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Television viewing from before birth up to the age of 5

A review of research literature

Research on television and children aged up to 5 shows that even babies take an interest in watching television. Yet there is much evidence that indicates television viewing does not begin to be beneficial until preschool age. This, however, depends on the programmes and especially on how often and long children watch.

Children today grow up in a media-saturated world, and television is still the most pervasive medium. But how and when does this “growing into” the media civilisation begin? How does television literacy evolve? And is early-childhood television viewing harmful or beneficial? These are concrete questions that empirical research should be able to respond to.

Compared with many other issues and age groups we know relatively little about the television viewing habits of children under 5 years old. The IZI in-house library lists approx. 300 research reports¹ on this subject area, of which outstanding results will be briefly summarised.

When does television viewing start?

Some television reception studies take an interest already in the prenatal stage of life. From the 9th, at the latest, to the 16th week of pregnancy the foetus responds to the mother’s emo-

tions unfolding in relation to certain music or images on the screen (note that it is not the music itself). In the 17th to the 23rd week (5th to 6th month) the foetus’s response to music can at times be rather lively if the mother is fond of it. An equal reaction can be seen regarding the mother’s television viewing. Again these stirrings must be understood as a reflection of the mother’s emotions. From the 32nd to the 35th week (8th to 9th month) these responses not only begin increasingly to vary, but they also start to become more independent from the mother’s emotional responses (Natsuyama, 1991, p. 79; Kobayashi, 1998). It is the combination of “hearing music” and “sensing maternal emotions” that points to the foetus’s learning from television viewing. Research conducted at the University of Belfast tested, among others, babies of mothers who had been regularly watching the daily soap *Neighbours* during pregnancy. The babies showed, both in the womb and after birth, significant modifications in their motion patterns as soon as the title music was played. While it made them livelier in the womb, after birth they became calmer as soon as they heard the music. After more tests it became clear that babies specifically recall this melody (Hepper, 1991, 1996). This makes apparent the prenatal significance of television viewing.

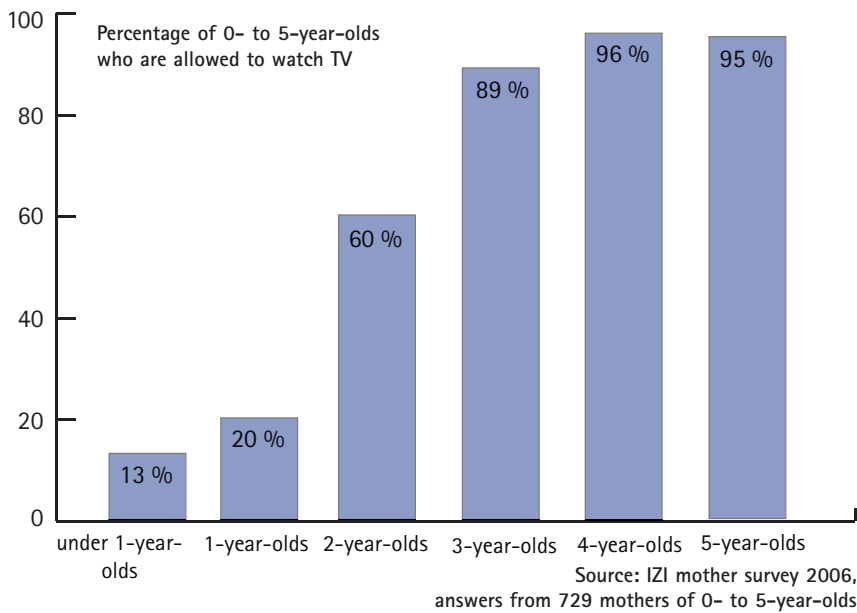
Conscious viewing, i. e. reception of the audio-visual medium, is a different matter, however. There is little

international data concerning when television viewing becomes a part of children’s everyday life.

The US-based Kaiser Family Foundation is one institution which conducts regular surveys on how much time toddlers and preschool children spend with media. According to a study from 2006, 79 % of US-American children have watched television before their 2nd birthday, while 43 % of these children watch television on a daily basis. Use is particularly frequent in low-income, low-education families and those of Afro-American descent (cf. Rideout et al., 2006). According to another study conducted in the United States, 2- to 3-year-olds consume 2 1/2 hours of television per day and 82 minutes of video in addition to that. The total media consumption per day thus adds up to 322 minutes (Jordan/Woodard, 2001).

Regrettably there is only limited European data for comparison. Turkish children on average start watching television at 2.1 years. The more siblings, the longer and the more frequently children watch television (Yalcin et al., 2002).

Data relating to Germany were collected in the ARD/ZDF study “Kinder und Medien” (children and media) in which parents of 2- to 5-year-olds were surveyed (cf. Feierabend/Mohr, 2004). At least 76 % of the German 2- and 3-year-olds watch television, and 29 % of those do so every day. Among the 4- and 5-year-olds the proportion of those watching television increases to 87 %. In com-



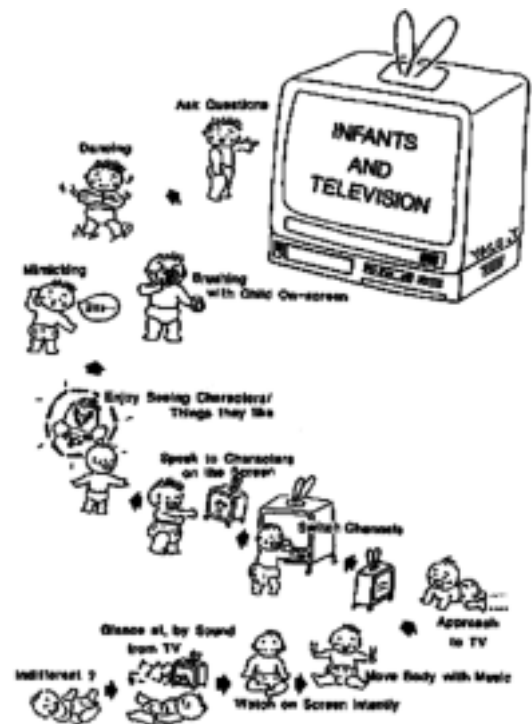
Ill. 1: Is your 0- to 5-year-old allowed to view television?

bination with books, audio tapes, radio, and so forth, German children between 2 and 5 have a daily media intake of 162 minutes. For comparison, playing, handcraft, and drawing combined amount to 229 minutes. A survey of the International Central Institute for Youth and Educational Television (IZI)² conducted in 2006 asked 729 mothers of children up to 5 years of age whether their child is allowed to watch television (see ill. 1). The results point out that in Germany the rate of children under the age of 2 watching television is below 20 %. This proportion rises to 60 % until the 3rd birthday. Already by the age of 3 years, 89 % are allowed to sit in front of the television, and among the 4- and 5-year-olds this rate exceeds 95 % (on parents' motivations for allowing viewing cf. Götz/Bachmann/Hofmann in this issue). Compared to the USA, German children have a distinctly later start into television use and view it only half as much time. However, by preschool age only a small minority of children have not yet begun to watch television in Germany.

When babies and toddlers watch television

The babies' interest in television begins – under natural conditions – in their 4th or 5th month of life (see ill. 2). Under laboratory conditions an inclination can be observed as early as the 3rd month. Babies respond to motion and colours on screen and certain sounds. If they are old enough to crawl, they move towards the television set as they would towards a toy (Matsui, 1991, p. 102). Babies even develop programme affinity and soon they pay attention only to the programmes they like: They recognise the title music of their favourite show, stop playing, and move towards the television (Lemish, 1987; Kobayashi, 1991, p. 71). Between the 6th and 10th month of life their interest becomes more targeted towards images and sounds that are meaningful to them, such as, for example, the voices of characters

from *Sesame Street*, drums, laughter, and so on (cf. Lemish, 1987). During the 10th and 11th month they start talking to the characters. Not much later they begin consciously moving along to rhythmic music and songs (cf. Matsui, 1991; Lemish, 1987). To some extent they even show preferences regarding content: thus 11- to 29-week-old babies particularly like looking, for example, at a television image of their mother (Kobayashi, 1998, p. 7). As far as research can show, the concept of watching television changes in the 2nd year of life (not before the 18th month and no later than with 2.5 years). Children learn to distinguish between TV characters and communicate with their mothers about personalities, objects, and plots. They imitate the actions seen on screen, sometimes even one day later (cf. Meltzoff, 1988; McCall et al., 1977). Various studies have investigated the objects of attraction for preschool children in the context of the Sesame Workshop. To summarise it briefly: attention-inducing son-



Ill. 2: Babies and TV – how a relationship develops (from: Kobayashi 1998)

ic features are, for example, lively music, sound effects, female voices, applause, baby sounds, children's voices, laughter, peculiar voices. Attention-inducing visual features are, for example, children, animals, babies, food/sweets, letters/numbers, toys, representations of affection and tenderness, physical activity, slapstick humour, but also aesthetic aspects such as strong colours, unusual camera shots and visual effects, or the succession of scenes, characters, and topics. Attention-reducing features on the other hand are, for instance, male voices, long speeches by adults, and lengthy voice-overs (cf. summary in Rice et al., 1984 and Valkenburg, 2004). Whereas in the 1970s and 80s it was predominantly visual attention that was targeted and researched, more recent programmes for preschool children try to mobilise and stimulate children in front of the television linguistically (e. g. *Dora the Explorer*), physically (e. g. *Barney & Friends*, *Little Einsteins*, *Teletubbies*), and intellectually (e. g. *Blue's Clues*). These offers to participate are emphatically embraced by the young target group (Howard/Roberts, 1999; Götz, 1999; Crawley et al., 2002; Anderson et al., 2000, Kirch/Speck-Hamdan in this issue).

Understanding television

Today's children learn to operate the technical devices surrounding the television very early in life (Rideout et al., 2006). An elementary understanding of televised images however, is not developed until about the age of 3 (Flavell et al., 1990). Tests have investigated, for instance, to what extent children at this age were able to relocate and position an object whose position they had seen on screen. This and other studies point to the considerable difficulties toddlers have in drawing inferences from

an on-screen image and relating these to their real surroundings (Schmitt/Anderson, 2002). As far as its content is concerned, television remains perhaps little more than a spectacle of images and sounds for the under 2-year-olds. Presumably children up to the age of approximately 1.5 years are able only to assimilate individual frames and short action sequences if the representations link up with their real experiences. With increasing age and television viewing experience, however, an understanding evolves of

Some basic rules for the production of preschool television programmes

- Allow plenty of time for empathising and understanding.
- Make acting characters the focal point on screen.
- Portray situations and subject matter that preschool children are familiar with from their everyday life.
- Narrate chronologically (e. g. without flashbacks) and always show the most important aspects of the story on screen.
- If formal elements of artistic style are employed, do so only in a contextualised manner.
- Explain emotions rather than implicitly assuming them.

the coherent quality of the representations (following among others Huston et al., 2006; Fisch, 2004; Rice et al., 1984). In this the visual aspect clearly becomes paramount for children and they can understand programmes to a certain extent even if they do not understand the dialogue (Fisch et al., 2001). Presumably sound has merely a guiding purpose. Already babies are capable of singling out certain characteristics of programmes in order to direct their attention to features of the content which are potentially interesting for them and to shut out those which for

them are too complex, adult-orientated, and over-challenging (Valkenburg et al., 2004). From the age of 4 years, children start to empathise with the characters and to judge the programme's relation to reality. Children acquire knowledge about channels and formats predominantly from formal elements of style (cf. e. g. Lemish, 2003; Kübler/Swoboda, 1998). Accordingly with increasing age, as an example, we can find a greater proportion of children who can distinguish between regular shows and commercials. 4-year-olds can already recognise commercials as distinct from the rest of the programme (Nieding et al., 2006). Nearly 50 % of 4-year-olds, 60 % of 5-year-olds, and 70 % of 6-year-olds understand that a product is being advertised to them (Charlton, 1995, p. 56).

Television viewing – even for very small children – is considered an active interpretative process of meaning making (following Bordwell, 1989), although, of course, their sign-reading competence develops only gradually (Nieding/Ohler, 2006). Preschool children not only have a slower way of understanding than adults, they also fail to decode certain details. Thus, 3- to 4-year-olds seem to be only capable of understanding chronological sequences (Brown, 1976; Gelman et al., 1980). To give an example: among the 4-year-olds only 4 % of children can comprehend a narrative style which includes flashbacks. This rate rises to 88 % among 8-year-olds. The ability to grasp temporal discontinuities in the narrative depends on children's cognitive development and their television viewing experience. In this regard, frequent viewers often do better than occasional viewers (Abelman, 1990). Furthermore, preschool children have no natural capability to decode formal elements of style. The split-screen, for instance, as a device to show parallelism between two events

is in this sense rather more intelligible than the use of point-of-view camera. The use of a dissolve as an indicator for dream sequences is scarcely understood by children. Visual effects (even the most straight-forward) can also hinder preschool children's comprehension of a programme (Beentjes et al., 2001). This also applies to the plot which is in fact decoded from the images on screen. If important segments of the plot are narrated "only" verbally, preschool children have difficulty grasping them. Additionally, complex, indirect, or emotionally-driven responses are hard for them to understand (Hayes/Casey, 1992). All things considered, preschool children's decoding practices and their ability to relate what they have seen to their own understanding develop with increasing television viewing experience (Baacke, 1999, p. 355). In this respect, television reception is not adequately described using stimulus-response-models, but rather by understanding it as a process of active appropriation (cf. e. g. Charlton/Neumann, 1986). Toddlers and preschool children, too, are active recipients who appropriate the symbolic material of the media in a way it is subjectively meaningful (Bachmair, 2001). In doing so they approach the medium thematically biased and according to this they actively direct their attention (Charlton/Neumann, 1986). They are looking for constants (Götz, 2006), and initially search for the familiar in the unfamiliar. They tend to bring what they see into line with their conception of the world rather than adjusting the latter to the medium (Kübler/Swoboda, 1998, p. 289). The material that is thus subjectively interpreted is used for expression of personal concerns (Neuß, 1999, 2001) and for positioning within the peer group and vis-à-vis adults (Paus-Haase, 1998).

Do toddlers learn from television?

Already the embryo appears to learn from television: the title melody of daily soaps, for instance. Accordingly toddlers are continuously learning – even if they are only learning how to sit in front of a device that shows flickering images. It has been shown that children attune their reception behaviour to certain formats. They are familiar with the programme's course of events and take on action strategies presented on screen (Crawley et al., 2002; Anderson et al., 2000). There are indications that even babies learn from television's content, for example, put forth in a study by Mumme/Fernald (2003). This study investigates to what extent 10- and 12-month-old babies adopt emotions from arbitrarily emotionalised items on television. On screen, adults responded either emotionally positively or negatively to, for example, a white tube. The 12-month-old babies who viewed these programmes modified their behaviour towards the object, but not the 10-month-olds. Evidence, however, that beyond this toddlers are cognitively fostered by television programmes – in the sense of the advertising slogan "For the genius in your child" – cannot be found (Weber/Singer, 2004). Nevertheless, preschool children clearly do learn some intended content. There is a long list of things preschool children demonstrably gain from educational formats (for a summary see Fisch, 2004). It is more than merely facts, numbers, and letters of the alphabet. By means of suitable programmes the inclination to read can be positively influenced (e. g. Linebarger et al., 2004; Uchikoshi, 2006; Register, 2004), speech acquisition can be fostered (e. g. Close, 2004), understanding of foreign cultures can be aroused (e. g. Cole et al., 2003), and pro-social behaviour can be encouraged (for a summary see

Mares/Woodard, 2007). With an appropriately designed programme and with the parents' support television viewing can indeed be beneficial for children. Long-range studies have proved that children who had watched educational programmes such as *Sesame Street* from the age of 2 to 3 performed better in certain tests at the age of 5 than those who had watched only entertainment-oriented programmes. The former exhibited a heightened interest in learning as well as a positive anticipation of school (Bickham et al., 2001; Anderson et al., 1996). 4-year-olds who had watched *Sesame Street* on a regular basis had an increased ability to identify colours, to count to 20, to recognise letters of the alphabet, and to tell coherent stories (Zill, 2001). Various studies point to the fact that especially toddlers between 18 and 22 months learn far less effectively from viewing television than from face-to-face interactions (e. g. Barr/Hayne, 1999; Krcmar et al., 2008). Real human interaction is clearly more effective as an environment for learning! Not least, the research on *Sesame Street* pointed out that success in learning is largely dependent on parental support: although the addressees of the programme *Sesame Street* – which was designed to further the education of preschoolers – were children from socially deprived areas, those who benefited from the programme were mainly middle class children – because their parents talked with them about what they viewed (e. g. Wright et al., 1990).

When early television use is harmful

Despite the euphoria about the potential of television viewing being of benefit to small children, the decisive factor must not be forgotten: too much television is harmful. Arguments against early television viewing are presented on various grounds.

Manfred Spitzer, German professor, for instance, argues from the context of brain research. One of his main points: being solely an audio-visual medium, television discourages the necessary linking in the brain required for complex thought processes in later life (Spitzer, 2005). The neurobiologist Fabienne Becker-Stoll emphasises the danger induced by the medium's stimulation power (Becker-Stoll, 2007). While studies on brain activities during television reception were conducted only with older children (Murray, 2006), various long-term and correlation analyses confirm Becker-Stoll's assessment. The long-term study by Zimmermann/Christakis (2005) with over 10,000 participants from the USA questioned over 2 years pointed out significantly worse results in tests for reading skills, reading comprehension, and short-term memory among children who had consumed more than 3 hours of television daily before their 3rd birthday. Furthermore, frequent viewing between the age of 3 and 5 is accompanied by a deterioration of performance in mathematics. Yet the study also verified that an improvement in reading comprehension is possible if children at the age of 6 watch less than 3 hours of television daily. The basic trend of the research results, however, is clearly that frequent viewers exhibit deficiencies. They have a comparatively limited vocabulary as well as less knowledge of language in general. In particular, frequent viewing of programmes designed for adults correlates with fewer skills (Close, 2004; Selnow/Bettinghaus, 1982). Watching television in infancy and frequent viewing before bedtime, coincide with various forms of sleep disorder (Thompson/Christakis, 2005; Owens et al., 1999). Some analyses come to the conclusion that frequent-viewing preschoolers who watch more than 1 hour of television daily tend to suffer from obesity more often (Lumeng et al., 2006). One possible reason: if preschool children eat

in front of the screen, they consume more and predominantly high-calorie food (Francis/Birch, 2006). In addition to this, there is the problem of violence, the discussion of which would go beyond the scope of this review of literature (cf. e. g. Caviola, 2000, for a summary also Peters/Blumberg, 2002). In the same way that children can learn pro-social behaviour from watching television, the opposite can also be the case. In this respect television is potentially harmful if too many programmes are watched, or if the programmes are not of suitable quality or age-appropriate. However, the claim that television viewing is damaging to infants' eyesight could not be confirmed. When 2-year-olds who watched more than and less than 1 hour of television each day were tested, no significant difference in their sight could be established. Rather, the vision of those frequent viewers under the age of 2 years was more advanced than that of those who sat in front of the screen less frequently. Watching television had trained mainly one skill: their "tele-vision" (Kobayashi, 1998). ■

NOTES

This article is based upon research efforts of, among others, Christine Bulla, Andrea Holler, Sabrina Bachmann, Monika Gröller, and Astrid Riedel.

1 It is somewhat difficult to verify a specific number in this context, since a variety of studies, such as for instance those conducted by the Sesame Workshop, were published in collected form.

2 Carried out by iconkids & youth, Munich, Germany.

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