authors state: “Results of our study suggest that CSBD shares similar pattern of abnormalities with both OCD and addiction.”³³

- The frontal control centers of the brain are functionally compromised in numerous studies of substance addiction, and this study from 2021 in the *JOURNAL OF BEHAVIORAL ADDICTIONS* describes similar findings with compulsive sexual behavior due to pornography addiction. The authors summarize: “We provide evidence of abnormal functioning of the anterior OFC in CSBD. They observed anterior OFC responses to cues predictive of erotic rewards in CSBD participants but not control participants suggest the recruitment of additional neural resources in CSBD during reward anticipation. Further studies should assess the clinical symptoms of CSBD associated with the described alteration of anterior OFC reactivity.”³⁴

33. Draps M, et al., *White matter microstructural and Compulsive Sexual Behaviors—Diffusion Tensor Imaging Study*. *JOURNAL OF BEHAVIORAL ADDICTIONS*, Volume 10, Issue 1, Apr. 16, 2021.

34. Golec, K., Draps, M., Stark, R., Pluta, A., & Gola, M., *Aberrant orbitofrontal cortex reactivity to erotic cues in*

- This study from 2022 used functional MRI to examine the metabolic responses of subjects with CSBD due to pornography, and found that the anticipation reaction in the reward center mirrored the response seen with substance addiction, supporting a neurobiological basis for pornography addiction. They summarize, “Our results support the validity and applicability of the developed task and suggest that CSBD is associated with altered behavioral correlates of anticipation, which were associated with ventral striatum activity during anticipation of erotic stimuli. This supports the idea that addiction-like mechanisms play a role in CSBD.”³⁵
- A 2023 paper describes another study using structural MRI to demonstrate that individuals struggling with compulsive/addictive pornography use have anatomic brain changes correlating with the severity of their behavioral addiction. This study supports the previous German studies showing the same finding, and provides further strong evidence of a neurobiological basis for pornography and sexual addiction. They summarize: “Our findings suggest that CSBD is associated with structural brain differences,

Compulsive Sexual Behavior Disorder, JOURNAL OF BEHAVIORAL ADDICTIONS, 10(3), 646–56 (2021), available at <https://doi.org/10.1556/2006.2021.00051>.

35. Liberg, B., et al., *Neural and behavioral correlates of sexual stimuli anticipation point to addiction-like mechanisms in compulsive sexual behavior disorder*, JOURNAL OF BEHAVIORAL ADDICTIONS, 11(2), 520–32 (2022), available at <https://doi.org/10.1556/2006.2022.00035>.

which contributes to a better understanding of CSBD and encourages further clarifications of the neurobiological mechanisms underlying the disorder.”³⁶

- The DSM 5 accepts compulsive gambling as a behavioral addiction, but has not yet categorized pornography as a potentially addictive medium. This recent 2024 study in the journal HUMAN BRAIN MAPPING found that the craving for pornography is greater than either for gaming or monetary reward. Therefore, if online poker can become an addiction, certainly online pornography would be even more potent as an addictive agent. The authors state, “Additionally, monetary and gaming-related stimuli seem to have a lower appetitive value than pornographic rewards * * * This finding is in line with the conclusions from Meerkerk et al. (2006) about pornography having the highest addictive potential among all internet activities.”³⁷
- Salience for rewards may be evaluated with EEG studies, and this recent study in the journal

36. Görts, P., et al., *Structural brain differences related to compulsive sexual behavior disorder*, JOURNAL OF BEHAVIORAL ADDICTIONS, 12(1), 278–87 (2023), available at <https://doi.org/10.1556/2006.2023.00008>.

37. Krikova, K., et al., *Appetitive conditioning with pornographic stimuli elicits stronger activation in reward regions than monetary and gaming-related stimuli*, HUMAN BRAIN MAPPING, 45(8) (2024), e26711, available at <https://doi.org/10.1002/hbm.26711>.

ARCHIVES OF SEXUAL BEHAVIOR supports an addictive profile for compulsive pornography use. The authors summarize, “PPU symptom severity correlated positively with the P1 amplitude difference between valid and invalid conditions. These results highlight the automaticity of attentional capture by pornographic stimuli and support the hypothesis of an addiction-related attentional bias during preconscious processes. The implication of these findings for understanding the clinical phenomenon of out-of-control addictive behavior are discussed.”³⁸

Just as pro-tobacco physicians and scientists minimized and denied the harms of tobacco in the 1960s and 70s, a few academic apologists today minimize the harms and addictive potential of pornography. Interests sympathetic to the views expressed by the pornography industry create confusion and doubt about the addictive potential of pornography, and also about its impact on adolescents. A recent paper, for instance, portrays the concept of pornography addiction as controversial and minimizes any harm to youth, much as the tobacco industry did previously.³⁹ Yet nowhere in this document are any of the numerous papers detailing ongoing research

38. Wang, J. & Li, H., *Neural Correlates of the Attentional Bias Towards Subliminal Pornographic Cues in Individuals with Tendencies Toward Problematic Pornography Use: An ERP Study Using a Dot-Probe Task*, ARCH SEX BEHAV (2024), available at <https://doi.org/10.1007/s10508-024-02965-8>.

39. Healy-Cullen, S., Taylor, K., & Morison, T., *Youth, Pornography and Addiction: A Critical Review*, CURR ADDICT REP 11, 265–74 (2024), available at <https://doi.org/10.1007/s40429-024-00549-z>.

on the brain and problematic pornography use cited or even mentioned. Even more remarkable is the absence of any reference to the ICD-11 diagnosis of Compulsive Sexual Behavior Disorder, the recent assessment instruments to diagnose and treat it, and the fact that eighteen universities participated in the development of the assessments.

Amicus Frederick Toates—a pioneer in the field of biological psychology and the Bolles-Bindra-Toates principles of incentive motivation⁴⁰—helped to frame the widely recognized incentive motivation theory of addiction of Berridge and Robinson.⁴¹ Professor Toates considers the concept of sexual addiction in the context of incentive motivation in a recent paper, addressing both the voluminous science supporting it and the controversy manufactured by those sympathetic to the pornography industry perspective on addiction. He has concluded that “the evidence strongly favors the viability of an addiction model of sex. Strong similarities to the classical addiction to hard drugs are observed and features can be better understood with the help of the model. These include tolerance, escalation and withdrawal symptoms.”⁴² Thus

40. Berridge & Robinson, *BIOLOGICAL RESEARCH IN ADDICTION*, edited by Peter Miller, 2013, Chapter 39, pp 331–39.

41. Robinson TE & Berridge KC., *The neural basis of drug craving: an incentive-sensitization theory of addiction*, *BRAIN RES REV.* 1993 Sep-Dec; 18(3):247-91. doi: 10.1016/0165-0173(93)90013-p. PMID: 8401595.

42. Toates F. A motivation model of sex addiction—Relevance to the controversy over the concept. *NEUROSCI BIOBEHAV REV.* 2022 Nov;142:104872. doi: 10.1016/j.neubiorev.2022.104872. Epub 2022 Sep 13. PMID: 36113783.

“other candidates for accounting for the phenomena, such as obsessive-compulsive behavior, faulty impulse control, high drive and hypersexuality do not fit the evidence.”⁴³

In short, numerous studies support an addictive model, with addiction scientists at Yale, Cambridge, and other universities summarizing this preponderance of evidence in a call to classify CSBD as an addiction in the ICD in a letter in the journal *LANCET PSYCHIATRY*: “We believe that classification of compulsive sexual behavior disorder as an addictive disorder is consistent with recent data and might benefit clinicians, researchers, and individuals suffering from and personally affected by this disorder.”⁴⁴

III. Pervasive Pornography Use—Fueled By Its Addictive Qualities—Is Particularly Devastating For An Adolescent Brain.

As a child’s brain develops, there is an initial focus on acquiring any knowledge from any source. Infants see, touch, and taste everything, and children continue to learn at an accelerated pace as they rapidly assimilate language and social skills. This rapid absorption of knowledge peaks at around 10 years old, and is facilitated by trillions of connections being formed between neurons (white matter) and an expansion of gray matter as well.

When the child becomes an adolescent, two primary processes, pruning and myelination, move the brain

43. *Ibid.*

44. Potenza, MN et al., *Is excessive sexual behaviour an addictive disorder?*, *THE LANCET PSYCHIATRY*, Volume 4, Issue 9, 663–64.

towards an adult configuration. Pruning is the elimination of connections that are redundant or not needed, so the brain can better focus on relevancy. Myelination is the insulation of the axons, which speed up communication between the neurons, allowing the brain to integrate and process information and react more fluidly and quickly. This primary structuring of the brain is not complete until the mid-twenties, and even then, the brain maintains a potential for change, termed neuroplasticity.⁴⁵

Adolescence is a time of mismatch in these systems.⁴⁶ It is for that reason youth are more susceptible to addictive stimuli such as tobacco and pornography. The drive to seek pleasure rewards is strong and is accentuated by puberty, but the prefrontal cortex is not fully myelinated or pruned until the mid-twenties.⁴⁷ Put another way, the brain's braking system is not fully developed, but the accelerator is fully engaged. This is why youth engage in pleasure seeking without fully understanding the consequences of alcohol, drug addiction, unwanted pregnancy, sexually transmitted disease, or pornography use—and the potential legal and other potential negative consequences of these behaviors. In short, the physiological developments in an adolescent brain create a vulnerability to addiction.

At the same time, pornography is a supranormal stimulus that is particularly harmful to adolescents.

45. Arain M, et al., *Maturation of the adolescent brain*, *Neuropsychiatr Dis Treat*. 2013;9:449-61. doi: 10.2147/NDT.S39776. Epub 2013 Apr 3. PMID: 23579318; PMCID: PMC3621648.

46. Guidd, J., *The Amazing Teen Brain*, SCIENTIFIC AMERICAN, May 1, 2016.

47. *Ibid*.

In generations past, pornography would typically be encountered rarely as a discarded or hidden magazine accidentally discovered. Today, however, both the product and the vehicle of exposure have changed dramatically. The internet seamlessly and ubiquitously presents explicit sexual intercourse to an adolescent brain in an endless cornucopia of sex. This is typically an index sexual experience for the youth. When combined with masturbatory conditioning, this combination sets both sexual arousal templates and programs the sexual scripts for these youth.

The unhealthy result is that it teaches young men to coerce and young women to be coerced. These youth then attempt to mimic both the acts and emotions they experience in what is much more than simply viewing pornography; they are immersed in a virtual sexual experience themselves. Many will prefer this virtual experience to actual relationships as they emerge as adults.⁴⁸ The overwhelming potency of the virtual sexual experience becomes a “supranormal experience” which, for them, becomes the standard to define their own sexual templates.⁴⁹

48. Victor Cline, *PhD Witness Statement: Commission on Child Online Protection*, San Jose State University, 3 August 2000, available at <https://govinfo.library.unt.edu/copacommission/meetings/hearing3/cline.test.pdf>.

49. Hilton, D. L., *Pornography addiction—a supranormal stimulus considered in the context of neuroplasticity*, *SOCIOAFFECTIVE NEUROSCIENCE & PSYCHOLOGY*, 3(1), (2013), available at <https://doi.org/10.3402/snp.v3i0.20767>.

IV. Public Health Legislation Is Necessary To Protect Minors From Predatory And Exploitive Businesses Such As The Pornography Industry.

It is undisputed that it is in the interest of public health to protect vulnerable adolescents from the manipulation and exploitation of predatory entities. The tobacco industry is one ready example. Those companies did not voluntarily restrict tobacco vending machines to venues which would protect adolescents—they were compelled to do so by public legislation. While some adults complained that their right to access a tobacco vending machine overrode any contrary public interest in protecting youth from tobacco products, the law was rightly viewed as reasonable and necessary. See, e.g., TEX. HEALTH & SAFETY CODE § 161.086(2) (prohibiting businesses “install[ing] or maintain[ing] a vending machine containing cigarettes, e-cigarettes, or tobacco products”). The business is exempt from this requirement, however, if it is not open to any persons under twenty-one. It is understood that parental control is unlikely to be able to prevent the minor from accessing the tobacco vending machine, and therefore the public law enforces the interest of the state in protecting children from tobacco products.

Similarly, given the ubiquity of pornography on the internet today and the sophistication of minors in accessing the internet, it is effectively impossible for parents to completely monitor and protect their children from pornography products. There is a growing recognition of the need to protect adolescents from predatory and unethical exposure to online pornography. A recent paper published in the *JOURNAL OF GLOBAL HEALTH* proscribes

eight recommendations including: providing families with guidance and resources; empowering adolescents to be responsible online participants through active discussion and education; encouraging industries to develop tight protective mechanisms for online access of those of inappropriate ages; establishing community centers that can provide educational workshops and resources to support adolescents; developing screen tools, books, and guidelines that help families with detection and treatment; and developing mechanisms for monitoring and evaluating the effectiveness of these interventions.⁵⁰ All this is especially important given the ICD-11 warning that pornography use may predispose adolescent users to develop the diagnosis of Compulsive Sexual Behavior Disorder.⁵¹

The JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION has warned that “younger adolescents cannot fully comprehend the consequences of smoking cigarettes; cognitively, they have not yet attained true abstract reasoning capabilities.”⁵² But this same concern regarding exploitation of youth by the tobacco industry is an even more pressing concern with regard to exploitation by

50. Dadi AF, Dachew, BA, & Tessema, GA, *Problematic internet use: A growing concern for adolescent health and well-being in a digital era*, JOURNAL OF GLOBAL HEALTH, Aug. 30, 2024.

51. ICD-11.

52. Perry, Cheryl L., *The Tobacco Industry and Underage Youth Smoking: Tobacco Industry Documents from the Minnesota Litigation*, JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION PEDIATRICS, September 1999, available at <https://jamanetwork.com/journals/jamapediatrics/fullarticle/347724>.

the pornography industry. In effect, the pornography industry has effectively set up virtual “vending machines” to dispense pornography to minors. Public health legislation is therefore necessary to protect minors from these exploitative adults.

Programs of age verification, such as those in South Korea and the European Union, have been described by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION as models to use internationally:

Initiating countries to implement stringent legal frameworks is crucial for restricting access to online sites for adolescents. Measures such as the Juvenile Protection Act, Internet Safety Zones, and the Real-Name System can effectively limit exposure to harmful online content and promote safer internet use among these age groups. * * * [T]he “Safer Internet program” is an initiative that aims to promote safer internet usage among children and adolescents across the European Union member states. It includes funding for hotlines to report illegal content, educational programs, and the development of tools to filter and block inappropriate content.⁵³

Other countries are likewise taking common-sense action to protect vulnerable adolescents from exploitation by powerful companies, either passing or attempting to pass

53. *Ibid.*; see also <https://apnews.com/article/porn-websites-age-verification-digital-services-act-64584aae905cb344dd3e1bfb385c7c27>.

age verification legislation. These include the Australia,⁵⁴ England,⁵⁵ and Canada.⁵⁶

In short, age verification as a protective mechanism is not a sanction, nor should it be viewed as a burden on free speech. Adolescents today are digital natives who are generally more electronically sophisticated than their parents—a fact that has been exploited by a predatory pornography industry. These companies have been allowed to harm vulnerable youth with no accountability. Thus, any claim of irreparable harm to their First Amendment rights is simply not true. The real irreparable harm is what has been perpetuated upon countless children in the wake of *Ashcroft v. Free Speech Coalition*, 535 U.S. 234 (2002). It is time for a public health approach that protects the next generation.

54. <https://theconversation.com/australia-will-trial-age-assurance-tech-to-bar-children-from-online-porn-what-is-it-and-will-it-work-229184>.

55. <https://techcrunch.com/2023/12/04/ofcom-porn-sites-age-assurance-guidance/>.

56. <https://www.theglobeandmail.com/politics/article-bloc-eyes-adding-age-verification-for-pornography-sites-to-online/>.

CONCLUSION

The judgment of the court of appeals should be affirmed.

Respectfully submitted.

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