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Playing With Fire

- How do computer games affect the player?

Report for The Media Council for Chilren and Young People

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Playing With Fire

– How do computer games affect the player?

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1. Foreword

Computer games can be beautiful, they can be entertaining, they can be social, and they can be worrying. It is the latter aspect – the worry – that is the axis around which this report moves. Games, after all, are regularly accused of being immature pop cultural products that inspire sexism, aggression, and addiction. Such accusations are often (or at least sometimes) based on research, but are also hotly contested. This leads to radically conflicting statements, which in their turn lead to widespread confusion. What, if anything, can we in fact say for certain about the effects of computer games?

That is the question which will be addressed in the following.

The report is a revised and updated version of a literature review commissioned by the Danish Media Council for Children and Young People on behalf of The Danish Ministry of Culture. The original "Forskningsnotat om computerspil og skadelighed" (Egenfeldt-Nielsen & Smith, 2003) is available at www.medieraadet.dk.

It is our hope that the report will inspire more discussion – and communication of results – across research fields than has hitherto been the norm.

Copenhagen, 11 of June 2004

Simon Egenfeldt-Nielsen and Jonas Heide Smith

2. Introduction

As a medium, the computer game is currently in a period of rapid development. From a design point of view, video games are becoming more complex and they are rapidly spreading to new platforms such as mobile phones, pocket computers, and websites. From a cultural point of view, they are becoming more visible and more difficult to write off as merely a youth phenomenon. From an economic point of view, games are attracting increasing interest, with the industry showing rapid growth rates and global turnover of approximately $17 billion p.a. (ELSPA, 2002).

This report looks at games from what might be termed the effects perspective - in other words, it focuses on the potential negative effects of computer games[1] on the player. The question we pose to the extant literature is this: **Do computer games have negative effects on their players?**

The question of whether a particular medium has negative effect on its users is a notoriously difficult one to answer; it has been the subject of a great deal of debate for decades. It should be said by way of introduction, then, that as far as computer games are concerned, there is no clear and unequivocal answer to that question and in fact, a variety of different, often conflicting answers have been proposed. This report summarizes the research already conducted on the subject and places it in a theoretical context. This is necessary in order to make understandable research results that might appear contradictory at first glance.

When the issue of potential negative effects of computer games is raised in public debate, it often happens in relation to the possible connection between violent games and aggressive behaviour on the part of the player. For this reason, much of the research into the effects of video games has revolved around that particular subject. This report, however, will also touch on other aspects of the negative effects of computer games, such as anxiety and the deterioration of social relationships.

This report divides the research into two main areas, which are dealt with separately and then summarized.

A) Research which poses the basic question 'What do people do to media?'
This area of research is based on the idea that media consumption must be understood in its natural context. Importantly, it also stresses that media users *use* and *make sense of* media on the basis of their personalities and social situations. Researchers within this tradition rarely focus directly on the advantages or disadvantages of particular media developments.

We refer to this research tradition as the *Active User* tradition.

B) Research which poses the basic question 'What do media do to people?'
This area of research assumes that media form or content has a predictable effect on media users. It builds upon the idea that media users are similar enough to allow for generalizations from studies of very limited samples (in the case of experimental studies) or larger samples drawn from special groups

[1] We use the term *computer game* to refer to all electronic games regardless of platform.

(in the case of surveys conducted among college students, for instance). Thus, it downplays the importance of subjectivity and individual interpretation for the issue of media effects. This tradition often – but far from always – looks for *negative* media effects[2].

We refer to this research tradition as the *Active Media* tradition. Because the Active Media tradition has most directly approached topics relevant to this report, it is granted most weight in the following.

2.1. The report

This report attempts to provide a broad picture of the dominant directions in research, to facilitate interpretation of the (often contradictory) conclusions reached to date and to summarize the most solid conclusions. It pays particular attention to recent (1999 and later) influential research.

Our intention is not to provide a complete list of all studies dealing with the issue, but rather to focus on the most solid of these, as determined by the stringency of their methodology and their impact on other research.

This report differs from previous publications such as those dealing with children's perceptions of computer games from a primarily cultural perspective (e.g. Sørensen & Jessen, 2000a) and research into media violence in other, older media (e.g. Boe, 1995). While a number of publications have summarized research on either the Active Media perspective or the Active User perspective, interdisciplinary reviews like the one presented in this report have been rare.

2.2. Background

The volume of research into computer games has increased steadily in recent years. Within a short period of time, there have emerged at least one academic journal (www.gamestudies.org), a number of recurring conferences, a Danish and an international organization for games studies (www.spilforskning.dk and www.digra.org) and a range of websites dedicated to game research (such as www.ludology.org and www.game-research.com). However, what we might somewhat stylishly dub 'mainstream game research' deals with potential negative effects only to a very limited extent. It concentrates instead on aesthetic questions, larger cultural issues, analyses of games and studies of the special characteristics of the medium.

The question of negative effects is mainly dealt with by researchers who are not actually part of the computer game research community, but who often have a background in medicine or a North American psychological tradition.

As mentioned above, the most regular question posed about the effect of games has been that of whether violent games lead to aggressive/violent behaviour. This question has been discussed since the 1976 game *Death Race*, in which the player knocks down human-like figures to win points. Researchers have been trying to provide a scientific answer since the early 1980s. In the US, the discussion culminated around 1994, when a number of particularly violent games (such as *Mortal Kombat*) led to a debate at the

[2] There is also a number of studies documenting positive effects (e.g., Bavelier & Green, 2003; K. Durkin & B. Barber, 2002; S. Jones, 2003)

highest political levels and to the passing of the so-called Video Game Rating Act. In response, American computer game producers set up an industry regulator (the Entertainment Software Rating Board). In Europe, a new labelling standard called PEGI was recently introduced, administered by the European Interactive Games Industry (ISFE).

Since the mid-1990s, particular attention has been paid to so-called '3D-shooters' (such as *Quake* and *Counter-Strike*), which have been accused of glorifying violence. Most recently, this accusation has been directed at the game *Grand Theft Auto III* (see Fig. 1). This has brought clear differences of opinion to light, as a more or less unanimous games industry has singled out *Grand Theft Auto III* as visionary and well designed (see, for example, Ó hAnluain, 2003).

Fig. 1 – Grand Theft Auto III (Rockstar Games, 2001)

A number of people involved in the debate base their arguments on articles in popular science publications, or publications that are part of public debate (rather than scientific). This is not always apparent from the way theories are presented by the news media, however. For example, in the spring of 2003, the Danish daily newspaper *Berlingske Tidende* referred to a marketing-oriented study of the importance of brand names to 8- to 13-year-olds:

> "Contrary to what has previously been believed, children's imaginations are destroyed by popular video games. However, international research shows that they adopt a far more strategic way of thinking." (Carstensen & Vestergård, 2003; our translation)

This is an example of those parts of the public debate about the subject that are based on assertions and studies that it would take a large amount of goodwill to describe as 'scientific'.

Some psychologically inspired studies have identified grounds for concern in specific contexts, but even using the same methods, other researchers have not always been able to replicate their results. At the same time, researchers of a more cultural bent, not least in Scandinavia and Great Britain, have questioned specific psychological experiments or completely rejected the idea that experimental methods can provide useful results. For

outsiders, the picture may appear somewhat diffuse because, as mentioned above, the research traditions involved differ considerably and pay little heed to each other's results.

In 2000, the Danish Media Council for Children and Young People summarized the research, as part of an evaluation of the importance of interactivity to the appeal and potential adverse effects of computer games (Sørensen & Jessen, 2000a). In brief, the study indicated that the interactive element did not contribute significantly to any potential negative effects. According to the study, contemporary computer games were in fact likely to be less damaging than violent films and TV programmes.

Negative effects of computer games have become the centre of renewed attention, however, primarily because of tragic incidences of violence, especially the tragedies in Littleton, Colorado (1999) and Erfurt, Germany (2002), in which school pupils shot and killed a large number of their fellow pupils. Violent computer games of the time were explicitly accused, both in the media coverage and in subsequent legal proceedings. During the Littleton case, the perpetrators' fascination with the 3D shooting game *Doom* (see Fig. 2) was regularly referred to as a contributory factor.

Fig. 2 – Doom (id Software, 1993).

A number of subsequent studies have cited the episode as motivation for studying the potential negative effects of computer games (e.g., C. A. Anderson & Bushman, 2001). In one Danish TV news broadcast (Søndagsmagasinet, DR, 5/5-2002), the Erfurt case was linked to the perpetrator's fascination with the game *Counter-Strike* and a theory was advanced about the possible psychosis-inducing effect of computer games. Since this case, computer games have been the subject of a certain amount of media debate in Denmark (Borg & Krogh Jørgensen, 2002; Carstensen & Vestergård, 2003; Kentorp). Swedish media recently picked up the discussion in the wake of the television documentary Dödligt Spel ('Lethal Play') (aired on TV4 on March 3 2004).

In addition to this, a series of meta-studies (studies that draw conclusions on the basis of previous studies) has attracted the attention of news media and policy makers.

3. Research directions

As mentioned above, we divide the research into two main directions. This division is pragmatic, of course, and does not do full justice to the range of studies. The summary below misses important provisos and nuances. However, the objective is to identify important tendencies and results, in order to outline the bigger picture; the reader is referred to the bibliography for examples of more in-depth analyses.

In table form, the research directions look like this:

	Active User perspectives	**Active Media perspectives**
Theoretical inspiration/back ground	Anthropology, ethnography, comparative literature/semiotics, media history, sociology	Social psychology, sociology, medicine
Main interests	Meaning, the role and function of the media	Behavioural effects, changes in attitudes, changes in worldview

It tends to be the Active Media tradition that attracts public attention and generates the most striking headlines. As a very rough rule-of-thumb, it can be said that newspaper headlines about the negative effects of computer games are based either on Active Media research or on commonsense perceptions that media violence must make people violent, while statements about positive potential stem from Active User perspectives.

The persistent Active User arguments about the complexity of the violence question may in some cases contrast with the bold pronouncements prevalent in effects research (Buckingham, 2001).

It is, of course, possible to highlight the areas in which the Active Media and the Active User perspective *supplement* each other (Feilitzen, 2001), but it is also important to point out that the two perspectives have quite different basic assumptions, which affect both choice of methods and conclusions.

3.1. Active User perspectives

A number of researchers, particularly those in Scandinavia and Great Britain, with backgrounds in culture or media studies have studied computer games. They have derived theoretical inspiration from the humanities and their methodology has often been inspired by ethnography, using qualitative methods such as interview and observation. Others, focusing more on the role of media in the lives of children and young people, have attempted to map changes using quantitative methodologies. For instance, German professor of media studies Johannes Fromme, who conducted an ambitious survey, states that:

> "It is crucial to see what happened on the part of the players... What made and makes video and computer games fascinating for them? How do they use and value different games? To what extent are the changing media environments of children connected to more general social developments?" (Fromme, 2003)

A similar outlook is found in the international research project *Young People and New Media* (further described below) led by Sonia Livingstone (e.g., Livingstone, 2002).

In general, branches of media research with strong inspiration from the humanities have long been of the opinion that media users are relatively competent and selective. This perception is due to theoretical development, which has increasingly stressed the demanding (and creative) work entailed in understanding and interpreting the content of a book, film or computer game (see Bondebjerg, 2000). The media product is seen as underdetermined in terms of meaning, many interpretations are possible and this is not compatible with the idea that media have direct and predictable effects.

This understanding is also based on empirical results, however. Studies have shown how people often attribute widely different meanings to the same book, film, etc., depending on their background and the situation in which they encounter the media product. The meaning they attribute to the product can even be relatively unpredictable for a researcher, irrespective of how thoroughly the actual media product is analysed (e.g., Jensen, 1994; Jessen, 1995).

It has been concluded that it is more or less meaningless to draw a direct line from the content of a media product to a change in the attitudes of a media user. The meaning that is attached to the media product will depend on a number of complex factors, which should not primarily be sought in the media product itself. In this way, a certain amount of agreement has been reached that media use is an activity that cannot be understood outside its context, and that the idea of studying the question of media effects with the help of staged experiments is, therefore, at best open to question. This also has consequences for understanding the concept of negative effects, which, in the Active User perspective, only makes sense in relation to the individual context in which the product is used. A computer game does not do any harm *per se* and is only problematic for some children and young people in certain circumstances (Gauntlett, 2001; Liestøl & Liestøl, 2001; Sørensen & Jessen, 2000a).

Extensive theoretical material exists to back up this perception. Much of this work builds on the groundwork of American anthropologist Gregory Bateson, who stressed that the meaning people attribute to a given situation is important for how the situation ought to be interpreted (Bateson, 1972). For example, if two boys are playing Star Wars in a backyard with wooden swords and tree stumps as props, it may resemble aggressive

behaviour to an outsider. From the boys' perspective, however, it is a game, and it would be wrong to consider it violence. In other words, one cannot look at behaviour in complete isolation from the interpretation and perspective of those taking part.

This corresponds nicely with a significant development in the theory of literature and semiotics. The literature theorist Wolfgang Iser stressed that the reader of a text has to carry out a significant amount of interpretation to derive meaning from the text and that the meaning cannot then be said to be dependent on the actual media product in any narrow sense (e.g. Iser, 1979). The reader - or media user - attributes his or her own meaning to the media product.

Inspired by Iser, the controversial American literary critic Stanley Fish claimed in the early 1980s that the importance of a media product was completely dependent on the recipient's background and schooling. According to Fish, a given person interprets a media product based on the codes he or she has learned to use during his or her upbringing, education, etc.

These theories have had great importance for media studies and, as a consequence, it has to be doubted within this perspective whether outsiders are ever able to decide conclude on the meaning of a given media product for a particular recipient. This problem is particularly relevant to computer games that adults may wish to regulate or censor and to which adults often have an extremely distanced relationship. From an Active User perspective, adults will have a very hard time predicting what children get out of computer games, for example.

For that same reason, cultural studies of children occasionally acknowledge a so-called children's perspective (Olesen, 2000). In this context, the researchers try to understand the importance of computer games to children and young people, for example, by looking at the medium through the eyes of the children, as it were. This can be an advantage in relation to phenomena such as interactive media, like computer games, to which many adults do not have a natural relationship. What we have here is a humble approach to a subject that the researcher acknowledges that he or she may not completely understand.

It is important to point out that when researchers from these directions - for example in public debate - seem to disagree with the Active Media research, it is not always on the basis of actual research results. In fact, the number of Active User projects that have dealt directly with the negative effects of or addiction to computer games is (extremely) limited. This pronounced scepticism about the results of effects research is very much due to the basic perception – which has both a theoretical and empirical basis – that media effects cannot be considered in such a simple and unambiguous manner. David Buckingham, a researcher focussing on children's culture (who thinks that both directions can justifiably be criticized) writes:

> "Despite the more complex views of meaning which have been developed... much of the work on violence has remained stubbornly tied to behaviourist assumptions." (Buckingham, 2001 67)

Due to the more fundamental disagreements between Active Media and Active User research, it must be considered fairly improbable that a specific experiment in Active Media research would in itself be sufficient to convince Active User researchers of the directly adverse effects of violent computer games.

3.1.1. Important studies

The Active User tradition is not so much a specific research direction as a number of related perspectives. None of these perspectives is inclined towards studying how (or whether) particular media influence their users. Consequently, the studies mentioned below speak only indirectly to the question of how games affect the player.

In Denmark, the culture researcher Carsten Jessen has conducted a series of studies of children's and young people's specific use of computer games over a number of years (see the presentation in Jessen, 2001). Through observations and interviews (in after-school clubs, kindergartens, etc.) conducted over a 10-year period, Jessen has found that children use computer games as toys in the same way they use other types of toys, and that the nature of their play cannot, therefore, be said to be dictated by the machine. Jessen stresses that children use the games in a different manner than that which outside critics might imagine – children are active and creative. He points out that it is not possible to understand the importance of the games to the players without including the children's own perspective and understanding of the games as a form of play.

The report *Det er bare noget, der er lavet* ('It's just something that's been made') (Sørensen & Jessen, 2000a; for an English version see Sørensen & Jessen, 2000b) is in keeping with Jessen's other studies. It reports on a qualitative interview study of 31 children in the five to seventeen age group, supplemented with observations of approximately 20 children playing computer games. Amongst other things, the researchers tried to create a picture of the way the children understand gaming, how they experience the social situation, how they experience violence, how they differentiate between fiction and reality and how they quantify the importance of interactivity for their fascination and the effects of the games.

As mentioned above, on the effects issue the researchers found reason to believe that there are fewer potential negative effects of the violent themes in computer games than of those in films and on television. The report also stresses that the children consider the games very much as play, in line with other forms of play. Another result is that some children find violent games to be highly frightening, but again the study finds that this effect is less intense for games than for movies.

In a Nordic context, two related reports exist, albeit with different focal points. The Norwegian report *Regulering av dataspill* ('Regulation of computer games') (Filmtilsyn, 1999) focuses on law, conditions in the industry and types of games, while the Swedish *Monstermassakren* ('The Monster Massacre') (Christofferson, 1999) describes contemporary computer games with very violent content.

The perception that the violent content of the games cannot be taken at face value – that the gamers are not attracted by the bloody scenes themselves, but by other elements such as basic stories about survival in a hostile environment or the psychological and cultural free space – is shared by the American Gerard Jones whose book *Killing Monsters* (G. Jones, 2002) is often posited as a counter argument to the assumptions made by effects research.

The multinational research project *Children, Young People and the Changing Media Environment* organized by Sonia Livingstone (e.g., Livingstone, 2002) examines what gamers actually use computer games for. It covers twelve European countries and combines qualitative and quantitative methods. The project involved a total of approximately 15,000 children and young people between the ages of six and sixteen.

The researchers note that the media play an ever-increasing role in private homes, and discuss a number of ideas about the influence this has on traditional distinctions between, for example, the public and private domains.

The project illustrates the overall perspective of the research direction: it focuses on the role that different media play for different groups of users, and is not concerned with assessing the extent to which changes in media use are a good thing or a bad thing. Media researcher Kirsten Drotner was in charge of the Danish part of the project, which included a survey of 1,392 children and young people and a qualitative element consisting of observations and/or interviews of 103 children. Drotner demonstrates that Danish children and young people are among the most avid gamers in Europe and that their media use is generally 'based on what they are interested in and find relevant' (Drotner, 2001 90) - in other words they choose games that fit their wishes and needs. The German Professor of Media Studies Johannes Fromme reaches similar conclusions on the basis of a survey (Fromme, 2003). Fromme also stresses that the children in his study do not reject physical activities in favour of games and that computer games are not part of everyday family media use, but are often confined to the children's rooms.

In other words, computer games constitute just one medium among many in this context. A more specific focus on digital media is reflected in the Danish project *Børns opvækst med interaktive medier - i et fremtidsperspektiv* ('Growing up with interactive media - a future perspective' - 1997-2001, e.g., Sørensen & Olesen, 2000), the purpose of which was 'to procure knowledge of growing up with interactive media'. The project used qualitative methods with special focus on so-called media ethnography and followed a group of fifteen children who were particularly keen IT users. They were followed at home, at schools and in their after-school clubs to obtain an adequate picture of their daily lives. The project's various publications discuss a number of aspects of children's use of digital media, although the question of effect is only touched upon indirectly.

One important research contribution has been the American psychologist Sherry Turkle's work, as outlined in the books *The Second Self* (1984) and *Life on the Screen* (1995). Turkle has studied a number of different attitudes to technology and evaluates the significance of our extensive use of computers and virtual worlds has for our identity as human beings. She has conducted a number of ethnographically inspired studies, which are used as the basis for some quite extensive conclusions. One of Turkle's points is that the computer inspires the user to think in a non-linear manner and with its interactive character forces the user to reconsider the relationship between human beings and machine, life and death, etc. People believe, according to Turkle:

> "… …that they are getting an instrumentally useful product, and there is little question that they are. But now it is in their home and they interact with it every day. And it turns out they are also getting an object that teaches them a new way of thinking and encourages them to develop new expectations about the kinds of relationships they and their children will have with machines." (Turkle, 1995 49)

In other words, Turkle believes technology may well have an effect, but that this effect cannot be classified quantified as predominantly positive or negative.

As mentioned above, the question of violence is rarely a central issue in these studies. On the other hand, the conclusion that a given media product is used in extremely different ways is sometimes used as a criticism of assumptions about general media

effects (see also Ward, 2003; e.g., Wright, Boria, & Breidenbach, 2002). A discussion of related research can be found in an article by Stald (2002).

3.1.2. Problems with the Active User perspective

Although Active User researchers often offer both implicit and explicit critiques of Active Media research, such criticism is rarely levelled in the opposite direction. It might even be suspected that effects researchers are either unaware of the Active User perspective or consider it irrelevant.

When Active User research is reproached, the criticism often revolves around the difficulties encountered when documenting conclusions reached in "messy" non-laboratory settings. These difficulties apply to qualitative research in general. The data used are often comprehensive or diffuse and difficult to present in a usable form (Hoyle, Harris, & Judd, 1991). For example, the researcher may have conducted participatory observations in an after-school club over a number of weeks and come to conclusions that it would be difficult to trace back to specific data. This is not a *fundamental* methodological problem, of course, but it does present a number of *practical* difficulties – it is, quite simply, difficult to present the data to other people.

In addition to this, qualitative research is sometimes criticized for being unrepresentative. For example, if a researcher has held in-depth interviews with 20 people, critics might argue that this does not provide an adequate picture of the population at large. The reasonableness of this criticism is open to debate (or rather: Whether it is reasonable depends entirely on the concrete study in question). Qualitative researchers do not usually seek to generalize their results in the same way that quantitative researchers do. The criticism cannot be swept aside completely, however, as some qualitative researchers do present conclusions that can be perceived as generalizations.

3.2. Active Media perspectives

The Active Media perspective has its theoretical roots in North American psychology, and the so-called 'behaviourist tradition' constitutes an important part of its foundation. Another basic building block is branches of communication theory inspired more by the natural sciences than by hermeneutic approaches to media use.

While behaviourism in its original shape conceptualized people as fairly simple input-output systems and attempted to avoid discussing inner mental processes, recent studies within the Active Media perspective have generally offered more sophisticated theoretical frameworks to guide predictions and interpretations.

While Active Media research could technically employ most types of methodologies (and most are represented in the literature), the basic assumption that one particular medium can have one particular effect on people (who are basically similar) often leads to the use of experimental research designs. Ideally, laboratory settings, by filtering out confounding variables, allow the researcher to measure the exact effect of a given variable. Such studies often start with two groups, one of which plays a violent computer game while the other plays a non-violent computer game. Afterwards, changes in the behaviour of the two different groups are quantified. Any differences in behaviour are attributed to the difference between the games.

More recent effects research has been refined in response to harsh criticism of the design of older studies. Researchers have attempted to endow individual studies with greater weight by collating the results in so-called 'meta-analyses' or applying more advanced statistical analysis. There is widespread agreement among researchers that the effect studies of violent computer games are *not* strong enough to provide a *final* answer to the question of the extent to which computer games induce aggression (Bensley & Van Eenwyk, 2001; K. E. D. Dill, Jody C., 1998; Freedman, 2001; Goldstein, 2001; Ivory, 2001; Sherry, 2001). Some exceptions are studies by Anderson and Bushman (2001) and Anderson (2004). These two studies find that violent computer games do have a significant effect on aggression level. Notably, this latter conclusion has been adopted by such sizable professional associations as the American Academy of Pediatrics, the American Academy of Child & Adolescent Psychiatry, the American Psychological Association, the American Medical Association, the American Academy of Family Physicians, and the American Psychiatric Association. These associations in 2000 issued a joint statement to the US Congressional Public Health Summit in which they state that:

> "The conclusion of the public health community, based on over 30 years of research, is that viewing entertainment violence can lead to increases in aggressive attitudes, values and behavior, particularly in children. Its effects are measurable and long-lasting. Moreover, prolonged viewing of media violence can lead to emotional desensitization toward violence in real life." (ACoP, 2000).

The statement notes, however, that studies of interactive media effects are limited, although indicative[3].

[3] Tellingly, 33 media scholars have published a statement warning against "*commonly held but mistaken beliefs about a proven causative link between violent entertainment and violent behaviour*." (Amici, 2002).

3.2.1. Theoretical background of the Active Media perspective

Effects researchers have a variety of theoretical starting points, which are used to design the research studies and interpret the results[4]. Some of the most important are:

Social learning theory: Behaviour is learned through imitation of attractive models with attached rewards. Supporters of social learning theory stress that computer games in particular are effective, as they demand the player's full attention and entail active identification with characters on the computer screen. Furthermore, rewards are attached directly to the performance of symbolic violence, for example getting points for killing opponents. Therefore it is more likely that these specific actions will be transferred to the outside world.

The general arousal theory: This theory claims that computer games will increase the player's arousal level and thus increase the energy and intensity of actions performed. The increased arousal results will not lead to different player actions, but merely to a heightened intensity of these actions. Supporters of this theory point out that especially violent computer games give the arousal necessary to facilitate more aggressive behaviour.

Cognitive neo-association model of aggression: The theory points out that media lead to hostility and aggression due to reinforcement of association nodes in the brain that are related to hostility and aggression. Computer games will support the creation and strengthening of such association nodes and through these nodes aggressive thoughts will be transferred into physical actions.

Catharsis theory: The idea of catharsis has a long history in psychology dating back to Sigmund Freud in the late 1890s, but computer games research uses a more recent version of the theory. Catharsis theory was brought forward by Feshbach and Singer (1971), who point out that experiencing depictions of violence in media can reduce aggressive feelings. The idea is that your own aggressive feelings will be mirrored in the media, and experiencing them will reduce your internal tension. In computer games, the active role of the player further enhances this effect.

Cultivation theory: This theory builds on television research and attempts to explain to what degree media lead to a distorted perception of social reality, for example through stereotyped perceptions. The theory has been applied less in relation to video games, and it is still uncertain whether (or to what extent) games affect the player's perception of the world.

General aggression model: The General aggression model (GAM) is a recent phenomenon that combines earlier theories on aggression. According to the model, violent media content causes aggressive behaviour by influencing the person's internal state represented by cognitive, affective, and arousal variables. Violent media content increases aggressive behaviour in different concrete ways: by teaching the player how to perform aggressive actions, by influencing underlying aggressive and cognitive schemata, by increasing arousal and creating an emotional aggressive state.

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[4] See introduction in (Calvert, 1999) and (Wartella, 2000))

To a great extent, Active Media studies of computer games have adopted methods from television research and have applied a positivist view of science. As to methods, the following are common:

Laboratory studies are the most widespread type. A laboratory study has a control group and an experimental group. The experimental group plays a given computer game and is subsequently examined to determine whether the experimental group's behaviour differs from that of the control group. The advantage of laboratory studies is that they have the ability to focus on the one variable the researcher wants to study (the computer game), while holding the other variables constant. The moment you leave the laboratory, you invariably encounter all sorts of conditions that will make the experiment more uncertain. Uncontrolled environments make it hard to identify what variables led to a change between the experimental group and the control group.

C*ross-sectional-correlation studies* look at a group's use of computer games and level of aggression at a given point in time. A correlation is said to exist if the players of violent computer games are more aggressive than the non-players. Thus, if a group of gamers plays more violent computer games and is more aggressive than others, then this denotes a correlation.

Longitudinal correlation studies typically take a given group of people and follow it over a number of years. If, over time, a correlation is ascertained between the fact that those who played violent computer games also exhibit more aggressive behaviour (and that behaviour was not present at the start) then there is a *causal* correlation: violent computer games in those cases lead to aggressive behaviour. Very few studies of this type have been undertaken (and none spanning extended periods of time), even though they would be the strongest type as far as establishing a real causal correlation between violent computer games and aggressive behaviour is concerned.

3.2.2. Major studies on aggression

The actual number of studies that focus on computer games and aggression is a matter of some controversy, but the most recent meta-analysis by Anderson (2004) suggests that there have been 44 studies of aggressive behaviour and computer games.

More recent effects research has, in particular, consisted of meta-analyses of earlier studies, albeit with exceptions (e.g., C. A. Anderson & Dill, 2000; K. Durkin & B. Barber, 2002; Gentile, Lynch, Linder, & Walsh, 2004; Lynch, Gentile, Olson, & Brederode, 2001; Robinson, Wilde, Navracruz, Farish, & Varady, 2001). These exceptions will be dealt with in greater depth below.

Anderson and Dill (2000) present two different studies using different methods to illustrate the question of aggression and violent computer games. Study 1 had 227 participants, all psychology students, with a clear preponderance of women and an average age of 19. They took part to gain course credits and were given the choice of participating in the study or writing an essay for a corresponding number of credits.

The participants completed questionnaires about aggressive behaviour, crime and personal views of the world, while academic performance was quantified by collating their grades. Use of computer games was quantified by participants describing their favourite games, how long they played them and how long they generally played computer games.

The study found that men felt more secure, played more violent computer games and generally played more than women. It was ascertained that the longer a person spent playing computer games, the more crime they were involved in and the poorer they did academically. Those who played violent computer games had even poorer academic performance and were more involved in aggressive, as well as non-aggressive crime.

Overall, Study 1 concluded that use of lifelike, violent computer games was closely correlated with aggressive behaviour and crime. The correlation was especially strong for men and individuals with aggressive personalities. Academic performance was also adversely affected by general playing time.

Study 2 had 210 participants, all psychology students with the same motivation to take part as those in the first study. The aim was to look at the correlation between violent computer games and aggressive thoughts, emotions, behaviour and perceptions, by exposing the participants to two different games: *Myst* and *Wolfenstein 3D*. The differences were quantified by asking them to play for 15 minutes then fill in a questionnaire. The strength of a sound that participants emitted towards their opponents was also measured.

The study found that violent games underpin aggressive thoughts and that men are most aggressive. Those who played *Wolfenstein 3D* emitted a significantly longer sound after losing than did those who played the non-violent game, *Myst*. According to the study, this supports the conclusion that players of violent computer games exhibit more violent behaviour in the real world.

The study by Durkin and Barber (2002) includes responses from 1,304 people with an average age of 16. The data were collected in 1998 with the help of questionnaires, psychological tests and data on the school performance of the individual participants. A number of correlations between use of computer games and general social adaptability in young people were studied: psychological adjustment, school results, friendships, participation in sports, school attendance and commitment, and the level of education of participants' mothers.

The participants were divided into three groups on the basis of the amount of time they spent playing games: none, low and high. It was ascertained that in several spheres the two groups of participants who played games coped better than the group that did not play. Depressed moods were less frequent in the 'low' group, while the other two groups suffered the same degree of depression. Self-esteem was higher in the 'low' group, while participants' opinions of their own intelligence, mechanical abilities and computer skills were highest in the two players groups, especially in the 'high' group. The 'none' group reported more disobedience and truancy than the two groups of players. Both groups of players reported less risky friendships and their attendance at and commitment to the school was higher. There is an indication of more aggressive behaviour in the 'high' group, but the difference is insignificant. Durkin and Barber (2002) conclude that computer games are a natural part of young people's lives.

The study by Lynch et al. (2001) included 607 pupils with an average age of 14. Participants were given three questionnaires: a computer-game habits survey, a hostile attribution survey and a hostility survey. The computer-game habits survey covered what was played, for how long, etc. Hostility was quantified by the participants choosing between two possible ends to a story. Hostility as a personality variable forms part of the so-called 'MMPI tests' adapted to 14-year-olds.

The study ascertained that the boys played more than the girls and preferred more violent content. It also showed that the participants reported an increased interest in violent content in computer games. In addition, the study measured other media use and ascertained that there was an overall correlation between the use of computer media and hostility to the outside world. The study also found that students who played more than others for several years, or who bought computer games, had more often been involved in physical fights. Finally, it was ascertained that those who played or preferred computer games with violent content had a more hostile perception of their surroundings than others. Those young people who played to purge themselves of anger saw the world as a more hostile place, argued more often with their teachers, were more hostile, were more often involved in physical fights and coped less well at school.

Those young people whose parents either checked age limits before buying games or set limits for playing time were less involved in physical fights. Young people who tried to limit their own playing time were less likely to be involved in arguments with teachers, were less hostile, and were less often involved in physical fights.

The following study by Robinson et al. (2001) is slightly atypical, as it does not focus narrowly on games, but rather takes a broader look at electronic media and the consequences of reducing the use of media. The study involved third and fourth grade classes (with an average age of nine) at two schools. It aimed to study the impact of reduced media use (television, video, and computer games). The participants were divided into two groups at random. One group continued its previous level of media use, the other received six months training in reducing the use of television, videos and computer games, in line with Bandura's social learning theory. The training involved observation and discussion of television as well as a 10-day, no-television period. After that, the children were encouraged to restrict their weekly consumption to seven hours. Parents were also involved in the process through a newsletter containing strategies for more controlled media use.

Several methods were used to quantify the results. In one, pupils assessed each other by means of a questionnaire with 15 questions about aggressive behaviour, popularity and prosociality. In another, the playing patterns of 60 per cent of the participants were observed during playtime. In the third, parents were interviewed by phone about media use, school and socio-demographic relationships before and after intervention.

The group that was trained in more controlled media use was considered less aggressive by their friends, and exhibited less verbal aggression. This group also had a tendency - albeit statistically insignificant - to be less physically aggressive and see the world as less threatening. No gender differences were discerned.

The new trend in examining the effect of violent computer games is to apply more advanced statistical analysis. Studies taking this approach are represented in a recent special issue of the Journal of Adolescence published in early 2004. While methodologically sophisticated, these studies do not address the fundamental epistemological issues raised within the Active User perspective. The studies reveal problems in earlier research concerning the limited focus on the relation between playing violent computer games and aggressive measures. Earlier studies have shown little interest in examining how large the effect of playing violent computer games in fact was, a quite essential question. We may find a relation between two variables, but we need to know the extent of this relation. New studies seek to address this issue, for instance Gentile et al. (2004) and Funk et al. (2004)

Gentile et al. (2004) found that adolescents who played more violent computer games were more hostile, got into more arguments with teachers, and were more involved in physical fights. These adolescents also seemed to perform more poorly in school. The study reveals that mediating factors are important to consider in assessing the impact of violent computer games. Gender and parental involvement account for a large part of the effect exposure that violent computer games have on physical fights. When these factors are considered, the effect of violent computer game exposure on physical fights practically disappears. The findings on mediating factors stress the importance of including explanatory variables and not limiting studies to an exclusive focus on the relation between playing violent computer games and different forms of aggressive behaviour. This also challenges earlier studies that have not taken into consideration these mediating factors and the meta-studies presented above that fail to take such problems into account.

Meta-studies: The conclusions reached by the most central meta-studies of aggressive behaviour and computer games conducted since 1999 do not reflect any consensus. Disagreement is clearly associated with how seriously the methodology problems are taken (see also Bensley & Van Eenwyk, 2001; Robinson et al., 2001). The psychology professors Craig Anderson and Brad Bushman conclude that "*violent video games increase aggressive behaviour in children and young adults*" (C. A. Anderson & Bushman, 2001 353). Communication researcher John Sherry does not disagree, but stresses that the effect is small and less than that of violent television (Sherry, 2001 409). Psychologist Jonathan Freedman underlines that the volume of research is extremely limited and he finds this highly problematic in relation to the strength of some of the pronouncements: "*I cannot think of another important issue for which scientists have been willing to reach conclusions on such a small body of research.*" (Freedman, 2001 2). Finally, the British professor of psychology Mark Griffiths points out that the only conclusion that seems to recur in these studies is that younger children are affected more than teenagers and older young people (M. D. Griffiths, 1999 203)[5].

Anderson (2004) has extended the scope of earlier meta-studies by trying to account for some of the methodological problems as well as by adding approximately 10 more studies. He concludes that "*Three major types of studies have clearly and consistently linked media violence to aggressive and violent behaviour: experimental, cross-sectional (correlational); and longitudinal.*" Anderson (2004) sees earlier reservations towards the results as cleared away.

3.2.3. Other questions

Above we have reviewed the research concentrated on aggression. Attention will now be drawn to problematic effects and to the question of the extent to which particular groups are more vulnerable than others.

The content of computer games

One basic question is the actual extent of the violence in computer games. Several studies point out that computer games reflect problematic solution models and are generally characterized by very violent content. This is also, some claim, the case for titles that do not appear to be purely violent games on the face of it. Dill et al. (in press), in a more recent study of the content of computer games, conclude that previous

[5] Event this conclusion is disputed, however, as we shall see below.

research results are unambiguous: computer games contain few female characters and those that *are* found usually conform to male fantasies and stereotypical gender perceptions. Similarly, the gaming universe consists of Caucasian characters and the under-represented ethnic minorities are depicted in a stereotypical fashion. Older people are also depicted in a generally negative fashion and are under-represented.

Aggression is a regular ingredient in most games, and 79-85 per cent of them contain violence (K. E. Dill et al., in press). Although Schierbeck and Carstens (1999) found that only five per cent of games released in Denmark in 1998 could reasonably be designated *very* violent. It is worth mentioning that the volume of violent games does not necessarily reflect children's and young people's preferences. For example, Buchman and Funk (1996) found that approximately 50 per cent of young people's favourite games featured violent content.

Dill et al. (in press) conclude that violent or stereotypical content is problematic because children and young people are influenced by what they see in the media. They emphasize that the effect is not limited to children under seven, who are normally assumed to be the most vulnerable because they have difficulty differentiating between fantasy and reality.

A recurrent feature of Active User research is the perception that stereotypical gender patterns may have an adverse effect, for example, despite the fact that cultural research is otherwise quick to reject the idea of direct links between content and effect (Buckingham, 2001). This is somewhat paradoxical, as it is close to claiming that violence is in the eye of the beholder, while stereotypes and gender patterns are not.

Social relations, self-esteem and anxiety

Individual studies have been conducted into the extent to which computer games lead to less prosocial behaviour, but most of them are of an older vintage and their methodology is weak (Wartella, 2000). A more recent study by Durkin and Barber (2002) shows that gamers are closer to their families and their friendships are more stable. It points out that, in their natural context, computer games can generate positive emotions and social interaction.

There have been studies on whether players with low self-esteem can improve their self-esteem by mastering computer games, and on whether gaming is linked to lower self-esteem. Most of those studies are now relatively old and have contradictory results. The conclusion is often that the relationship between self-esteem and computer games can vary, depending on the gamer (Harris, 2001). These correlations, however, have only been explored to a limited extent to date.

Some studies have looked at the effect computer games have on the players' perception of the world around them. These studies have often focused on aggressive perceptions of the outside world, but they have also looked at the extent to which gamers experience the world as more frightening and anxiety-provoking than do other people. The results are fairly unambiguous and suggest that the use of violent computer games leads to a negative perception of the outside world (C. Anderson & Ford, 1986; C. A. Anderson & Dill, 2000; Kirsh, 2003; Lynch et al., 2001). In the case of computer games more generally, however, Durkin and Barber point out that moderate gamers are better psychologically adjusted than others, while non-gamers and those who play a lot have the same level of psychological adjustment. A similar theory has been presented with regard to mass media, under the heading 'cultivation theory' (Gerbner, 1973). It has made attempts to assess the extent to which television in particular communicates a

distorted image of social reality, resulting in stereotype-related misconceptions on the part of viewers. While it has arguably been possible to document that computer games communicate 'stereotypical images', no agreement has been reached about the significance of this, if any, for the individual player's perception of reality.

Academic performance and crime

Several early studies demonstrated a correlation between arcade games and crime, but these studies were often based on young people who paid to play per game in arcades (Egenfeldt-Nielsen & Smith, 2000; Harris, 2001). Studies of more recent forms of computer games have not been conducted. Internet cafés would be a particularly obvious choice, due to their similarity with the arcades.

In their study of people who play violent games, Anderson and Dill (2000) found that both non-aggressive and aggressive types of crime were more common in this group.

The results concerning the effects on academic performance are ambiguous. Some studies suggest that computer games may lead to poorer academic performance, while others come to the opposite conclusion (Harris, 2001). The most recent study addressing this question is Durkin and Barber (2002). It concludes that those who play computer games have a more positive commitment to school. On the other hand, Anderson and Dill (2000) suggest that children who play computer games do worse than others at school and that gamers who play violent computer games are even more vulnerable.

Addiction

Like other areas of research into games, research into addiction and computer games segues into adjacent areas of research such as general research into pathological gambling, Internet addiction, psychology and psychiatric diagnostics. The question has long enjoyed a certain amount of attention, but in recent years, games that are increasingly demanding and extensive (especially certain on-line role-playing games) have revived this worry.

The extant research has almost exclusively been conducted by the British professor of psychology Mark Griffiths, who has carried out several studies of addiction and computer games since the mid-1990s. In one of his most recent articles the issue is summed up as follows:

> "…it is this author's belief that videogame addiction does indeed exist but that it affects only a very small minority of players. There appear to be many people who use videogames excessively but are not addicted…" (M.D. Griffiths & Davies, in press).

One of the major problems has been to agree on a common and apposite definition of addiction. Outside a medical science context it is fair to discuss how reasonable it is to use the concept of addiction in relation to a given activity. The concept usually seems to be employed by people who already consider the activity in question to be inappropriate. Thus, it is worth noting that many of the addiction criteria would, in principle, categorize certain people's relationships to book-reading, socializing or play as addiction.

Compared with other forms of addiction, computer games are characterized by the fact that addicts do not suffer many of the after-effects that follow in the wake of pathological gambling, such as financial problems and crime.

The very different definitions of addiction shine through extant studies, in which the numbers of addicted gamers vary greatly. One study found that 37.5 per cent of gamers were addicts (M.D. Griffiths, 1997), while another found that 19.9 per cent were addicts

(M.D. Griffiths & Hunt, 1998). More recent research has, therefore, been interested in establishing a suitable definition of computer game addiction. Griffiths and Davies (in press) define addiction on the basis of six characteristics taken from the DSM-III-R scale:

1. *Salience*: when computer games are the dominant activity in somebody's life.
2. *Mood modification*: the playing experience affects the player's emotional condition.
3. *Tolerance*: the player has to play more in order to achieve a special state of mind.
4. *Withdrawal symptoms*: the player experiences uncomfortable emotions when s/he stops playing.
5. *Conflict*: the player is in conflict with his or her surroundings and other activities, and is in internal conflict.
6. *Relapse*: the player quickly falls back into the previous gaming patterns, even when s/he has not played for a long time.

On the basis of these criteria, it is the 1998 Griffiths and Hunt study that comes closest to matching the definition. It finds that 19.9 percent are dependent. However, in their most recent article, Griffiths and Davies (in press) point out that a group of seven percent in particular, gamers who play more than 30 hours per week, are in the danger zone.

Gender and age differences

The question of gender differences in the use of computer games has attracted considerable attention. Computer games have traditionally appealed mostly to boys (see, e.g., Fridberg, 1999; Jeanne B. Funk, 2000; Subrahmanyam, 1998). It is also clear that there is a major difference between girls and boys in terms of which computer games they play and how much they play (Harris, 2001). This has given rise to various considerations about the extent to which this gender difference might be problematic *per se*. For example, it has been suggested that girls might not possess a sufficient degree of appropriate IT skills of relevance to the labour market, and it has been considered whether this might lead to inequality. This perspective has been dealt with on different levels in Jenkins and Cassels' *From Barbie to Mortal Kombat* from 1998, but, as computer games have become increasingly mainstream, the gender differences have also diminished somewhat and the question no longer attracts the same research interest. That the games have become far easier to play in purely technical terms has presumably also reduced the concern that boys will acquire general IT skills by playing computer games that girls will not.

The majority of studies applying the Active Media perspective have differentiated between girls and boys when studying aggressive behaviour and computer games, but the results are almost as contradictory as the research in general. Some studies (e.g., Cooper & Mackie, 1986) find that girls are effected more strongly by violent computer games, while others provide less unambiguous results (e.g., Kevin Durkin & Bonnie Barber, 2002).

It has been pointed out from several sides that age is a critical factor when it comes to the effect of computer games. From a psychological perspective, it is pointed out that younger children (aged four to eight) can have difficulty differentiating between fantasy and reality. The lack of ability to differentiate between fiction and reality is one of the critical pivotal points for effects research in general. According to the social learning

perspective, children imitate what they see and the extent to which it is fiction or reality is of no great significance. From a cultural perspective, however, it is pointed out that children are capable of making this differentiation early on (Buckingham, 2000).

The argument that younger children may be more vulnerable is often used as a type of public compromise, but in research terms the evidence does not back up this assertion (Kirsh, 2003). Despite the public focus it is only through meta-analyses that we are able to get a feeling for age differences, as other studies do not typically compare different age groups. The problem with meta-analyses, however, is that the different age groups are not all included in the same studies and the participants in meta-analyses might therefore have enjoyed very different gaming experiences during the experiments, such as wildly varying playing time and genres (Freedman, 2001).

In Sherry's (2001) meta-study there seems to be a trend that the older you get, the more aggressive computer games make you, which does not really fit in with the commonsense assumption that small children are more vulnerable. Other studies by Bensley and Van Eenwyk (2001), Griffiths (1999) and Sakamoto (2000) have divided the individual studies into three different age groups. They conclude that the studies of the younger age group are more consistent because all the studies suggest an aggressive effect. Kirsh (2003) suggests that young people in general are more aggressive than other age groups because of the higher social and psychological demands imposed by youth. This is crucial to understanding the importance of violent computer games for this target group. Kirsch suggests that the great popularity of violent games together with the higher level of aggression among young people is unlikely to be the result of chance.

Studies of age differences are made difficult by the age groups' different computer game preferences and by ethical limits to the amount of violent content to which it is permissible to expose the participants in the experiments. For the time being we cannot go beyond the observation that some indications of age differences are evident.

Socially vulnerable children and young people

One popular compromise in the debate about the adverse effects of computer games is the theory that certain groups are more vulnerable than others. Different suggestions have been put forward about which factors might be significant, including gender, age, adult contact, behavioural difficulties, self-esteem and type of personality, but very few actual studies of vulnerable groups have been conducted recently.

The general reviews Mediascope (1999) and Harris (2001) suggest that individual studies find personality variables associated with certain uses of computer games, but it is not clear to what extent the personality differences are due to the fact that computer games affect certain players more strongly. A single preliminary study by Funk et al. (1999) was unable to identify more aggressive behaviour in young people with behavioural problems who play violent games.

Lynch et al. (2001) found that young people with higher levels of hostility play more violent computer games, prefer more violent play, have fewer adult restrictions and exhibit more aggressive behaviour. The conclusion underpins Wiegman and van Schie's (1998) earlier study, which found a correlation between aggressive children and the amount of time they spend playing violent computer games. The question is, however, whether this group is more vulnerable or whether computer games bring out latent aggressive behaviour.

The question of hostility needs to be studied over a longer period of time. You would need an experimental group and a control group that have the same hostility level before the study begins (this was not established in the studies above). The experimental group should play violent computer games for a fitting amount of time, whereas the control group should abstain from playing any violent computer games. Changes in the level of hostility measured after playing violent computer games would be possible to trace back to the computer games.

As things stand, the results that might underpin the idea that special groups are more vulnerable are conflicting. It is too early to reach any unambiguous conclusion. As regards identifying particularly vulnerable groups, the research has focused too narrowly on finding a general correlation between computer games and adverse effects.

3.3. Problems with the Active Media perspective

Below, we will present the type of criticism levelled at the Active Media perspective, both as expressed from within the paradigms and as expressed externally by other types of researchers. M.D. Griffiths and Davies (in press) are disposed to think that "*all the published studies on video game violence have methodological problems*".

One very basic methodological problem is the inconsistent use of the concept of aggression in the different studies. The range of measurements includes aggressive thoughts, the tendency to donate money or to hit a doll, playing patterns, use of language, aggressive behaviour and decidedly violent behaviour. The different definitions draw on different theoretical traditions (see the section Theoretical background of the Active Media perspective).

3.3.1. The laboratory is not an everyday situation

One of the main problems is that most of the experiments do not manage to reproduce the phenomenon to be studied. A laboratory is not a living room. It is extremely rare for the design of a study to take into account important variables such as the social experience, the normally pleasure-based approach to computer games and the player's control of the situation. One specific example is that the playing time in the different studies varies from 4 to 75 minutes. It is not the players who decide what they want to play, for how long or how. Sherry's (2001) meta-analysis of computer games finds that the longer you play them, the less aggressive behaviour you exhibit. This sounds counter-intuitive, and might suggest that it is more likely to be the unnatural situation that leads to aggressive behaviour and that, in the longer playing sessions, the players get used to the situation. Sherry follows up on this, but points out that the results suggest the need for a better methodological approach and a consistent way of designing the studies.

There is little focus on the fact that respondents might be led to report the results that researchers expect. Most of these studies work with negative assumptions (i.e. they expect to find an adverse effect).

3.3.2. Problems of causality

Arguably, the validity issues raised in relation to laboratory studies above are also problems of causality. Even within the carefully controlled laboratory environment we cannot be certain how to explain a given effect. If players of violent games exhibit aggressive behaviour this could be attributed to the fact that they didn't choose the game

themselves, that they were "forced" to play a specific title not necessarily to their liking. Such problems are even more pronounced in correlation studies. Here, a study may find that those who show a preference for violent games exhibit more aggressive behaviour than those who play more peaceful games or do not play at all. But from this result alone *causality* cannot be established; the aggression could be caused by the violent games or the preference for violent games could be caused by the person's aggressive tendencies. In the case of longitudinal correlation this problem is less acute. However, such studies cannot completely assure validity. The gaming variable may theoretically be tied to other variables that are in fact causing the aggression measured. Again, theoretically, the aggression could be caused by the social stigma assigned to players of violent games rather than the games themselves.

3.3.3. The effects research forgets that computer games are not all the same

Computer games cannot be considered essentially similar, a fact that is often ignored when comparisons are made between violent computer games and non-violent ones. Despite the rapid development of research-based computer game terminology and clear differentiation of, for example, action and adventure games, Anderson and Dill (2000) compare *Wolfenstein 3D* (a violent action game) with *Myst* (an adventure game). In research circles, *Myst* is notorious for being an atypical computer game and it is in no way characteristic of the most popular games. The problem is that you cannot just quantify the difference between a violent computer game and a non-violent one. You also have to take into account the difference between an action game and an adventure game and the fact that this can have an influence in relation to gender and gaming experience (Freedman, 2001; Sherry, 2001).

It has also been pointed out that many of the older studies, upon which more recent research draws, study computer games that differ in crucial aspects from more recent games. An important aspect of the more recent effects research has also been the importance of more realistic violence. Nevertheless, older studies are still referred to in meta-analyses even though they looked at games with significantly less realistic depictions of reality.

3.3.4. General criticism

It has been stressed that the focus of Active Media research (for example, attempting to discern a correlation between computer games and aggression) is wrong. Critics claim that research should focus on those situations in which aggression is exhibited, and should then make attempts to quantify the extent to which a meaningful relationship to computer games can be established. It has further been argued that the perception of children and young people found in effects research is conservative and out of step with modern developmental psychology. In this context, it is noted that the player's meaning construction is ignored by Active Media research: it is not immaterial whether you kill somebody to save the world or just for the fun of it (Gauntlett, 2001).

In general, internal methodological problems and general criticism of the effects perspective's theoretical assumptions combine to raise questions about the effects perspective's fundamental ability to say anything valuable about the potential dangers of computer games. Importantly, however, raising valid methodological concerns should

not be confused with the claim games cannot have a direct effects on users. That may be the case, but this should be settled using scientifically valid procedures.

4. Summary

The potential adverse effects of computer games have long been a subject of debate. This debate intensified in the 1990s as certain games became more and more realistic and detailed in their depictions of violence. In recent years, a number of violent incidents have been linked - especially in public debate - to the perpetrators' fascination with violent games. At the same time, more realistic audio and graphics, as well as more complex games, have reignited worries about potentially adverse effects.

This report summarizes research into the potentially adverse effects of computer games. This research has focused in particular on the relationship between *violent computer games* and *increased aggression in gamers* and has presented a number of results obtained over a period of two decades. These results, however, have often pointed in different directions. Whereas some researchers think they have found clear signs of aggressive behaviour caused by computer games, others have not been able to replicate their results and still others have been strongly critical of the methods used in the studies.

This disagreement is understandable to a certain extent if the research is divided into two main directions.

The Active User perspective derives inspiration from ethnography and culturally oriented media studies. Researchers in this paradigm stress the fact that the media user's meaning construction is *context dependent*. According to this perspective, it is not possible to study the potentially adverse effect of violent computer games in artificial settings or without attempting to understand the player's own perspective. The Active User perspective has a strong position in Scandinavia and Great Britain.

The Active Media perspective is based on medical and psychological traditions. The researchers usually try to study the question with the help of specially staged experiments, in which people are exposed to different types of games under very controlled (but not very realistic) conditions. This perspective has strong support in certain academic groups in the US.

This report stresses that these two academic traditions are in strong disagreement about the answer to the question '**do computer games do the players any harm?**'

While the majority of Active User researchers either answer that this does not seem to be the case in any direct sense or that the question is quite simply too general to answer, some Active Media researchers answer in the affirmative.

It is not possible to determine once and for all which group is right. At best, it is possible to stress the most solid arguments and conclusions.

4.1. Do violent games lead to violent behaviour?

There are indications that this is the case. But the studies that purport to show this correlation have been exposed to serious and continuing criticism. The criticism is primarily that it is an oversimplification to perceive computer games as a phenomenon that can be isolated from the player's everyday life and studied in isolation from the way the games are actually used.

4.2. Is it possible to become addicted to computer games?

There are indications that this is the case. One recent study claims that seven per cent of gamers are addicted. The research is very limited, however, and the definition of addiction is not consistent. In general, it should be stressed that addiction in a non-medical sense is an extremely controversial concept. Critics of these studies point out that the concept often seems to be ideologically biased; for example, the concept is almost exclusively used by people who perceive the activity in question as a deviation from the norm and a deviation from the desirable.

4.3. Are some groups particularly vulnerable?

It seems probable that younger gamers are most susceptible, but this very common hypothesis lacks documentation.

There is also only sparse evidence to suggest that the player's gender should exert any influence as far as potentially adverse effects are concerned. It is, however, quite well documented that many computer games communicate a stereotype image of, for example, gender roles, ethnic minorities, and models for solving problems. Studies have not been conducted into whether this affects the players' personal views about the world.

On this basis, it is not possible to say anything conclusive about the potentially adverse effects of violent games. The empirical evidence is too limited and the criticism of the extant research too serious. It is, however, part of the picture that the lack of clarity is not exclusively attributable to the lack of research results or to the dubiety of research results. To just as great an extent, the disagreement is due to academic disagreement about how to understand and quantify the effects of a given medium.

We *can* say that the question of the extent to which computer games *in general have an adverse effect on all or on many* gamers is too broad for a specific answer.

In conjunction with a potential campaign targeting particularly vulnerable groups, it would be more constructive to ask which combinations of types of game, types of personalities and gaming situations have the potential to have adverse effects - in other words, the question of which types of games cause damage to which people, in which contexts. It would probably be possible to conduct more realistic and constructive research on this question in the future.

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