

University of California, Berkeley
Department of Economics

EC196: Topics in Economic Research

First Paper

Economic Analysis of Media Violence: A Policy Perspective

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I. Introduction

The main purpose of this paper is to evaluate the economic literature on the effects of media violence on various aspects of both social behavior and number of crimes in the society. Current literature seems to offer an inadequate policy perspective, with a wide gap between the effects of media violence on social behavior on the one hand and number of crimes on the other. In addition, lack of knowledge on long-term consequences of media violence restricts the policy makers on short- or medium-term decisions which are, as argued by some, inadequate in dealing with violence in society. This paper makes an attempt to create a synthesis of seemingly contradictory evidence in order to provide applicable, sensible policy proposals. The main focus is on two lines of thought. Firstly, it is a series of papers in psychology published by Anderson (Anderson et.al, 2002; Anderson, 2003), which as a premise have the idea that media violence corresponds with a more violent society because it causes aggressive behavior. Secondly, it is based on the recent paper by DellaVigna and Dahl (2009), which argues that media violence is associated with a reduction in the number of reported crimes (maybe mention their time substitution thing). A thorough analysis of these conflicting findings is necessary in order to grasp the true combination of Anderson's psychological approach, Dahl-DellaVigna economics approach, and to finally produce a sensible policy proposal on dealing with violence. (to have the parallel structure with verbs

The paper is organized in the following way: Section II provides a brief overview of the two articles to which I refer throughout the essay. Section III analyzes the Dahl-DellaVigna article in detail, questioning the external validity of their study by using a different set of descriptive data, yet eventually acknowledging the value of their findings. In Section IV, I observe the strengths and weaknesses of Anderson's study, and I attempt to synthesize the two papers discussed. Section V discusses policy implications of this synthesis. Finally, in Section VI I propose a longitudinal research design that could answer some currently unanswered questions, and I summarize my paper in Section VII.

II. Literature Overview

A recent paper by Dahl and DellaVigna (2009) reaches an intriguing conclusion on a well-explored topic of media violence. Their field research of variation in the violence of movies and its effect on same-day assaults concludes that there is a decrease in violent crime on days with larger attendance in theatres showing violent movies¹. According to their paper, the effect is twofold. On one hand, the effect is due to what they call ‘voluntary incapacitation’: the mere fact that is highly unlikely to commit a crime while one is sitting in the cinema watching a movie. Thus during the movie, violent crime reduces by 1.1 to 1.3 percent. However, after exposure to the violent movie, crime rates are further reduced, which is explained by the self-selection of potentially violent individuals into violent movie attendance, which effectively turns them away from potential alternative, violent activities. This in turn can be a consequence of the fact that cinema attendance appears to reduce alcohol consumption. The estimates presented in the paper suggest that in the short-run, violent movies deter as much as 1000 assaults on an average weekend. The paper makes no conclusion on long-run effects, while finding no evidence of medium-run effects (up to three weeks after initial exposure). Although I adhere to the findings of Dahl and DellaVigna, I argue that defects in their research design most likely bias the true effect on media violence on reduction of crime, which I discuss in more detail in the next section.

Anderson’s studies (Anderson et.al, 2002; Anderson, 2003) provide an overview of the most important psychology literature on the effects of media violence on human behavior, and subsequently, the number of crimes. He argues there is a growing consensus that exposure to media violence increases violent behavior among individuals. The majority of the studies are randomized experiments, and thus he succeeds in eliminating any potential bias. He argues research in psychology provides strong evidence that in the short term, exposure to media violence causes increases in children’s, adolescents’, and young adults’ physically and verbally aggressive behavior, as well as in aggressive-related variables that may instrument for aggressive and violent behavior. (Anderson, 2003)

¹ Although I do outline their main results and conclusions, it is beyond the scope of this paper to reproduce their figures as there is a very large number of models they use. For more detailed results, please refer to the original paper (Dahl and DellaVigna, 2009).

III. DellaVigna and Dahl: The Economics

In order to observe the external validity of Dahl-DellaVigna paper, I look at the demographic characteristics of the moviegoers. This is due to the fact that the field study in Dahl and DellaVigna's paper is conducted on a sample of people attending the cinema, but no attempt was made to create a profile of people attending cinema. If indeed cinemagoers are significantly different than the rest of the population, then the policy implications of Dahl-DellaVigna findings need to take that into account. In my demographic analysis, I focus on overall cinema attendance, average age of cinemagoers, as well as their income. I use independent data by a number of marketing-agency studies².

Despite the fact cinema tickets are not very expensive today, it is certainly worth noting that cinema public might not be the representative sample of the whole population in terms of income. In fact, many marketing agencies concluded that movie-goers not only have income, but are very willing to spend it³! 76% of the adult audience has incomes in excess of \$30,000, while 52% earn more than \$50,000, which is well above the national average⁴. Income percentage of movie audience is presented in Figure 1. The importance of it lies in the fact that crime is, on average, negatively correlated with income. Although the causality and the extent of this correlation are disputed, there is a general consensus that crime is more prevalent amongst individuals of lower income. For a good overview of literature on that topic, see Hsieh and Pugg (1993). After establishing that there is a growing consensus that resource deprivation is associated with assault and homicide, they analyze previous research and find evidence that poverty and income inequality are each correlation with violent crime.

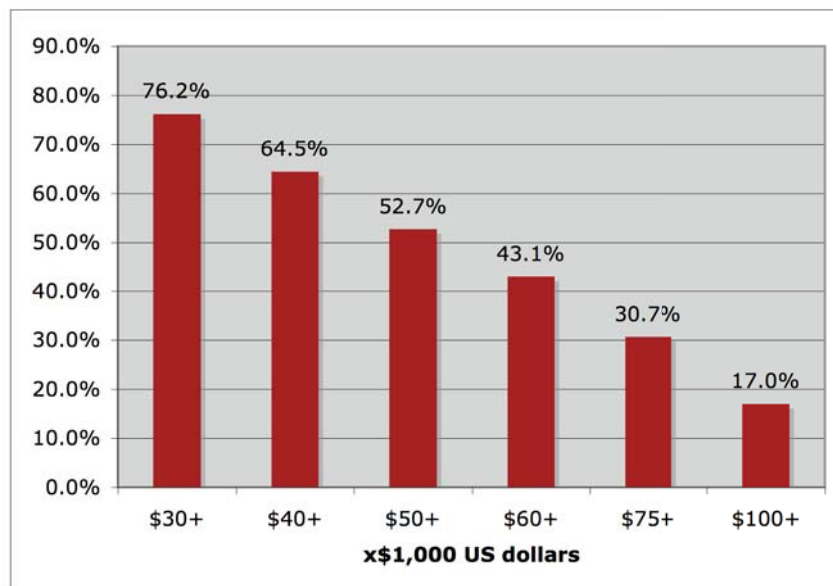
² Although these studies mainly focused on effectiveness of cinema advertising, their demographic data is still very useful and applicable for general demographic characteristics of cinema-goers.

³ One could argue that marketing agencies, which funded this research, could be biased, as they profit from such findings. However, the data on movie attendance demographics is surprisingly scarce, and in absence of any other data to contradict these claims, I adhere to these findings.

⁴ According to 2000 Census, real median household income was \$42,148. See US Census Bureau, 2000.

Taking a step further, the marketing companies researched other habits of cinemagoers, and found interesting results. Approximately 73% of the movie audience combines movie going with dining out, while 69% combines movie-going with shopping. The data also states that 65% of the adult audience has graduated or at least attended a college, while 68% of the audience owns a home. However, there is no specific data on income demographic characteristics by movie genre, which, as I argue later, would be very useful for further analysis. In light of such findings, and considering that average income of cinema goers is higher than population average, we can see assume selection bias in studying effects of media violence on violent crime using cinema audience as a representative sample.

Figure 1: Income Distribution of Cinema Audience

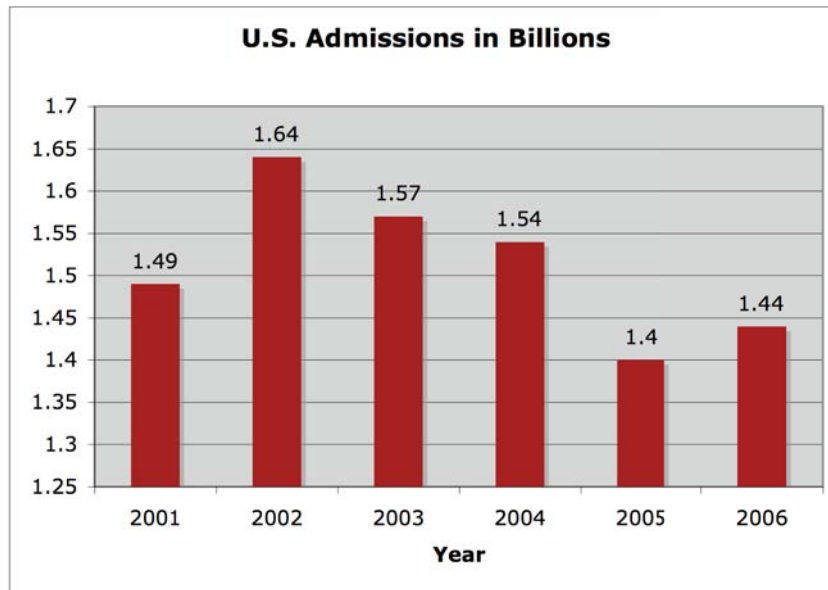


Source: Spring Mediamark Research Inc., 2000

The second important feature that needs attention is general cinema attendance. Figure 2 below demonstrates that cinema admission has slightly varied in the period between 2001 and 2006. Although there has been a decrease in cinema attendance began in 2003, in the last year measured there was a 3.1% increase in total admissions. The problem with this data is that it is not very informative alone. We do not know how many people actually go to the cinema, and what proportion of them watches what type of movies. According to Dahl and DellaVigna, over

a weekend, strongly violent and mildly violent blockbusters attract up to 4% and 8% respectively of the U.S. population, or between 12 and 24 million people.

Figure 2: US Theatrical Admissions

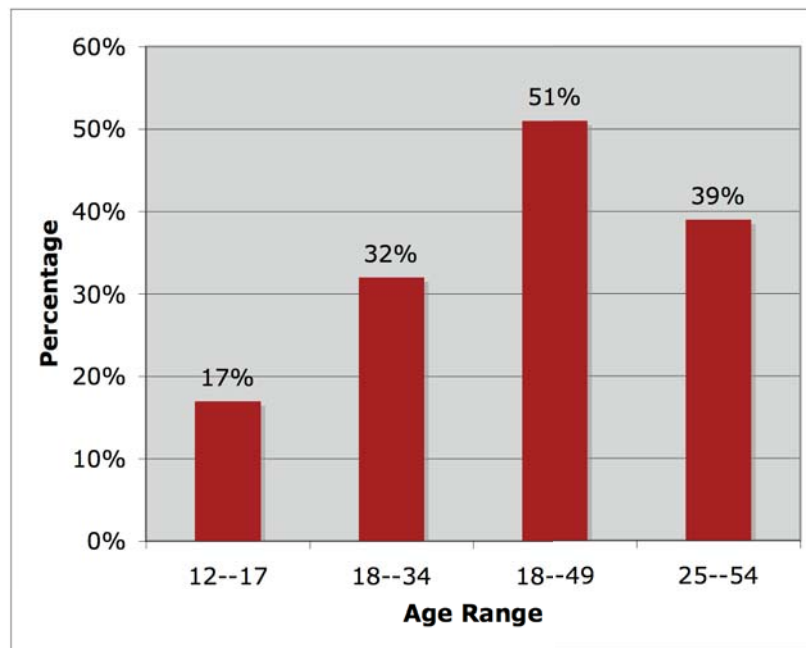


Source: MPAA 2006 U.S. Theatrical Market Statistics

At first, this might seem like very large numbers, both in terms of population proportion and total theatrical admission. However, there is no substantial data on what proportion of “media space” is actually taken up by cinema. In other words, I believe cinema is a relatively “weak” medium. In comparison to how much time a person spends at his computer (i.e. surfing the internet), watching TV, or listening to radio/music, I argue that the relative importance of cinema is a lot smaller than these more prevalent, “stronger” media. Also, a finding that very relevant to this argument is the fact that data from the National Television Violence Survey (NTVS, quoted in Anderson et.al., 2003) show that that 61% of programs on television contain some violence, while only 4% of all violent programs on television feature an antiviolence theme. In other words, 96% of all violent television programs use aggression in their narratives. Thus we can see that violence is highly prevalent in the media to which people are a lot more exposed. If one could prove that cinema is indeed a “weak” medium, that would suggest that the results by Dahl and DellaVigna actually underestimate the true effect of media violence on rate of crime, as one could argue that spending time on the internet is also a type of voluntary

incapacitation – while sitting at a computer or watching TV, one also does not commit crime. However, this is merely speculation, as I have already mentioned that more substantial data on these issues is not easy to find.

Figure 3: Age Percentage of Audience



Source: 2005, based on Motion Picture Association of America

A final very important feature of cinemagoers that needs to be discussed is their age. Figure 3 illustrates average age of movie audience according to one source (Motion Picture Association of America, 2005). As we can see, large part of movie audience is young. Another source (Entertainmentmedia, 2001) actually claims that up to 80% of movie audience is in the 18-49 age range. The data on teens is particularly striking. According to Arbitron Cinema Advertising Study (2007), 81% of teens have been to the movies in the past 30 days, while 59% saw three or more movies in the past 90 days. Their report on cinema advertising states that an average American sees two movies in the theater in a three-month period. Among persons aged 12-24, the average is four movies in the theater in a three-month period. Their conclusions are that frequent moviegoers are made up of a high concentration of teens and young adults. This is a

particularly important fact as young viewers are more affected by on-screen violence, as Anderson's article presented in the next section argues.

Finally, even if we assume external validity of the Dahl-DellaVigna study, and disregard my previous analysis, there are further problems regarding the research design of that particular study. Namely, it is the fact that the researchers use National Incident Based Reporting System (NIBRS) as a source for violent crime. Although they argue that the number of reporting agencies has increased substantially, the authors do acknowledge that submission of NIBRS data is still voluntary, and it mainly covers smaller cities and counties, not covering the nation's largest cities at all. It could be the case that movie attendance, particularly on opening nights, differs vastly between urban and rural areas. Again, I found it hard to obtain such data, but I believe it is necessary to look at the cinema attendance data and see whether cinema attendance differs between rural and urban areas.

The previous facts and statistics show the potential biases with regards to external validity of the Dahl-DellaVigna study. In particular, it questions two premises. Firstly, I question whether cinema is a representative medium, i.e. whether violence on the big screen is actually representative of other forms of media violence (i.e. internet, TV, music lyrics). If not, then the topic of Dahl-DellaVigna study cannot be defined as "media violence", but more specifically "cinema violence". Secondly, it is the precision of the estimates presented in the paper. I argue that their estimates are imprecise due to selection bias. On the one hand, the cinemagoers are wealthier than population average. As crime is more prevalent among the poor, the effect of cinema on crime could be underestimated. Specifically, the "incapacitation effect" could potentially be larger if the poor people, who are more likely to commit a crime, were actually attending the cinema. Similarly, the incapacitation effect could be even larger if we took into account incapacitation by other media, such as sitting at a computer, or watching TV. On the other hand, what Dahl-DellaVigna study examines is merely the short-run effects. The true long-run effect of violent movies on crime might, as some argue, be completely opposite, i.e. violence in media increases the long-run rate of violent crime. In order to observe a theory that argues that violence in media increases violent behavior, and thus potentially the possibility of violent crime, I now turn to the study by Anderson et al.

IV. Anderson – The Psychology

The study by Anderson et al. (2003) is one of the most influential and comprehensive studies in the field of psychology on the issue of media violence. To an observer, it might seem that Dahl-DellaVigna's study and Anderson's paper are in contradiction. I oppose such views and will here try to justify my opinion.

Anderson's research gives evidence of media violence increasing the probability of violent or aggressive behavior in both short and long-term contexts. The study finds that this effect is larger for milder forms of aggression than for the more severe forms of violence, which is a point I will further emphasize when attempting a synthesis of Anderson's and Dahl-DellaVigna studies. There are two main and striking differences in those two studies. Firstly, it is the question of interest, which although it seems similar, is actually vastly different. Anderson inquires into the effects of media violence on violent or aggressive behavior, while Dahl and DellaVigna observe its effect on the crime rate. This is a very important difference, particularly in light of Anderson's finding that the effects of media violence are larger for milder forms of violence. Another important difference is that Anderson's research is conducted on a large research base: it is very diverse in both its methods and samples, and it uses a wide variety of media genres, while still being consistent in findings. Dahl-DellaVigna, on the other hand, use only one media genre (cinema), and thus limit their sample to only cinema-goers, the consequences of which I discussed in the previous section.

I argue that the findings presented in Anderson's study are striking, relevant, and not necessarily opposite from a policy perspective from those by Dahl-DellaVigna. Firstly, it was observed that media violence has a modest direct effect on serious forms of violent behavior ($r=.13$ to $.32$). Secondly, a large body of research shows a larger impact of media violence on aggression (including violence; $.18$ to $.38$), and those conclusions are made on a large research base, diverse in methods, samples and media genres. Thirdly, for a significant number of individuals, exposure to media violence in childhood extends into adulthood even if media violence is no longer consumed. Finally, even individuals who are not highly aggressive are negatively affected by exposure to violent media both in short-term situations and over long periods of time. Recently, a small number of large-scale longitudinal studies have shown that

repeated exposure to media in childhood is closely linked with aggression later in life and in particular with increased likelihood of serious physically aggressive behavior, including physical assaults, spouse abuse, and other types of crimes.

It is important to note that Anderson's study is actually a synthesis of years of psychological studies, an overview, or one could even say a consensus in the field of psychology about short- and long-term effects of media violence on violent behavior. Although there are certain statistical ambiguities and potential biases in research methods⁵, it is beyond the scope of this paper to analyze them in more detail. However, as I argued previously, the wide and diverse scope of research methods that reached same or similar conclusions allows us to accept the results as valid with a reasonable degree of certainty.

V. Policy Implications

Anderson's study suggests that policy-makers need to take a harsh stance on limiting exposure to violence in media, particularly for the young. As mentioned, violence is contained in 61% of TV material, and it reaches children easily. Adults are also exposed to violence, even when they are not completely aware of it. Thus making it clear that certain media material contains violence is crucial for people who opt not to watch violent material, or want to limit violent material from their children. Recent technology developments allow parents to restrict internet access for their children to inappropriate websites, and the law obliges media to rate the material according to the amount of violence or explicit language it contains.

The Dahl-Della-Vigna paper provides interesting space to debate whether and to which extent are restrictive measures productive in reducing crime. In particular, there is obviously a positive side-effect of violent movies – they incapacitate the viewer in a safe, social⁶ environment in which he is a lot less likely to commit a crime. Those individuals more prone to

⁵ Most of the psychological research presented includes randomized experiments, thus successfully avoiding selection bias. Yet an important setback of randomized experiments is the fact that there is a probability of experiment subjects to change their behavior due to the fact that they are knowingly in an experiment.

⁶ Arbitron (2007) study found that the majority of viewers go to the cinema with at least one other person.

violence self-select themselves into more violent movies, and thus during those movies we see a significant decrease in crime. It seems like a trade-off: do we prefer individuals prone to violence to sit in a cinema and watch a violent movie, or we would prefer they are out in the streets, where there is a certain probability they will commit a crime? This question is not as straightforward as it might seem. Sitting in a cinema and watching a violent movie obviously, according to psychologists, could cause potential problems in the future. However, it does deter crime in the present. Thus the intertemporal trade-off needs to be resolved from a policy perspective.

I argue that the government should act on two fronts. Firstly, they should be careful not to overly restrict violent movies in the cinema. As I mentioned before, a large part of cinema audience are younger individuals, and restricting violent movies from say 18-21 year olds could potentially lead to an increase in crime. While not being restrictive, the government should, at the same time, work at reducing incentives to go and watch violent movies. By promoting sports, physical exercise (i.e. martial arts), and other “incapacitating” activities, particularly among the young, one could achieve a significant reduction in demand for violent movies.

VI. Need for Further Research – A Potential Research Design

It is here argued that seemingly opposite findings presented in this paper can and should actually be reconciled into a sensible policy to fight violence. However, although Anderson calls the cup of research knowledge about violence in the media “relatively full, but not overflowing”, I believe much is left to be done. Most importantly, more longitudinal surveys, tracking individuals over longer periods of time is necessary to better understand the long-term effects of media violence on both human behavior and rate of violent crime. In particular, a more holistic approach needs to be taken in these surveys. It is not sufficient to do run randomized experiments and merely look at the effects of media, as violent behavior is a more complex phenomenon affected by a number of issues. What needs to be discovered in the field of media violence research is the effect of different aspects of human environment (i.e. level of education, family situation, physical activity) on individual’s ‘responsiveness’ to media violence.

In particular, my proposed research design would include selecting a large random sample of pre-school children from different states and backgrounds, and conducting monthly or annual survey of their media consumption, along with other aspects listed previously. For small children, these surveys could be taken by their parents, while after a certain age the children would fill out the surveys themselves. The most important part of the questionnaire would be on media consumption: in particular, what type of media is consumed, and how often is it consumed. These surveys would have to continue up to the individual's adult life, in order to observe their probabilities of committing a crime, or demonstrate aggressive behavior.

I am aware that such research design suffers from a number of shortcomings, yet their negative effects can be minimized. Firstly and most importantly, such survey would be extremely costly and would take a very long time, as it would be undertaken over a period of 20 or more years. This in turn means there is a high probability of attrition, as it would be hard to track all the survey respondents once they move. Yet through financial or similar incentives, attrition could be reduced. Another very important shortcoming is the fact that self-reporting is not a very accurate method of data collection. Although it is true that people might tend to over- or under-estimate the true values in their reports, this could potentially be dealt with through different econometric methods. For example, in the case of young children, an instrument is used in the form of their parents' reports⁷.

Despite these shortcomings, I believe the data collected would be extremely valuable. One could observe the correlation between media violence exposure at youth with actual probabilities of committing a crime in the future. For causal relationships to be established, different econometric methods can be used (as I mentioned, instrumental variable regression could be one of them). Only such a comprehensive study could capture the true long-term effects of media exposure in real-life setting.

⁷ There is a number of similar instruments in economic literature. For example, in estimating returns to schooling, Ashenfelter, Orley and Krueger (1994) successfully use the sibling's report of income (or schooling) for the self-report, which tends to be overestimated.

VII. Conclusion

In conclusion, this paper attempts to synthesize two seemingly opposing views on the effect on media violence on crime and general violence, in order to provide a coherent perspective for policy makers. The analysis of a recent, controversial paper by Dahl and DellaVigna on shows that there are significant setbacks in their research design. Namely, it is the selection bias, which stems from the fact that cinemagoers are not a representative sample of the general population. They have higher income than average, which could potential cause a serious bias in their estimates, considering the fact that crime is more prevalent among poor individuals. Also, there is a very high proportion of younger people among cinemagoers. Finally, the dataset used as a source for violent crime (NIBRS) covers only smaller cities and counties, not covering nation's largest cities at all. Despite these setbacks, I argue that the Dahl-DellaVigna paper does provide important and useful information on self-selection of individuals prone to violence into watching violent movies, as well as the incapacitation effect which prevents them from committing crime while preoccupied by another activity.

Further on, I analyzed the view of psychologists who generally argue that media violence increases violent behavior and thus subsequently violent crime. Their research includes a wide range of media genres and a diverse range of methods, which all come to identical or similar conclusions. Despite the fact that this seems opposite to what Dahl-DellaVigna study implies, I argued that from a policy perspective these two views can be synthesized. A policy to curb violence should not be overly restrictive, yet at the same time should work towards providing alternative activities which incapacitate the individual. An overly restrictive policy in the short run could lead to a surge in crimes, as there would be no mechanism to 'ventilate' for individuals prone to violence. Yet an overly lenient policy would probably cause long-term negative effects. In order to establish more accurate measurements of long-term effects of media violence on humans, I proposed a longitudinal research design which would follow a sample from their pre-school age to early adulthood and measure exposure to violent media as well as probability of committing a crime. Although I acknowledge certain flaws in such a design, I believe the results would be very informative and valuable in future research.

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