

## Testimony Regarding Vermont Senate S.289

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I wish to thank Chair Ram Hinsdale and Vice Chair Clarkson and members of the Senate Committee on Economic Development, Housing and General Affairs for the opportunity in support of the Vermont Kids Code today.

I am an Associate Professor of Pediatrics and Director of the Division of Developmental Behavioral Pediatrics at University of Michigan Medical School. I am an NIH-funded researcher in the field of digital media and child social-emotional development and am Chair of the American Academy of Pediatrics (AAP) Council on Communications and Media, where I have led the development of policy statements on children and media. My testimony today reflects my expertise as a researcher and does not reflect the views of the University of Michigan or the national American Academy of Pediatrics.

My goal today is to talk about my research on persuasive and engagement-prolonging design in digital products and its impact on children.

In my research program, we track young children's smartphones and tablets, identify the apps and platforms where they spend the most time, and then analyze the design features of those platforms to examine whether they align or mismatch with child developmental needs. We focus on design because it determines whether digital media provide an opportunity versus a risk for children. We understand that digital products are often designed around adult-centered design norms, but children have unique developmental characteristics that that can contribute to increased risk of manipulation and harm, including:

- **Immature Executive Functioning:** Early childhood and adolescence are two timeframes when significant frontal lobe development occurs and children develop impulse control, mental flexibility, perspective taking, and attentional control.
- **Sensitivity to parasocial relationships:** These relationships are with fictional characters, celebrities, or influencers whom they like or identify with. Research shows that children trust their parasocial relationships and are more likely to follow their instructions.<sup>1,2</sup>
- **Attraction to novelty and rewards:** Children's behavior is very shapeable by positive reinforcement and rewards (e.g., tangible rewards like stickers in early childhood, "social rewards," such as positive feedback from peers in older children).
- **Limited abstract reasoning:** Research shows children have limited understanding of the motivations of marketers, what profiles are created about them by tech companies, or how data collection works.<sup>3</sup>

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<sup>1</sup> Richards, Melissa N., and Sandra L. Calvert. "Media characters, parasocial relationships, and the social aspects of children's learning across media platforms." *Media exposure during infancy and early childhood: The effects of content and context on learning and development* (2017): 141-163.

<sup>2</sup> Tolbert, Amanda N., and Kristin L. Drogos. "Tweens' wishful identification and parasocial relationships with YouTubers." *Frontiers in psychology* 10 (2019): 2781.

<sup>3</sup> Sun, K., Sugatan, C., Afnan, T., Simon, H., Gelman, S. A., Radesky, J., & Schaub, F. (2021, May). "They See You're a Girl if You Pick a Pink Robot with a Skirt": A Qualitative Study of How Children Conceptualize Data Processing and Digital Privacy Risks. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing*

With this in mind, we define design as manipulative, or also called “dark patterns,” when they nudge the user in a way that meets the technology developer’s best interests – at the expense of the user’s interests. In 2022 we published study examining 133 apps and platforms used by preschool-aged children.<sup>4</sup> Manipulative design was present in 80% of apps, and appeared intended to meet 3 goals: 1) prolonging longer engagement with the app (65% of apps), 2) encouraging purchases (56% of apps), and 3) encouraging the child to view advertisements (32% of apps). These are all ways that apps monetize children’s digital experiences, and they were more common in apps played by children from lower-income and lower-education households.

These easily recognizable designs took the form of:

1. **Parasocial relationship pressure** (e.g., when the user hasn’t played the *Miraculous* game that day, the main character sends notifications to the child to reengage with the game; character cries when the child does not make a purchase)
2. **Fabricated time pressure** (e.g., count-down clocks during stoppage points in the game, such as in between levels of *Subway Surfers*, that create a sense of urgency that the user should keep playing or watch an ad)
3. **Flashy rewards** that try to draw the child’s attention (e.g., virtual dollars and gold, gameplay items)
4. **Navigation constraints** (e.g., games auto-advancing to the next level with no option to save and quit; ads that take over the whole screen and don’t have an “x” to minimize appear until 20-30 seconds later, with prompts to interact with sometimes violent content).

[See attached examples of these designs below.]

These examples of manipulative design add to our understanding of persuasive design, which we often think of existing in social media products used by teens, in the form of likes and other social quantification, infinite scroll, personalized feeds that algorithmically adjust to the child’s characteristics or mental state, pressure to engage with ephemeral content, or features that create anticipation. However, it is important to understand that engagement-prolonging designs are commonplace throughout the digital products and games children use. Moreover, manipulative designs don’t all use the behavioral reinforcement techniques that we think of as ‘addictive’ – there are other ways that children are pressured by characters and navigation constraints.

What is the harm imposed by manipulative designs?

- **First is monetary.** Almost 25% of parents reported that their child spent more than \$50 per month on in-app purchases in smartphone games in 2020, led by *Fortnite*, *Candy Crush Saga*, and *Pokémon GO*.<sup>5</sup> In March 2023, the FTC filed a complaint with Epic Games, the maker of *Fortnite*, requiring the company to pay \$245 million as penalty for

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*Systems* (pp. 1-34).

<sup>4</sup> Radesky, Jenny, et al. "Prevalence and characteristics of manipulative design in mobile applications used by children." *JAMA Network Open* 5.6 (2022): e2217641-e2217641.

<sup>5</sup> SellCell.com. (March 3, 2020). How much do your kids spend each month on in-app purchases in smartphone games? [Graph]. In *Statista*. Retrieved April 15, 2023, from <https://www-statista-com.proxy.lib.umich.edu/statistics/1107246/kids-in-app-purchases-spending/>

the use of dark patterns to manipulate users into making purchases.<sup>6</sup>

- **Second is compulsive use or use that is extends longer than users intended.** More time online is consistently associated with poorer sleep in children.<sup>7,8</sup> Meta-analyses of the research literature also support small but significant associations between time spent on digital media and increased externalizing and internalizing child behavior,<sup>9</sup> depression symptoms, and sedentary behaviors.<sup>10</sup> Many studies have documented how teens feel that they find it hard to stop using platforms.<sup>11</sup>
- **Family conflict.** Time-prolonging features like autoplay also contribute to conflict between caregivers and children<sup>12</sup> and more child behavior dysregulation<sup>13</sup> when caregivers try get children to transition away from media.

What can be done to reduce manipulative design? There is already a blueprint for this. In my research, we have interviewed teams of designers who work at child digital media companies to understand how they incorporate child needs into their product design and testing process.<sup>14</sup> These child-centered designers would never consider using dark patterns or manipulative design – instead they focus on making a good product that is inherently engaging and doesn't need design tricks to keep children interested.

I hope this testimony helps convey the pervasiveness of age-inappropriate design in products used by children and teens, and the need for a Kids Code that would make platforms and app stores more accountable for the designs in what they offer to children. It is an important time for children to stop being an afterthought or blind spot<sup>15</sup> in the design of digital products and services, and I appreciate Vermont's leadership in encouraging new design standards where children's needs are considered as first principle.

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<sup>6</sup> Federal Trade Commission, 'FTC Finalizes Order Requiring Fortnite maker Epic Games to Pay \$245 Million for Tricking Users into Making Unwanted Charges' (March 2023)

<sup>7</sup> Janssen, Xanne, et al. "Associations of screen time, sedentary time and physical activity with sleep in under 5s: A systematic review and meta-analysis." *Sleep medicine reviews* 49 (2020): 101226.

<sup>8</sup> Carter, Ben, et al. "Association between portable screen-based media device access or use and sleep outcomes: a systematic review and meta-analysis." *JAMA pediatrics* 170.12 (2016): 1202-1208.

<sup>9</sup> Eirich, Rachel, et al. "Association of screen time with internalizing and externalizing behavior problems in children 12 years or younger: a systematic review and meta-analysis." *JAMA psychiatry* (2022).

<sup>10</sup> Wang, Xiao, Yuexuan Li, and Haoliang Fan. "The associations between screen time-based sedentary behavior and depression: a systematic review and meta-analysis." *BMC public health* 19 (2019): 1-9.

<sup>11</sup> Weinstein, Emily, and Carrie James. *Behind their screens: What teens are facing (and adults are missing)*. MIT Press, 2022.

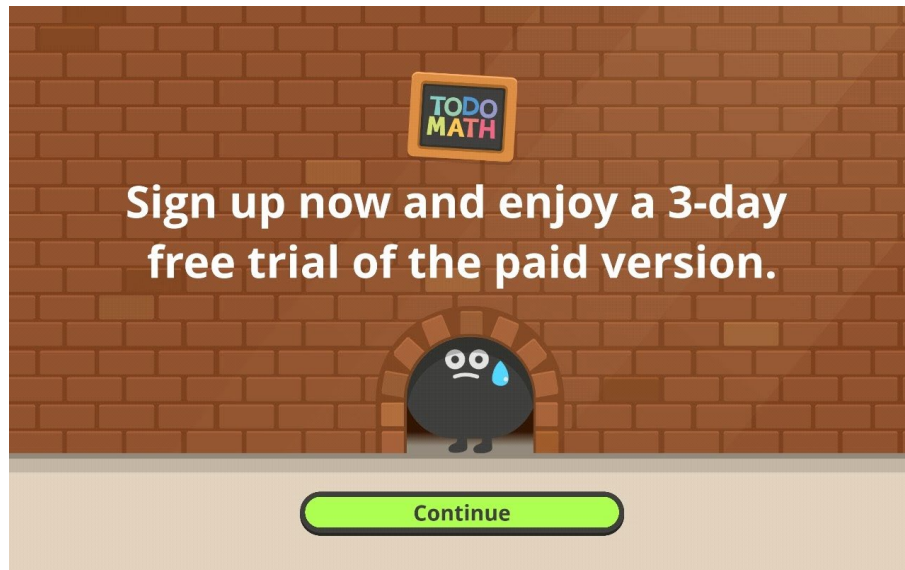
<sup>12</sup> Hiniker, Alexis, et al. "Screen time tantrums: How families manage screen media experiences for toddlers and preschoolers." *Proceedings of the 2016 CHI conference on human factors in computing systems*. 2016.

<sup>13</sup> Munzer, Tiffany G., et al. "Tablets, toddlers, and tantrums: The immediate effects of tablet device play." *Acta paediatrica (Oslo, Norway: 1992)* 110.1 (2021): 255.

<sup>14</sup> Landesman, R., Radesky, J., & Hiniker, A. (2023, June). Let kids wonder, question and make mistakes: How the designers of Children's technology think about child well-being. In *Proceedings of the 22nd Annual ACM Interaction Design and Children Conference* (pp. 310-321).

<sup>15</sup> Lenhart, Amanda, and Kellie Owens. "The unseen teen: The challenges of building healthy tech for young people." *Data & Society* (2021). <https://datasociety.net/wp-content/uploads/2021/05/The-Unseen-Teen-.pdf>

# 1. Parasocial relationship pressure to engage with or return to an app, or to make purchases



# 1. Parasocial relationship pressure to make purchases



Kick the Buddy Character says:  
"Buddy need more money"  
"Invest in me!"  
"Don't just stand there, buy something!"  
"Gimme gimme gimme"  
"Feeling lucky? You won't regret it."  
"Dolla dolla dolla bill y'all!"  
"Sell something pal!"  
"Baby needs a new pair of shoes!"  
"Show me your wallet"

2. Fabricated time pressure (combined with 3. Lures/Rewards) to keep playing, watch ads, or make purchases applied in between gameplay levels

★ VIP MEMBERSHIP ★

Get All Heroes!

- 20 Miraculous Characters!
- Remove All Ads!
- VIP Missions!

+ Daily Bonus

- +2000
- +20
- +3

Start 3 Days Free  
Then \$7.99 Per Week

Cancel Anytime!

This subscription automatically renews unless auto-renewal is turned off at least 24 hours before the end of the current period. Users can manage their subscriptions by going to their Account Settings. Cancellation will come into effect after the end of the current billing cycle. Canceling your subscription or auto-renewal does not entitle you to a refund. Payment will be charged to your Google Play account.

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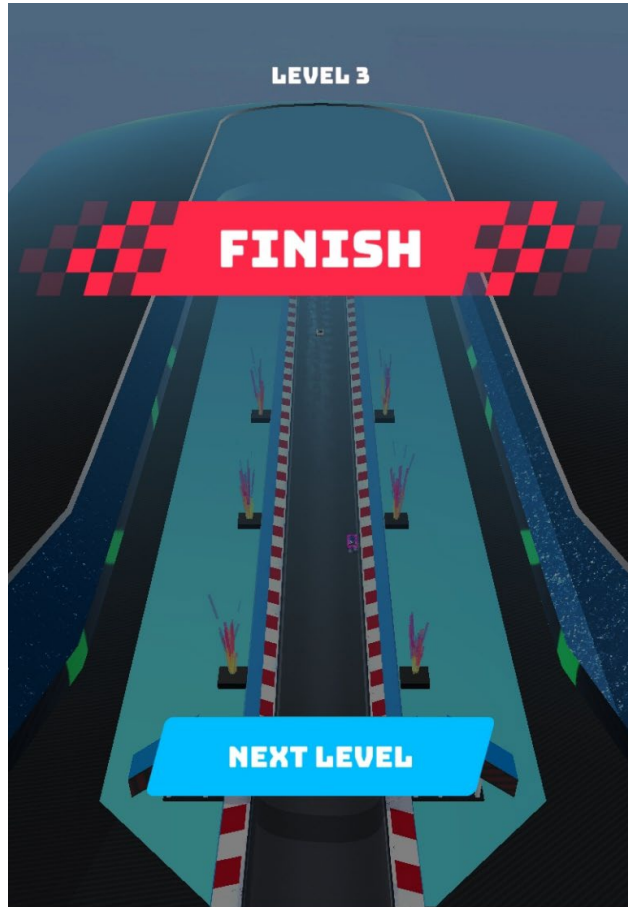
Collect 9 more ladybugs to complete the level

70 130 150

Save Me! 5

4 Free

4. Navigation constraints: No option to save and quit; only option provided is “Subscribe now” while “x” is very faint.



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Weekly Premium automatically renews for \$ 7.99 per week after the 3-day free trial. Payment will be charged to your Apple ID account at the end of the trial period of purchase. The subscription automatically renews unless auto-renew is

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# Roadblock ads that encourage the child to play violent games

