Zentrum für
Medienpsychologie und
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WHITE PAPER

BRAINROT REALITY?

Evidence-Based Neuropsychiatric Perspectives on Early-Life Media Use

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QUESTIONS? CONTACT US.

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The Zentrum für Medienpsycholgie und Verhaltensforschung (ZeMV) is a specialized, non-profit research institution dedicated to the interdisciplinary study of modern media's psychological, social, and economic impacts. ZeMV aims to foster critical discourse and advocate for ethical media and technology design. The center's mission is to promote informed media literacy, enabling individuals to engage critically and consciously with media content.

ZeMV operates with a dual focus: providing accessible, evidence-based insights to inform and empower the public while simultaneously conducting academic research to advance the scientific community's understanding of modern media's influence on human cognition, social behavior and psychological well-being.

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PURPOSE OF THIS PAPER

The only thing we know is that we know little. But we're getting there. Or are we?

'Brainrot' (or Brain Rot) was elected Word of the Year 2024 by Oxford University Press. Describing a 230 % increase of common use over the year, OUP defines the word as:

'Brain rot' is defined as "the supposed deterioration of a person's mental or intellectual state, especially viewed as the result of overconsumption of material (now particularly online content) considered to be trivial or unchallenging. Also: something characterized as likely to lead to such deterioration".

Furthermore, OUP states that the term gained traction on social media platforms, especially pertaining to the widespread use of TikTok among Gen Z and Gen Alpha, and has now been adopted in mainstream journalism. It specifically refers to the abundance of poor quality content that floods in and out of popular media platforms every single second, raising significant concerns about the consequences of the daily consumption of such – especially in young, and very young, people [1].

EPISTEMOLOGICAL REASONING

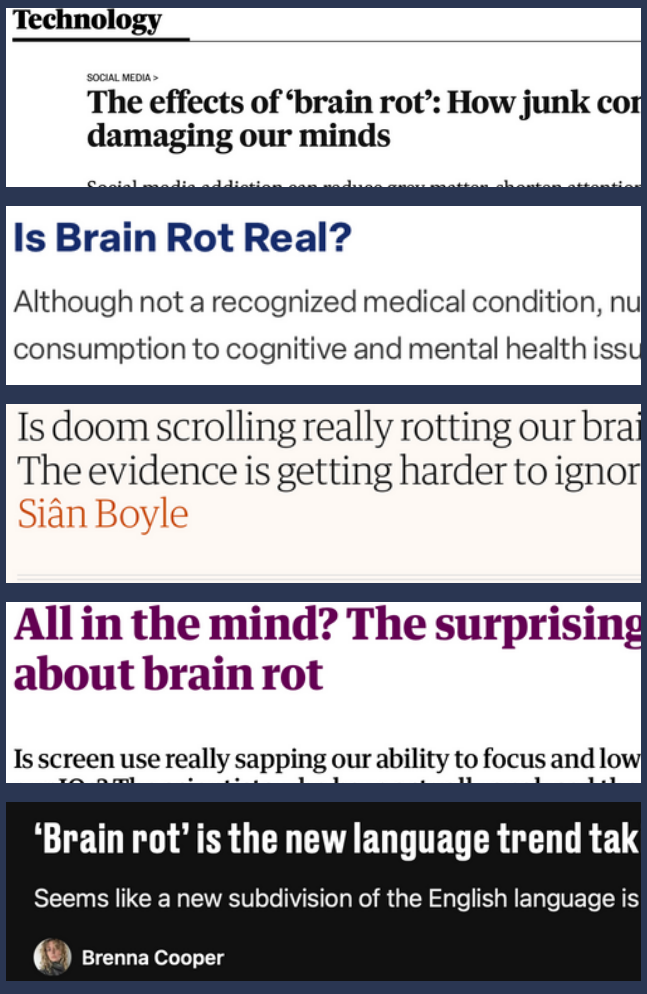
Logic and Knowledge Governs All Inquiry

At the heart of this investigation lies a critical *epistemological* challenge: the boundaries between what constitutes 'poor quality' versus 'high-quality' content are not clearly defined. Social media, as a vast and multifaceted ecosystem, defies simple categorization. It serves not only as a source of entertainment but also as a platform for edutainment, social interaction, and information exchange. This continuum of content makes it difficult to isolate specific factors that might contribute to what we term as 'Brainrot', particularly when such adverse effects could stem from a complex interplay of multiple influences.

Our approach is to first acknowledge these ambiguities. We are aware that the assumptions underpinning our inquiry are provisional. We can attribute certain factors – such as rapid, overstimulating visual cues or prolonged exposure during critical neurodevelopmental periods – to potential risks, but we do not yet possess the clear-cut boundaries required for a more definitive categorization of content quality. This means that while we observe correlations with behavioral dysregulation, cognitive disruption, and even hints of structural brain changes in very young children, we remain open to the possibility that these trends are part of a broader, more complex picture.

BRAINROT AT A GLANCE

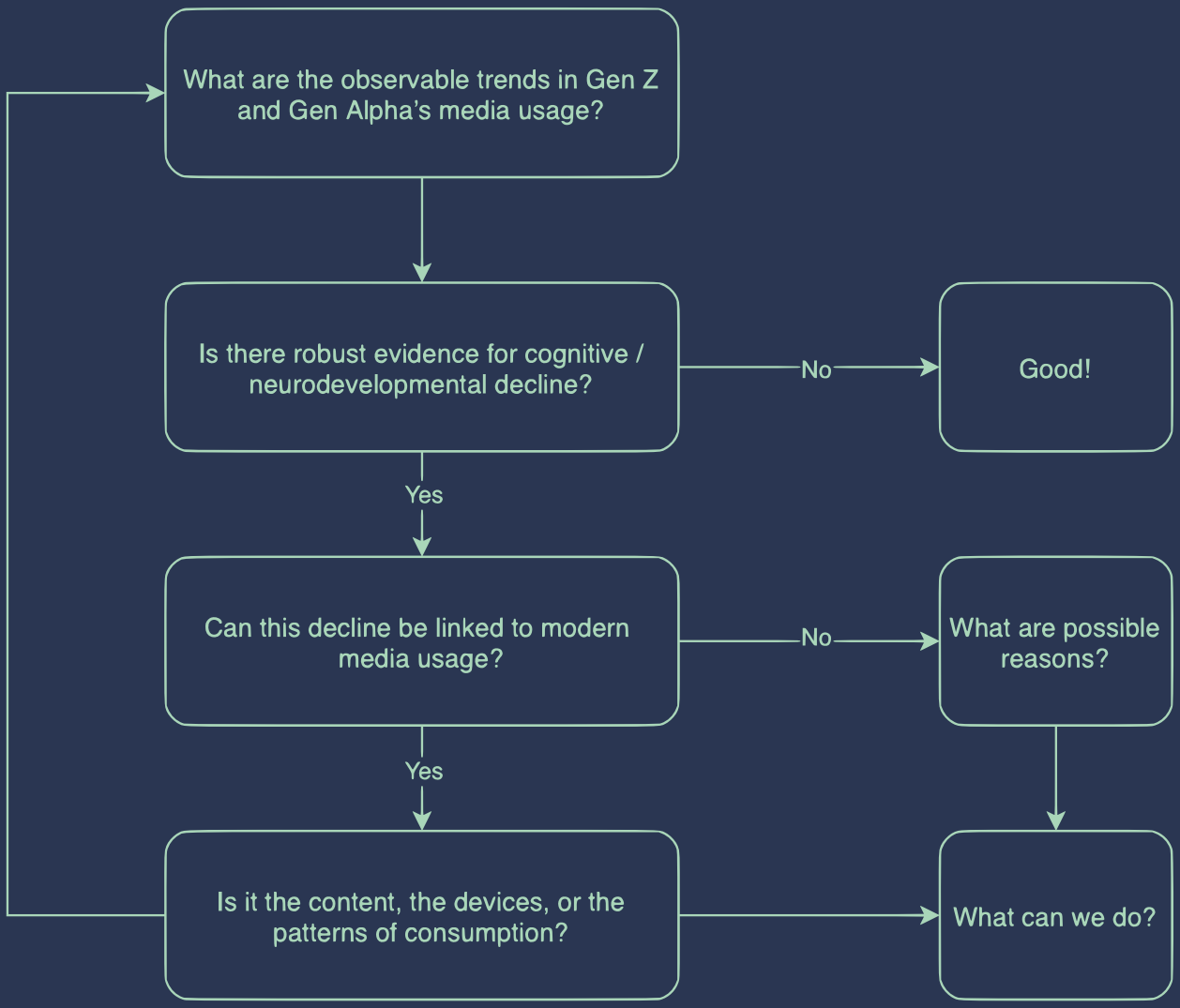
Navigating the Noise.



There is a lot of information circulating on the internet, and once a topic has gained a certain amount of attention, it becomes increasingly challenging to verify facts and tell noise apart from the truth. Brainrot is no different, and to find out what is really behind all the newly published information from the endless abundance of outlets (which significantly vary in quality), we must dig into the scientific facts and regard the current research status as is. There seems to be something about modern media and our brain and mind. But how much of it is actually grounded in evidence, and how much light have we *actually* shed on it yet?

HOW?

**Finding the right answers
requires asking the right questions.**



It should be clarified that findings hardly ever lead to an answer as conclusive as 'yes' or 'no'. The above sequence chart is a simplification that is meant to display the best practice approach we should take in order to find the truth. While there are often inconclusive results in studies as complex as this one, the truth lies in the correct interpretation of all available information at the most recent point.

MEDIA TRENDS AMONG YOUTH

...are a moving target for scientists. Keeping up means that investigations must attempt to avoid lagging behind. Technology use is evolving so fast that there is a high risk of outdated data. This makes conclusions harder. Longitudinal studies take years to complete and findings don't necessarily generalize well across demographics.

Key Considerations

We know that children and youth are using digital media more than ever. Especially since COVID-19, many have retained their increased usage patterns [2]. In our last publication, we also reported that among adolescents, the daily average time spent on at least one sort of screen was more than half of the entire wake cycle.

A 2019 study of 422 children between the ages of 1 to 60 months, less than a quarter had never used a mobile device. While at age five, that may not be surprising, the median age for the first use was one year [3], while the WHO strongly advises against any type of screen device use under the age of two [4]. Interestingly, in a 2024 study that assessed the media use among young children, particularly the devices available in their own bedrooms, it came to light that around 65.8 % of the parents questioned had *no knowledge* about the concept of *screen time*. The study argues for a better allocation of time discussing this during routine healthcare visits [5].

MEDICAL INSIGHTS AS OF NOW

The current state of research in global medicine

Disassembling Brainrot

…'the supposed deterioration of a person's mental or intellectual state'

The first aspect where we must exercise caution in approaching this question is the fact that *Brainrot* is considered epidemic and generational in this context; therefore, we must always consider the scope about which we are talking: The *bigger* the scope is, the more variety of factors must be considered and the *less representative* are small sample sizes. However, it is possible to get a good impression of where we are standing at this time.

Screen time is related to poorer connectivity between brain regions in school-aged children. As opposed to reading books, the time spent engaged with digital devices can be linked to decreased brain development. Findings however are based on a study with limited participants [6].

Many studies yield inconclusive or contradictory results – that is in part due to the vague definitions in 'digital media' that are used to characterize the forms of engagement and therefore, inconsistent investigations. There are however hints that point to negative developmental trends for the cerebellum, especially noteworthy because there is a tendency of acceleration of decreased cerebellum volume. The cerebellum is vital for executive functions and movement, speech and other cognitive functions [7].

High levels of screen exposure in children have been linked with elevated levels of biological stress and lower learning and language performance – this in turn can be a predictor of later occurring developmental disorders [8]; [9].

There is a specific mention of the show 'Cocomelon' that is supposedly suitable for young audiences but has faced scrutiny by parents for its yet unclear negative influence on children. Parents criticize the show heavily for the fast cuts and highly stimulating nature with overly saturated colors etc. Investigations could link consumption of the show with poor development in language and attention problems in young children [10], [11]. A quick narrative review of respective *subreddits* about parenting done by ZeMV revealed that a significant portion of parents reported 'hypnotized' children, 'frightening' effects, 'epic meltdowns *[when shut off]*', 'making kids crazy', 'addicted toddlers', 'constantly glued to the TV', 'a nightmare', 'throwing tantrums' and many more. One parent labeled their post colloquially "Cocomelon made my kid an asshole" [12].

Repeated associations have been made between ADHD (or ADHD symptoms) and digital device / digital media use in children. It is worth noting that evidence points to a reciprocal relationship that indicates higher prevalence of the development of said symptoms in children with excessive media use from an early age on, but also a gravitation towards media use of children with diagnosed ADHD [13].

Large scale meta-analyses yielded an essence of knowledge on the general associations between digital device use and childhood development, especially regarding cognitive functions as well as psychological and social development. Generally, excessive consumption of said contents strongly points to negative outcomes in physical health and cognitive abilities, including reduced attention spans and severe disruptions of sleep [14].

As we noted in a previous publication, the COVID-19 pandemic introduced changes to children's and adolescents' use of digital devices that have been *at least partially* retained after the lockdowns [2]; this is reflected in other investigations likewise, along with significant health impacts through the heavy use of digital devices by preschool-aged children, school children and teenagers. Behavioral changes reported include socioemotional dysregulation, low levels of cognitive development achievement, ocular problems, physical activity reduction, sleep disturbances, higher levels of aggression and inattention, paired with lower age-appropriate life-skills [15].

Studies further found correlations between higher-than-recommended media use in very young children and lower microstructural integrity of brain white matter, indicating a negative impact of screen-based media on the brain development [16]. The study highlighting these correlations was criticized by scientists claiming that there were other factors to be considered such as exposure to electromagnetic fields (EMF) and that the attribution should not be made to screen media solely [17]. However, the original authors of the study delivered further clarification stating that their findings fit into a broader pattern where screen time displaces developmental opportunities rather than directly damaging brain tissue via EMFs. They support their assertions citing related neuroimaging research showing positive associations between nurturing home reading environments and better white matter integrity in the same group of children, and in addition associate complex and multifactorial effects, involving both direct (like age-inappropriate content or sleep disruption) and more importantly, indirect ones – especially the displacement of caregiver-child interaction and enriching experiences |18].

FOLLOWING THE FRAMEWORK

What is the root of the problem?

- Digital devices are ubiquitous these days and integrated into nearly all aspects of life – tasks and chores, education, recreation, entertainment and many more.
- Children grow up learning that heavy engagement with those devices is normal.
- Contents that are deemed 'kids content' cannot necessarily be trusted to be harmless.
- There is evidence for cognitive and neurodevelopmental decline among children with heavy screen exposition.
- Links between said decline and screen exposure can be established, yet not generalized.
- Cognitive abilities and brain structure *are undeniably negatively influenced* by exposition to certain forms and durations of screens.
- Certain contents appear to have effects on children that have yet to be explained, but can be observed in larger scales – and they exhibit worrying forms.

ADDRESSING THE KEY QUESTIONS

How can we make sense of the current research state?

The observable trends in Generation Z and Generation Alpha's use of digital devices and media are markedly different from those of previous generations. A growing body of research indicates that developmental changes in these generations may be linked to their digital habits, with emerging evidence particularly concerning the cognitive development of very young children. Although the current scientific literature does not yet allow for a one-size-fits-all conclusion — given the wide range of influencing factors — there is sufficient evidence supporting the argument that excessive use of digital devices negatively impacts development in a variety of ways. While we acknowledge that rigorous confirmation from fields such as neuroscience or pediatric psychiatry is still evolving, anecdotal evidence from numerous parents reporting concerning behaviors should not be dismissed.

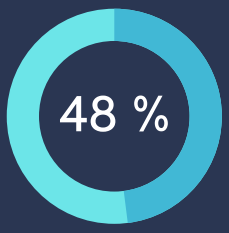
Is it common sense to wait for empirical evidence that confirms that it is too late? – No, because even if there are some particular pieces missing, we can already see the bigger picture – as in an almost-completed jigsaw puzzle.

IS THERE CONTEXTUAL INFLUENCE?

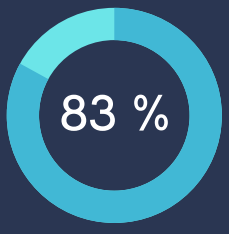
Insights That may be Falling Through the Cracks

Device use in parents is one strong predictor for the habitual use of devices by children and toddlers. That is not only because of the aforementioned integration into everyday life, but also due to devices being used to calm or occupy them [19]. This goes along with findings of objective device-embedded tracking that stands in contrast with the routinely underreported screen time of children, by their parents [20]. The unsupervised screen time is apparently significantly underestimated, indicating that children use a lot more of their spare time on screens than parents think.

Considering the potential effects discussed before, it is vital that parents be aware of their children's habits in using digital devices and closely monitor not only the time spent, but also the content consumed.



of children aged 0 - 8 have already watched short-form video content on platforms like Instagram or TikTok.



of content on TikTok is watched unsupervised, according to the reported study's results.

[21]

THE DISCUSSION IS GAINING TRACTION.

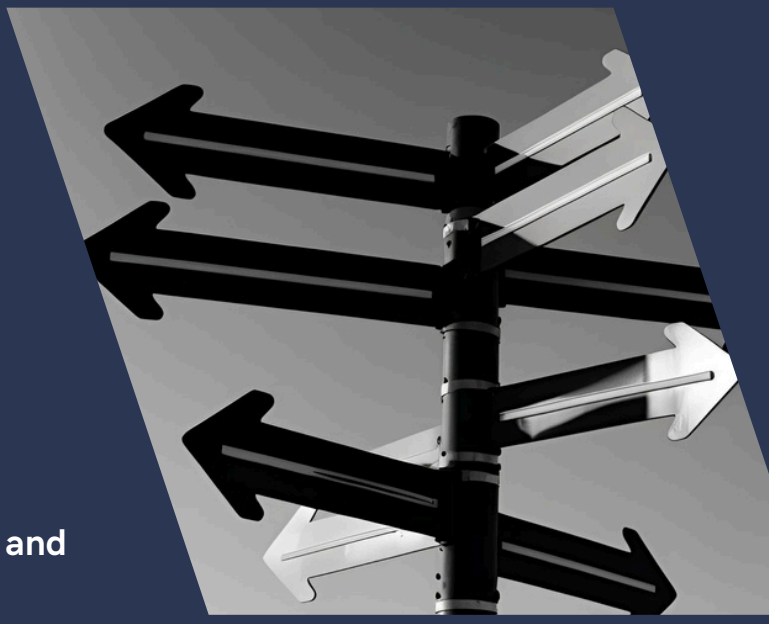
In February 2025, there was filed a *Parliamentary Question* to be evaluated by the European Parliament particularly regarding two shows that are popular among very young audiences and that are reported to have the 'hypnotic' effects we mentioned earlier.

The question also reports of highly unethical practices that the creators of said shows allegedly use in order to ensure the undivided attention of kids. While we cannot confirm these, it seems to align with the described ultra-fast cuts between scenes and the widespread reports of children in a 'hypnotized' state and 'glued to the screens'.

A part of the filed question number E-000563/2025 reads:

"[...]Over the past decade, children's screen time has doubled. Children aged 0 to 6 spend an average of 99 minutes behind a screen every single day. Series such as CoComelon and PAW Patrol are addictive and have a negative impact on toddlers' linguistic and social development. The videos are designed with bright colours, sounds and rapidly changing images, and are tested by placing children in front of two screens: one with the series and one with regular images. As the children look away, the videos are adjusted to make them more addictive[...]." [22]

CURRENT ISSUES IN SCIENCE



'Brainrot' is still a matter of perspective and definition, as are the findings.

While we are particularly trying to highlight the potential dangers in overexposition to screens at very young ages, there are other voices on Brainrot that offer a different perspective. In the University of New South Wales article "Brain rot and digital overload: more myth than menace", Lachlan Gilbert acknowledges that there are experts opposing the idea of Brainrot [23].

The researchers cited in that article argue that there is insufficient causal evidence linking digital media use to long-term cognitive deterioration, especially when media is used in moderation and within developmentally appropriate contexts. This perspective is valuable and adds necessary nuance to a discourse that often veers toward *alarmism*. It reminds us to avoid overly generalized claims and to remain scientifically grounded in our interpretations. However, the article does not invalidate our concerns or contradict the core thesis of our white paper...

...HERE'S WHY.

We are focused on a demographic for which the existing evidence shows significantly more vulnerability due to rapid neurodevelopmental processes occurring during this stage of life. The evidence we cite emphasizes that it is not general media use, but specific types of media and chronic overexposure that are associated with behavioral dysregulation, cognitive disruption, and potential structural brain changes.

Our approach is not to draw definitive causal conclusions but to highlight emerging patterns in neuroscience, pediatrics, and behavioral psychology that indicate plausible risks.

Even though conclusive evidence is lacking in some areas, the precautionary principle remains valid in public health – especially with populations as vulnerable as infants and toddlers. We argue that waiting for conclusive, decades-long longitudinal data before taking any protective action is scientifically irresponsible and ethically risky.

The UNSW article critiques the broad cultural panic around screen use, particularly in adolescents and older children.

The UNSW researchers call for better-quality evidence before jumping to conclusions – a position we strongly endorse. In fact, their call for better research underscores the importance of investigating these early trends before waiting for irreversible outcomes.

The fact that UNSW highlights the lack of conclusive evidence is valuable – it reinforces the scientific challenges we are facing. However, the stakes are high in the observations and even though they are partially preliminary, they should be taken very seriously.

All the correlations in combination point to a trend that should be counteracted – since we must all agree to the following:

Nobody knows where we're heading.

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