INTERVIEW WITH DR. DANIEL R. ANDERSON: CHILDREN and MEDIA

$\mathcal{D}$r.Anderson is a Professor Emeritus at University of Massachusetts. His published work concerns attention, comprehension, viewing behavior, and the long term impact of television on development, particularly the cognitive and educational aspects of it. His current research interests include toddler understanding of television, the impact of television on parent-child interactions, and the effects of adult back ground television on infant and toddler behavior.

Anderson was involved in the creation of children's series including Blue's Clues, and Dora the Explorer and Go Diego Go. He has also acted as an advisor to The Sesame Street.

He was one of the distunguished lecturers in Children and Media Congress that took place in İstanbul in last November. We had the chance to have an exclusive conversation with him on media's cognitive and educational effects on children.

İ&D: *Recent researches show that television continues to reach more audience on average than any other major medium, across all major demographic groups.*

What is it about TV that has such a hold on us?

Daniel R. Anderson: First, in part it comes from our biological **orienting action**. When we watch TV, our brain focuses its attention on gathering more information while the rest of the body quiets. whether the simple formal features of television like cuts, edits, zooms, pans and sound effects activate the **orienting action**, thereby keeping attention on the screen. By watching how brain waves were affected by those features, the researchers concluded that these stylistic tricks can trigger involuntary responses and derive their attentional value through the evolutionary significance of detecting movement.

In this sense, TV works at both bottom up and top down perceptional levels. Bottom up is all perceptional and intentional levels. So, if something changes in the screen, your attention is brought back to the screen automataly. We always orient the changes in our environment. This is the bottom up part. The top down part is interpreting what is going on, namely creating a story. So, if TV programming is well designed there is always 'I want to see what is going to happen next'. Average shot lasts about 3 seconds and when you are just about to throughly understand what is going on, you get a bottom up change that keeps your attention for a second or two. Now you can move forward to see if your question gets answered. Then of course as you have more sophisticated understanding, larger questions pose themselves; 'I wonder so and so was the murderer' and so on.

The point is that you don't need to take any action and this is a very natural thing for humans to do. While watching TV, we use the parts of the brain that are for situational awareness. **Situation awareness** is the perception of environmental elements with respect to time and space. During TV viewing your situational awareness is always active. So, I am aware of walls around me; I am aware that I am in this room; I am aware that this is a slightly formal meeting.

When you are using a computer or a tablet or a game console, what you experience depends on your action. You constantly have to make choices as to what is going to happen next, which in a lot of ways is good. A well designed computer game is also very enjoyable and really fun. But every time you have to decide what to do it breaks your situational awarness chain. You are now activeting a different kind of the brain which is the decision making part of it. So, you lose some of your situational awareness and there is also the possibility that you can make a wrong choice. For a young child, when you touch a wrong button and there comes the wrong screen and takes you to a crazy place, like a commercial that you did not want to look at. Well, to a greater or lesser degree, it happens with all interactive media forcing you to start over. That kind of things never happens with TV, except for commercials. Also, with TV we have to talk about attentional inertia.

The theory of **attentional inertia** holds that attentional engagement increases over the time course of a look at television and that this engagement rapidly dissi-

pates when the look ends. The theory was tested in a study of 41 undergraduate students' viewing of 2 hours of videotaped dramatic television programs and associated commercials. The first result was that inertial engagement sustains looks across boundaries between programs and commercials, that is very important.

The other thing they found was that inertial engagement was associated with greater recognition memory for TV content. So, if you have been maintaining your attention for about 15 seconds without any kind of break, you start moving into a different kind of state and your engagement deepens. You processing more information, your understanding of what is going on improves and most importantly you start shutting down the outside world. So, the longer you maintain your focus on a TV program your engagement gets stronger. There is nothing quite like that when it comes to the computer. May be the best designed computer games engage that way. That is why I think TV is still the dominant medium and and it seems it will stay the same way at least until intractive technology becomes seamless. I will give you an example of how this could happen: You know the idea of virtual reality. Virtual reality is a computer simulated environment that can simulate physical presence in places in the real world or imagined worlds. So, you have the experinece of being immersed in the environment, move in it. If the choices that you make is natural then it will seem seamless. Just the same way as you walk around a real city. So, it is not inherent in interactive media to have the power of the television. It could happen but we are not there yet. So, it is the form, not the content of television that is unique.

İ&D: *You have been actively involved in public broadcasting for children as both an academic and consultant. What does your experience tell us about the impact of educational TV programs on children's cognitive development who are younger than preschool age?*

Daniel R. Anderson: Unfortunately, there is very little research on this matter. Recent research, however, has indicated that infants have a great deal of interest in touch-screen media and rapidly learn how to use them. In particular, infants appear to learn from touch-screen applications more effectively than they learn from television.

Although it is too soon to draw conclusions, I am optimistic that touch-screen media can provide useful educational tools during late infancy. Television programs and videos are normally edited. Consider a shot that shows the outside of an office building followed by another shot that shows two people having a discussion inside of an office. An adult who watches such a sequence immediately infers that the second shot represents a space inside of the building seen in the first shot. The adult infers that there is a logical connection between the shots and is not disturbed by the sudden change from outside to inside the building. Infants

begin to recognize and understand shot transitions at about 18 months of age, with their understanding of editing montage growing throughout early childhood.

İ&D: *You talk about the down sides of video programs and call it as video deficit phenomenon. What exactly do you mean by it?*

Daniel R. Anderson: Our studies over the years have established that until about 2 ½ years of age, infants' understanding of television and videos is poor. Infants are much better at learning from real-life demonstrations than they are at learning from videos. Unlike what the producers have been claming, educational videos are not very effective in teaching infants. Besides, there is strong evidence that harmful effects can occur because media distract or displace infants and parents from engaging in positive behaviors and interactions.

When watching a video, infants engage in less sustained and focused attention when an adult television program is on in the background, and parents engage in lower quality interactions with their children. Studies have found that the more children are exposed to television at home, they have poorer language and cognitive development. There is some indication that the type of program on the TV is important. For example, one study found poorer cognitive self-control in infants that was related to exposure to adult, back ground television, but was not related to exposure to child programs Another study found a difference between educational programming and entertainment programming. This study found poorer development of attention in relation to entertainment programming exposure but not in relations to educational programming exposure.

It is widely recognized in child development studies that infants benefit greatly from engaged interactions with their parents and other family members. Social interaction with family members is extremeley important. We use term **video deficit** to explain this fact.

İ&D: *There is considerable amount of educational programming for pre-schoolers in the US. Do we know whether the impact of TV viewing for this age group is positive for cognitive development? If so, how does it vary?*

Daniel R. Anderson: At pre-school age, namely 30 months old and older, many children begin to play games on computers, game consoles, and touchscreen devices. The content they watch is mostly of the type intended for children. Beyond the preschool years six years and older, children begin to watch a much larger variety of television programs as well as play a larger variety of computer games and begin to use social media on the Internet. As children approach adolescence, much of the content in their TV viewing and interactive media use is directed at adult audiences.The great increase in screen media use is closely related to preschool children's ability to comprehend media.

Preschool children are able to understand that particular programs have features, such as the use of puppets, or brightly colored animations, that indicate the content is for children. Nevertheless, they do not pay attention to programs that use attractive formal features if they cannot understand the content. By the time they can comprehend media, they selectively choose programs they can understand and pay most attention to parts of the programs that are most important for comprehension. Because preschool children can understand screen media, they can also learn from them. The problem is that starting at abuout age 6 children are getting more and more interested in adult content. This changes about at 12 years and they only watch smal amount of kids programs and less interested in educational programs. The challenge here is that getting them to watch childrens program. The children who watch it or made to watch it by birnging the programs to class environment learn from them, there is no question about that. They even like the educatinal content. If they are left to watch whatever they want they probably choose to watch the violent program.

İ&D: *I remember PBS' Bill Nye the Science Guy, Cyberchase and World Girl for older children. Is there any studies done to show us that they have a positive impact?*

Daniel R. Anderson: No, actually there isn't. But studies has shown that children learn from these kind of scientific programs are much more able to apply scentific principals that is taugt in the program at high school. There is this show callled Crows and they get to learn about how wings work. You test them later and want them to build an airplane from different parts to be put together. İt turns out that the children who have seen Crows would choose beter parts because they understand the principals better. So, it works. It just takes getting them interested in.

İ&D: *Seasame Street was the first TV show to use a carefully designed curriculum to teach preschool children knowledge and skills to prepare them for elementary school. As a part of the Sesame Street team, can you tell us about the need behind of this kind of programming? Is there any resaerch done to measure who is it most beneficial to and what the varying factors are?*

Daniel R. Anderson: During the 1960s President Johnson started a program called war on poverty. I think after the civil raights movement the nation became aware that black children were terribly unprepared for school and had terrible scores in nation-wide tests. Especially in the south but actally all over the country. There was an awarenees about this issue and it led to a pre-school education project called 'Head Start'. It was started in President Kennedy's term but after he was assasinated it got established by Jhonson administration.

A group of people who were involved in television programming wrote a proposal to make a TV program that was designed as a commercial, because it

was obvious that commercials were much more effective than anything else. That was the original idea but actual program was so different than this initial idea. These producers got funding from two foundations, Ford Foundation and Carnegie Foundation to develope a plot program. Later they got the government interested in it and the US Department of Education porvided money as well. A lot of Money was put into it. Remember, it is 1960s and the original budget for developing the whole thing was about 40 million dollars. In today's value it would be more like 400 million dollars. So, they were able to hire the top writers and top producers and Jim Henson was the puppeteer and so on.

Then they hired a lot of top psychologist and advisors including me to create the project. This was never done before. They also hired a lot of good researchers to actually study the different way of producing shows, which ones the children like best, which ones children learn more from. They threw away the commercial idea partly and added other things.

İ&D: *So, it was started for under-previlliged kids. How did it become to include the other social groups?*

Daniel R. Anderson: It is an interesting story. After a while a lot of rich kids started watching it and show got critizised, this is a show for kids but you got those rich kids watching it. Their defense was 'poor kids are watching it too. What is the problem?' In subsequent studies it turned out that most benefited group from the show was poor kids indeed.

İ&D: *Who else benefited from it?*

Daniel R. Anderson: To our suprise, it was more beneficial to boys than girls. In the US, - that maybe true for Turkey, I don't know - culturally there is less demand on boys to learn and to be quite, sit still, read books and so on. So, girls are better prepared for school. Research showed that the boys who watched Sesame Street got more prepared for school.

There is a strong evidence that handicapped chlidren benefit from these programs too. For two reasons: One is that they have diffuculty getting away from where they are. And the other thing is they see handicapped characters in the show as well. It helps a lot.

İ&D: *I know a lot of people who enjoy watching sesame street with their kids. What does it make it watchable by adults? Is it intentional?*

Daniel R. Anderson: Yes, it is specifically designed to apeal adults as well. Because there is eneough evidence that children learn most when they are watching with their parents.

İ&D: *Putting together educational content with entertainment worries some parents. They fear that kids get addicted to the entertainment content and will not learn at school. Do you think that is a valid concern?*

Daniel R. Anderson: I think what that really indicates is that kids are always going to be bored at school. There is a seperate world outside the school. The challenge on the one hand is to make school as well as TV, not TV as well as school. The other challenge is to make it better so they are using entertainment time in a positive way.

İ&D: *There has been an ongoing debate and growing concern about the effect of TV regarding development of attention. The most common hypothesis is that frequent changes in scenes and content disrupt young children's ability to sustain attention. Some even blame it on the fast pace of programs such as Sesame Street. Is there a correlation between exposure to TV and attantion disorders?*

Daniel R. Anderson: Yes, some studies show that television causes attention problems in infancy period but no one really knows how and why. I've done a lot of research on that too. It has not been published yet. The people who found these effects say it is because the rapid changing in the screen and so on. There is some evidence in favor of that. Babies don't know where to look on the picture. So we studied the eye movements. We found that a scene has to last about 12 seconds before babies can find the important spot to focus in the picture. By babies I mean 12 month olds, not the tiny babies. But the avarage shot lasts for 6 seconds. So, one year old sees images and trying to understand, then it changes even before they figure out what exactly it is about and it changes again and so on. So, it is not the stupidist idea to think that it causes attention disorders. But also no strong evidence either. Plus, many other studies have not found any relation. It is a very confused area right now. I would say the evidence is not good enough to make strong claims.

İ&D: *There are claims that heavy usage of the digital media changes the usual structure of the brain. Is there any truth to that?*

Daniel R. Anderson: Those are all empty claims. There is no evidence to that. Anything that changes your behaivor or your thinking changes your brain. When I look at you, the areas in my brain that involves face recignition cahnges.

İ&D: *But this is not a physical change, is it?*

Daniel R. Anderson: Actually, it is. Memory is a permanent change. If I see you a year from now and recognize you it causes a physical chnge in memory cells. What we are learnig about the memory is that it both involves biochemical and also structural changes between the connection of nerons. So, in one sense it is obvious that media change the brain. But it is no different than any other kind of life experience. Every experience changes the brain.

İ&D: *What is the role of parental involvement in TV viewing and exposure to media content? Does co-viewing subtantially change the impact?*

Daniel R. Anderson: At one level family involment is important as to set the rules for media use in the same way you set rules for every behaviour, like 'pick your clothes off the floor'. You also set the rules like 'certain media are not for you' and 'there is a limit tothe amount of time you spend with media', 'have you finished your homework yet'. That kind of things. It is really important that family sets rules and explain the rules to be reasonable. This is one level. In the other level we have co-viewing. I did a study in which we set up cameras in peoples homes for ten days and we recorded all kind of interactions in the family. What we realized is that children ask a lot of questions during TV viewing. If they are let to ask questins they often ask: ''Is that real? Would that really happen? Parents' responses are really important to the child to understand what realy is going on. Some parents, -I should say this is strictly limited to the American parents- don't like that. They don't think kids should be talking during the show. For that kind of family co-viewing doesn't add much at all. So, talking to children, answering their questions, sometimes pointing out somethings that would get interest of the child is important. We found that 12 month olds follow their parents when they look at the TV. If I am the baby and you are the parent, I look to see what you are looking at. And when they look, they look for a longer period of time. To some extent child is learning from the parent as to what kind of the program is important and it probably helps to understand the medium itself. When it comes to older children, they still look and then they become active and start asking question like 'what does that word mean?' and so on. Then they become teenagers and tell you to be quite.

İ&D: *There have been a lot of efforts in the US and other parts of the globe to create special curricula to integrate educatinal media, such as Ready to Learn Project. Is there any evidence indicating that children's cognitive and language abilities benefited from it?*

Daniel R. Anderson: Well, American teachers think that childrens' use computer games and TV viewing make them less interested in school. But that of course doesn't prove anything. In my opinon it just means teachers need to do a better job. Good teachers already add more fun to their cirricula. One important part of a being good teacher is deveolping a relationship in which children trust the teacher and see teacher as a safe person that they can go to when they have needs of any kind. But the other part of it is that they all need to be a little like Steve of Blues Clues. They have to have enphusiasm and entertainment at the same time.

Now we can start talking about alligning the content with academic standards to improve literacy. According to a study conducted by the Education Develop-

ment Center, low-income children are better prepared in kindergarten when their preschool teachers incorporate educational video and games from PBS' Ready To Learn initiative.

According to a study conducted by the Education Development Center, low-income children are better prepared in kindergarten when their preschool teachers incorporate educational video and games from PBS' Ready To Learn initiative. Research shows that teachers and caregivers who serve low-income communities may themselves not have the training and resources they need to teach early literacy skills. Many teachers are Having diffuculties make choices about how much time to invest in digital technologies without clear guidance about the outcomes they can expect. To met this challenge PBS developed three on line professional development courses that specifically address this need for early educators. In recent studies on the succces of these courses, participants demonstrated impressive gains in both specific skill acquisition and knowledge and understanding of key literacy concepts.

İ&D: *How about tablets?*

Daniel R. Anderson: It is a similar situation. It totally depends how good the apps are and what the learning is. For example, if it is geography and you want to know about Pan American Highway that goes from North America to South America you could follow it on the tablet and see the pictures of the cities along the way. It is of course much harder with the paper. You could also use some apps that just as easily done as a book etc. So, I think over time tablet are going to replace the books.

İ&D: *It is generally assumed that time spent with media or digital technology, regardless of content or quality is central to the way they shape the youthful learning and academic skills. Do you think influence of digital media on young people's cognitive devolepment is that simple? What does the researches tell us about the significance of content?*

Daniel R. Anderson: I prefer to answer this question through an analogy. We do not ask whether food is good or bad for children; rather, we try to determine the best combination of foods, keeping in mind what we think kids like and need. With food the overall quantity ingested is important, but equally important are quality and balance. Same goes for media useas well.

As for the significance of content, I 100 % disagree with Marshall MacLuhan about his 'medium is the message' claim. If you stay all day on the computer or watching TV regardless of what you are doing, then it is the medium, content really doesn't matter.

But in fact content is what really matters. More than the type of media platform or even how much time is spent using media, the content is what determines whether the impact is positive or negative.

Media content that is designed to promote pro-social behavior does increase social capacities such as altruism, cooperation, and tolerance of others. Contrary to common perception, researchs show that children and youth use electronic media mainly to better communicate with their offline friends, not with strangers. On the flip side, the content of some entertainment and news programs can cause fear and anxiety in children.

We should also mention that media help develop healthful behaviors such as preventing smoking and alcohol and drug use, and promoting physical activity.

İ&D: *Is there a substantial link between using digital media and spatial reasonin & problem solving skills?*

Daniel R. Anderson: Actually, there is. A study suggests that digital experiences allow children to take active control of their own learning, adjusting the pace and the level of difficulty of the material. We observed that when elementary school children engage in both entertaining and educational games that allow them to control their own learning; they spend more time on the activities and therefore learn more.

Students today are truly growing up digital. They can't imagine not being plugged in. We need to take advantege of this and channel it to be something more productive.

İ&D: *In today's world media multi-tasking is at an all-time high. You are one of the few researchers wo focuses on multitasking in infancy and early childhood. Can you share your major findings with us?*

Daniel R. Anderson: Well, I think the first finding that is worth mentioning is that from early ages children commonly watch TV while they play with toys or engage with family memebers.

We see it as the earliest form of media multi-tasking. In laboratory studies, we observed that preschool children look at and away from the TV about 150 times an hour. By age 5 years, this multi-tasking becomes more sophisticated in nature. They start learning to monitor the TV audio for features that can alert them when they need to pay full attention. In other words, children learn when and how to look at the TV while they are engaged in another activity. We think it is likely that these early media multi-tasking strategies form the early skill basis for attention deployment during the later formation.

However, we do not really know whether and how these experiences are related to later media multi-tasking or how they are related to later cognitive and attention skills in general. What we know for sure is that the neural systems and associated attention skills undergo prolonged development. We have the evidence

suggesting that this development is not purely maturational and it is substantially influenced by children's social and physical environment and education.

İ&D: *What are the challenges that reseachers of the fieid of children and media have been dealing with? Does the move from analog to digital technology has further complicated this already complex issue?*

Daniel R. Anderson: Over the past 50 years, few researchers have had consistent programs of research on the matter. The reasons lie in the insularity of academic disciplines and the lack of sustained sources of research funding. But nevertheless, the media explosion in children's lives is happening, releasing forces with unknown consequences. The field has been evolving and we expect that research would benefit from better coordination, more sustained funding, and greater methodological clarity. The walls that separate sectors are often steep and are seldom scaled. Interactions are few and far between among those who have an interest in, and insights into digital learning, such as researchers, industry leaders, parent groups, media producers, legislators, health care providers, and child advocates and so on. As a result, research and development efforts have been suffering.

The common method that traditional researches apply is media-use diaries, in which youth record the time they spend using various forms of media. But they are no longer useful as youths are often using two, three, or even four forms of media simultaneously. We need to develope a new way of conceptualizing media exposure to capture accurately children's media use and exposure.

While some researchs have been conducted by educational researchers; others come from various branches of psychology such as cognitive, social, and developmental; still others come from neuroscience. In all of these fields, however, for every question that has been answered, many more remain.