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"As if you're right in the middle of the place where the story is happening"

How children and adolescents experience stereoscopic 3D technology

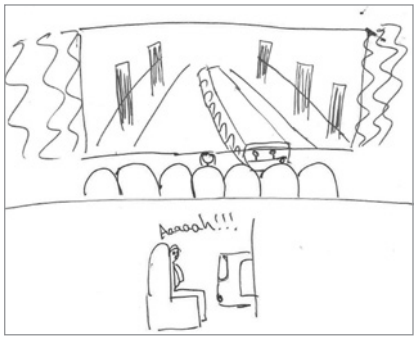
An IZI study with 51 children and adolescents in Germany inquired how children experience stereoscopic 3D technology, and what expectations they bring to films with this technology.

It is snowing, and the snowflakes seem to float through the cinema, close enough to touch. Sina, aged 13: "When it started to snow you could reach out to touch it." In stereoscopic 3D technology, images from 2 cameras which record the same scene from slightly different positions are projected onto the cinema screen. Seen through special glasses, the images are registered separately by the right and left eyes and put together in the brain, creating the illusion of spatial depth. The images are given a third dimension (cf. Wegener, Jockenhövel & Gibbon, 2012), leading to new challenges for the telling and understanding of stories (cf. Pfanz, 2011).

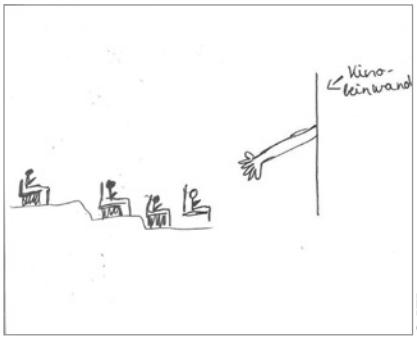
While children's television is still reluctant to adopt this technology at present, films with stereoscopic 3D technology are part of the standard repertoire in cinema for children and adolescents. While only 17 of the new films released in German cinemas in 2009 were in 3D, the number rose to 30 in 2010, and to just under 50 feature-length films in 2011 and 2012.[1] 3D films have become well established, at least in the cinema. Reception studies suggest there is an increased sense of presence, i.e. the opportunity to become more immersed in the world of the film. Here the 14- to 29-year-olds – i.e. a group that includes younger adolescents – show a particular affinity with 3D films (cf. Wegener, Jockenhövel & Gibbon, 2012, p. 87).

So far, however, there have only been a few isolated studies investigating how children experience this technology. Preliminary standardized studies point to an increase in emotional involvement and in the experience of fear, especially when events are transported into the auditorium and fly towards the children (negative parallax). The frightening elements, however, tend to play a minor part in the experience of a film (cf. Wegener, Jockenhövel & Gibbon, 2012, p. 177).

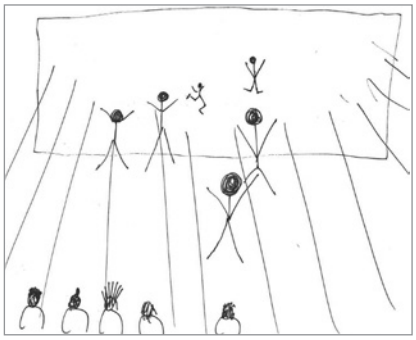
Nonetheless, many questions remain unanswered for the child/adolescent target group, e.g. how they perceive and understand stories told with 3D technology, what expectations they have of this technology, and to what extent these expectations are actually met by films. In an exploratory study in the spring of 2012 we used the films *Hugo* and *John Carter* to investigate the above questions about how stories with 3D technology are experienced.



Ill. 2: **Adolescents describe 3D technology: "A train leaves the screen and travels into the cinema hall" (girl, 15 years)**



Ill. 3: **Adolescents describe 3D technology: "The film reaches out a giant hand to the cinema audience" (girl, 13 years)**



Ill. 4: **Children describe 3D technology: "People fly in the room" (girl, 10 years)**

The study

We questioned children and adolescents who had, of their own accord, bought tickets for the 3D screening of *Hugo*, the Oscar-winning film about the orphan Hugo Cabret, set in magical 1930s Paris, or *John Carter* (cf. ill. 1), a film about the soldier John Carter, who fights for survival on a foreign planet. Before and after the film, the children and adolescents and their caregivers – if present – filled in a qualitative questionnaire with writing and drawing tasks. 51 children and adolescents between the ages of 6 and 17 (19 girls and 32 boys) and 22 adult caregivers took part in this exploratory pilot study.

What is children's and adolescents' experience of 3D technology?

For most respondents (90 %), stereoscopic 3D technology is no longer a novelty in 2012, and they have already seen one or more films with this technology. When asked what constitutes 3D technology, they mainly drew and described the spatial dimension in comparison with 2-dimensional representation:

"It's not like it's drawn on paper, it stands out like in real life. It looks as though you could touch it." (girl, 13 years)

A 6-year-old girl tries to express the spatial illusion in words:

"3D [offers] the opportunity to see things completely, that is, to see the sides that aren't visible as well." (girl, 6 years)

The 3D film experience makes viewers aware of the limited nature of other forms of filmic representation. The experience of the film is described as "just like real life" (boy, 12 years), or "as if it was reality" (boy, 13 years). When children and adolescents draw their experience of films with 3D technology, they often show an object coming out of the screen. For example, a huge hand reaches out of the film into the theatre, a train comes out of the screen into the cinema (cf. ill. 2, 3), or people – marked with manga-style movement lines – come out of the screen into the theatre (cf. ill. 4). These are graphic ways of articulating a visual experience in which certain objects no longer remain on the screen, but come closer to the viewers. The visual experience leaves the familiar dimensions behind, leading to intuitive reactions:

"3D is like this, for example you see what's flying towards you. Sometimes you think it's falling straight onto you, then you duck." (boy, 12 years)

As Wegener, Jockenhövel and Gibbon (2012) found: it is the "negative parallax" effects which shape many images and memories. This illusion of objects coming out of the screen and into the theatre leads to greater involvement on the part of children and adolescents:

"Things come towards you that look as though they're right in front of you. You feel as though you're right in the middle of it." (girl, 11 years)

"You feel as if you're right in the middle of the place where the story is happening." (girl, 15 years)

Children's and adolescents' previous experiences have created a mental image of what the technology can do, and their expectations before the film are correspondingly high.

Expectations of 3D technology

When asked what added value they expect from 3D technology, nearly all the respondents have high expectations: that things or people will fly towards them, that the action will seem more real, and that the film will simply be more fun to watch than in 2D. Just over two thirds of respondents hope that the 3D technology will make it easier for them to engage with the story emotionally, and feel as though they are in the film. Half of the respondents hope to experience the story as more plausible, more exciting, and funnier, and to feel some physical sensation. In comparison, more is expected of the Oscar-winning film *Hugo* than of *John Carter*. Questioned after the film, it became evident that the expectations of several girls and boys had been fulfilled in some aspects. The 3D technology did in fact make the film seem more exciting, and nearly all those who had hoped for this stated that it had been more fun watching it in 3D, and that they had felt it was "more real".
They were disappointed, however, by the objects flying towards them, having expected more spatial illusions.

Hopes that the 3D technology might perhaps cause butterflies in the stomach were also only fulfilled for a fifth of the children. The feeling of "being right in the middle of it" was experienced by most of those attending *Hugo*, but not those attending *John Carter*. The hope that the technology would make the film more convincing was largely not fulfilled for the audience of *John Carter*, while expectations of *Hugo* were clearly surpassed.

Where storytelling with 3D technology succeeds

To identify particularly successful elements of 3D technology in the films, we asked the girls and boys to describe the parts which had been made especially interesting by the technology, i.e. the moments in which they had felt, for example, as though they were right in the middle of the action. Here we found typical areas which were seen as particularly successful.

Creating aesthetic experiences

Children and adolescents enjoy scenes in which the technology offers them a specific visual experience, e.g. "when you had the people right in front of you, it felt as though they were only talking to you. That was cool" (boy, 14 years). The new technology offers a more intensive experience of parasocial interaction (Horton & Wohl, 1956), and momentarily allows the illusion that the protagonists are speaking directly to the viewer. Faced with this new aesthetic experience, even children who have obviously grown up with various "new media" are amazed at what technology can do. Stones or spears which seem to come out of the screen stimulate the perception, give visual pleasure, and increase a film's visual appeal.

A number of children, for example, described the beginning of *Hugo* as particularly successful, not referring to the various artistic effects (of maps which become blurred and turn into the inner workings of clocks), but taking pleasure in the falling snowflakes: "At the beginning, when it snowed. It was cool because it felt so real." (girl, 12 years) The effect has no overt significance for the plot itself, but nonetheless establishes a certain receptive attitude and sets the mood for a surprising film experience in which naïve impulses (such as reaching out to touch illusory snow) will be permitted.

Allowing viewers to participate in protagonists' experiences

Scenes in which the technology allows viewers to experience the subjective perspective on a completely different level are also mentioned as being particularly impressive. Here chase scenes from *Hugo* were mentioned several times, for example: "When Hugo was being chased by the station guard and ran between the people." (girl, 11 years) This is a climax in terms of content: here the orphan Hugo is in danger of losing his meagre home – the only one he has – if the station master catches him. This scene, enriched with readily discernible 3D effects, shows the boy's perspective: it is shot from his eye-level, which is roughly waist-high to the other passers-by in the railway station. Here the camera occupies the subjective angle of view of the children. Hugo's perspective is ushered in by the intense 3D effects, creating the impression that one is running through the crowds at child height. The respondents seemed to perceive it in exactly this way: "When Hugo ran away from the guard, I felt as though I was right in the middle of it." (girl, 9 years) The subjective camera, familiar from 2D film technology ("movie ride" aesthetics), is further intensified here, and the viewers can share in the boy's subjective feeling. In interviews with (mostly) adults, Wegener, Jockenhövel and Gibbon identified this moment of "physical absorption" as the main thing viewers gained from the film (cf. Wegener, Jockenhövel & Gibbon, 2012, pp. 148 ff.). The children and adolescents who took part in this study also described this as a particularly enjoyable moment in the experience of the film, e.g. after viewing the Disney film *John Carter*: "When John was on the plane […] it looked as though you were in the film. Just for a little while it felt as though you could fly" (boy, 10 years). Here the 3D technology creates a more intense perspective and the chance to physically feel the experiences of the film protagonist, at least for brief moments. So from the children's and adolescents' point of view, 3D technology definitely does enrich the film experience, creates quite distinctive aesthetic moments of experience, allows physical sensations which would only rarely be possible with 2D technology, and thus leads to greater involvement in the action and the point of view of the protagonists.

Potential for improvement, as seen by children and adolescents

When asked to give the filmmakers further tips on where they could have used more 3D technology, the respondents mentioned on the one hand scenes which they had already found "intense", but in which they could have imagined an even more intense experience. In *John Carter*, for example, these were battle scenes: here respondents would have liked more of a spatial illusion, especially in scenes where spears were being thrown. In *Hugo* it was in the most exciting scenes that the children and adolescents would have liked more effects, e.g. in the chase, or in the scenes where the train comes towards the boy. Here more pronounced and probably longer-lasting 3D effects could have made the experience even more suspenseful. Thus the action-packed climaxes are the places where the children and adolescents would have liked more spatial illusions.

Another "type" of scene for which the children recommended more pronounced 3D effects is, for example, the scene in *Hugo* "when Méliès's drawings fly through the room" (girl, 15 years, cf. ill. 5). This is a turning point in terms of content, a moment which the film's dramatic structure has been building up to, creating suspense: the moment when the children discover the secret of the toy seller – that he is the forgotten silent film artist Méliès. They cannot yet interpret the images, it is not yet clear how the subsequent plot will develop. The scene is important, however, and heralds the still-uncertain resolution of all the problems, and the initiation of the general happy ending. From the point of view of the young audience, this moment would definitely have warranted more time and more effects.

For all the scenes mentioned, however, one thing holds true: they already have a distinct 3D effect. This could on the one hand mean that children and adolescents do not have enough imagination to visualize more intense 3D effects in scenes, or it points to a fundamental problem: are 3D films as a whole cut too fast? At present it is normal to produce films in such a way that they can be screened in both 2D and 3D. Particularly in mainstream cinema, care is taken not to create any "longueurs" in which the audience might get bored. In viewers, however, this can easily produce "reception pressure" – stress about having to follow the action without having time to immerse oneself in the desired experience. In the early years of German reception studies in the area of "children and television", Hertha Sturm, then head of the International Central Institute for Youth and Educational Television (IZI), formulated the idea of the "missing half-second". For her, the most important difference (in terms of emotional effect) between television perception and other kinds of perception lies in the acceleration produced by cutting, which does not allow children in particular to process what they have seen (cf. Sturm, 1987). In films with 3D technology this absence of the necessary processing time is even more apparent, since the brain needs time here to define positions within the space and to process the visuals. Since the films are cut in exactly the same way for 2D screenings as for 3D, it can be assumed that this "missing half-second" is multiplied, and that child viewers are thus subject to greater demands and more strain.

3D or 2D: which is better?

When asked whether they would prefer to have seen the film in 2D or 3D, most of the children and adolescents expressed a definite preference for the stereoscopic 3D technology. The film is "more alive" (boy, 8 years) and "realistic" (boy, 11 years), and it is "more exciting […] when things come towards you" (girl, 11 years).

The main argument against 3D is that the technique is physically overtaxing, e.g. "because 3D is more tiring for your eyes" (girl, 9 years), and "because I get a headache" (girl, 12 years). In particular cases, impaired vision limited the enjoyment of 3D films, as with an 11-year-old girl who said that she squints a bit, and could not see the effects so well. A further argument from the children and pre-teens against 3D technology is the necessity of wearing glasses "which [make] the film darker (in terms of brightness)" (girl, 12 years), and "because it's uncomfortable with the glasses" (girl, 12 years).

A surprisingly large proportion (of the adolescents in particular) commented that they did not care whether the film was in 2D or 3D, "because I choose films by content" (girl, 13 years). You have to weigh it up, thinks a 17-year-old boy, "because some are better this way and some are better the other way". For one 16-year-old girl, "3D [may be] more life-like, but 2D is just as exciting". On the one hand these comments suggest that the adolescents are positioning themselves as media-literate consumers, on the other hand they hint at a crucial argument: stereoscopic 3D is, in 2012, not (or no longer) a reason to buy a ticket to the cinema. As ever, what matters is the story, or the things the children and adolescents have heard, read or seen about the film. The positive film

experience itself, however, is not primarily shaped by presence on posters or fast-food products, but by a story which is aesthetically implemented in such a way that it is as enriching as possible for children and adolescents in the cinema, and is seen by them as a high-quality product.

What is quality in 3D narration?

From the point of view of the children and adolescents who took part in our study, stereoscopic 3D technology definitely has many enriching elements. What is striking, however, is the difference between the 2 films they were asked about. In the question about where the 3D technology really contributed something to the filmic experience, *Hugo* rates higher in nearly all the items, and elicits the answer "totally agree" 3 times more often. In the perception of the children and adolescents, the 3D effect made the film more exciting,[2] made it look more real,[3] made it funnier,[4] and made them feel as though they were in the middle of the action.[5]

This exploratory study comprised only a small sample, and so far no comparative figures are available in reception research which is publicly accessible. The results, however, clearly indicate that, from the point of view of the audience, there are definite quality differences in narratives with 3D technology. These probably lie partly in the elements of the dramatization, in which every shot is understood as a "stage setting", and is composed coherently with various levels. It is also, however, a matter of the narrative rhythm, since viewers can only take full advantage of the visual enjoyment offered by the technology if they have enough time to immerse themselves in the multi-dimensionality and to look around in the filmic world (cf. Pfanz, 2011). This is probably especially relevant for children and adolescents, even if far too little concrete reception research has been done on this as yet.

The use of 3D technology for storytelling so far, as an effect in itself, to aid comprehension of the subjective perspective of meaning, and to add drama to the climaxes, has already highlighted areas in which the technology can be successfully deployed. Other possibilities, however, have not yet been fully explored, e.g. that of spatial imagery (cf. Borstnar, Pabst & Wulff, 2002, pp. 154 ff.). Space as a metaphor could make it possible to experience the inner development of the hero/heroine.

Using 3D effects to give meaning to spaces

Hans-Dieter Erlinger suggests that a particularly important component of film and television narrative for children is that it enables viewers to experience the necessary changes undergone by the hero or heroine by means of images that serve as metaphors, such as the act of stepping through a gateway. This can also be achieved by dramatic use of the gaze into a space, e.g. in a scene from the classic Czech film *Drei Haselnüsse für Aschenbrödel* (UK title: *Three Gifts for Cinderella*). Here, the protagonist fixes her gaze, in a clear, well-staged manner, on the top of a fir tree, shortly before shooting cones out of it with a crossbow. The end of the film, where she rides ahead up a snow-covered hill, offers a further example – here space and perspective are charged with symbolism, and the film/television narrative can be experienced with the senses (cf. Erlinger, 2007).

Some examples of the successful use of object and space metaphors are to be found in scenes from *Hugo*, e.g. in individual pictures flying out of a secret box and through the room/the narrative space, pictures which are apparently significant, but do not yet yield a meaningful whole. The children in the middle of the scene are the catalysts, the ones who have stirred up what was hidden, the detectives following traces, and yet they cannot understand what is happening to them. A wonderful metaphor which would have warranted more time, and which shows how much potential there still is to further enrich the sensory experience of storytelling through stereoscopic 3D. ■

NOTES

[1] *Calculated from data on www.digitaleleinwand.de/3dfilme [12.09.2012]*
[2] *"totally agree": 38 % for* Hugo, *13 % for* John Carter
[3] *"totally agree": 47 % for* Hugo, *13 % for* John Carter
[4] *"totally agree": 29 % for* Hugo, *6 % for* John Carter
[5] *"totally agree": 52 % for* Hugo, *13 % for* John Carter

REFERENCES

Borstnar, Nils, Pabst, Eckhard & Wulff, Hans J. (2002). Einführung in die Film- und Fernsehwissenschaft. *Konstanz: UVK.*

Erlinger, Hans-Dieter (2007). Märchenverfilmungen im Fernsehen. In Achim Barsch & Peter Seibert (ed.), Märchen und Medien, *(pp. 108-121). Baltmannsweiler: Schneider.*

Horton, Donald & Wohl, R. Richard (1956). Mass communication and para-social interaction. Psychiatry 19*(3), 215-229.*

Pfanz, Ludger (2011). 3D stereoscopic. A new technique challenges TV and cinema producers. TelevIZIon, 24*(E), 52-56.*

Sturm, Hertha (1987). Das »Wie« der Präsentation. Methoden und Ergebnisse zu Wirkungen der formalen medienspezifischen Angebotsweisen. In Marianne Grewe-Partsch & Jo Groebel (eds.), Mensch und Medien *(pp. 33-41). München: Saur.*

Wegener, Claudia, Jockenhövel, Jesko & Gibbon, Mariann (2012). 3-D-Kino. Studien zur Rezeption und Akzeptanz. *Wiesbaden: Springer.*

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