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Long-term ECG measurement on the effect of young children´s digital media consumption on psychological and physiological parameters

Digital Media in Early Childhood

Study results on the frequency and length of digital technology use vary in different countries, although overall television is the mainly used digital device in family homes (Feierabend, Plankenhorn, & Rathgeb, 2015; Johansen, 2007; Kutscher, 2015; Rideout, Vandewater, & Wartella, 2003).

The use of digital media by young children is currently critically discussed. An early use, especially of smartphones and tablets, is assumed to have negative effects on children's health and sleep, but also on language development, learning and the ability to concentrate. Studies suggest that an early (within the first life-year; Radesky et al., 2014) and especially an excessive consumption of television or videos are accompanied by sleeping disorders, obesity or rather a lack of physical activity, behavioral problems and attention deficits (Andersen, Crespo, Bartlett, Cheskin, & Pratt, 1998; Nunez-Smith, Wolf, Huag, Emanuel, & Gross, 2008).

Children that use tablet or smartphones everyday might need longer to fall asleep and sleep shorter in total (Chindamo et al., 2019). Ribnera & McHargb (2019) also found out that if children spend an hour engaging with screen media, they sleep nearly 13 min less on a typical night.

While these results focus on negative on effects of digital media use, one might also ask for potentials. However, until now research has paid little attention to whether digital media use harms children´s development or whether it bears potential (Anderson et al., 2017; Galetzka, 2017).

Research Design

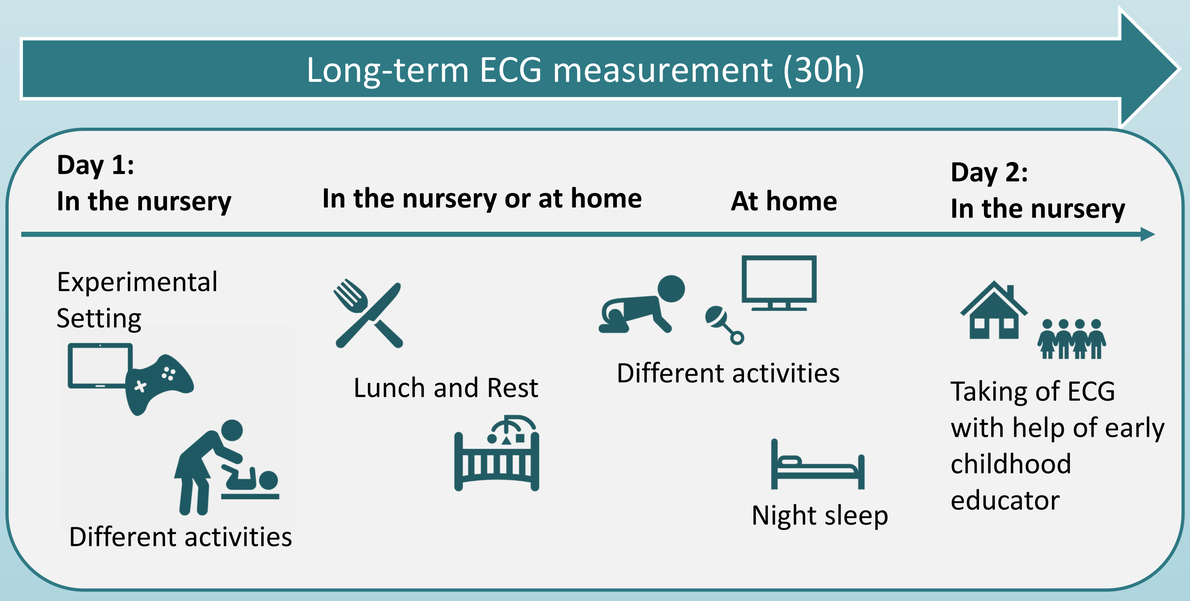
Research Question: What correlational effects of the digital media consumption on the children´s psychological and physiological parameters can be found?

Sample

N = 69 families with young children aged between 16-43 months (*M* = 28 months)

Method

1. Piloted parent´s questionnaire on the type and extent of media use in families with young children
2. Motoric Test ET 6-6 R (Petermann & Macha, 2015)
3. Temperament profile battery ICT (Zentner, 2010)
4. Experimental setting with recording of vital functions via long-term ECG measurement in different situations:



First Results

1. The average length of digital media use is higher during the weekends (*M* = 3.07 during the week, *M* = 5.72 weekends) and the time children spend with media during the week is significantly correlated with the use at the weekends (strong effect: *r* = .639, *p* > .001).

Table 1: Interactive screen media use of children

	n for this item	not used	< 1h/day	> 1h and ≤ 2h	> 2h and ≤ 3h	> 3h/day
Mobile phone	54	25	24	5	0	0
Tablet	51	35	14	2	0	0
Computer, PC, notebook	53	48	4	1	0	0

2. No significant correlations between digital media use and the motoric development of the children could be found.

3. Aspects of temperament (ICT) such as endurance/attention correlate highly significantly with the children's use of digital media and technology, *r* = -.349, *p* = .007.

4. A positive correlation between the heartrate in the phases of the restful sleep and the extent of daily interactive screen media use during the week (r = .28, p = .049) was found. The more children used interactive screen media the higher was their heart rate and the worse their regeneration.

Discussion

The results presented here need to be interpreted cautiously as the extent of digital media use in the sample was rather low.

1. The reason for the correlation between digital media use during the week and on weekend could be explained by the greater free time children have on the weekend.
2. Reasons for the non-existent correlation between the motoric development could be explained by the small extent of digital media use in the sample or the age of the children, as effects on the motoric development might show later.
3. The effect of interactive screen media on the regeneration might be connected to the character and the use of the device.
4. As for the aspects of the children´s temperament profile. Some sort of training effect might be the reason for the correlation between the digital media use and endurance.

Literature

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Authors

Karoline Rettenbacher MA[1], Marina Eglmaier BSc MSc[3], Univ-Prof. Dr. Lars Eichen[1], Dr.in Sigrid Hackl-Wimmer[3], Mag. Dr. Rominger Christian[2], Priv.-Doz. Dipl.-Ing. Dr. Helmut Karl Lackner[2], Univ-Prof.in Dr.in Manuela Paechter[3], Univ-Prof.in Dr.in Catherine Walter-Laager[1]

[1] Department of Early Childhood Education, University of Graz
[2] Otto Loewi Research Center, Division of Physiology, Medical University of Graz
[3] Educational Psychology, University of Graz