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Is the 'Idiot's Box' raising idiocy? Early and middle childhood television watching and child cognitive outcome☆

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ABSTRACT

There is widespread belief that exposure to television has harmful effects on children's cognitive development. Most studies that point to a negative correlation between hours of television watching and cognitive outcomes, fail to establish causality. Using the National Longitudinal Survey of Youth (NLSY) we study young children between 5 and 10 years of age during late 1990s and early 2000s. We find strong evidence of negative correlations between hours of television watched and cognitive test scores. However, once parent's characteristics and unobserved child characteristics are taken into account these correlations go away. We find that hours of television viewed *per se* do not have any measurable impact on children's test scores. Our results are robust to different model specifications and instrumental variable estimates. We conclude that despite the conventional wisdom and the ongoing populist movement, proactive policies to reduce children's television exposure are not likely to improve children's cognitive development and academic performance.

1. Introduction

In 1950 only 10% of the households in the United States had a television set; by 1980 it rose to 98% and it has not declined since. American children between 2 and 17 years of age watch an average of 25 h of television each week, with one in five watching for more than 35 h (Gentile & Walsh, 2002). The daily estimated hours of television watched by a typical child is almost double the suggested guidelines by American Academy of Pediatrics (AAP); AAP recommends 2 h or less of quality programming in a given day for children of age two and above, and for children under age two it suggests that television be avoided altogether.[3]

It has become a conventional wisdom that television, in general, and higher exposure to television, in particular, has an adverse effect on children's cognitive development, and that television is at least partly responsible for the widespread deterioration in the youth school

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[3] AAP Policy: http://aappolicy.aappublications.org/cgi/content/full/pediatrics;104/2/341.

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performances.[4] Barack Obama, as a candidate and as President, time and again, called upon the parents to assume personal responsibility regarding their children's education and turn the television off. The perception of a link between television and child outcomes is very much alive and growing in the policy arena. Grants are available for a "TV-free America" from organizations such as *Media Transparency* who are backed by some of the largest philanthropies in the country.[5] The organization called *Center for Screen-Time Awareness* claims that since 1995 more than twenty-four million people have participated in "TV-Turnoff" weeks, which is also endorsed by the AAP.[6]

However, establishing a causal effect is essential prior to establishing any limit on hours of television watched to improve cognitive outcomes. A key impediment in identifying a causal relationship is the role of unobserved child and parental characteristics that are correlated with both cognitive outcomes and hours of television watched. Barring a very few exceptions (such as Gaddy, 1986; Gentzkow & Shapiro, 2008; Gortmaker, Salter, Walker, & Dietz, 1990; Zavodny, 2006), existence of a causal relationship between hours of television watched and children's cognitive outcomes are rarely established.

In this paper we focus on the children of the baby boomers and their television viewing behavior in the 1990s and 2000s. We use the data from the 1979 National Longitudinal Survey of Youth (NLSY79) and its associated child survey (NLSY79 Child). We focus on the formative years of the child – early and middle childhood – when television may be especially crucial developmentally (Greenough, Black, & Wallace, 1987; Wallace, Kilman, Withers, & Greenough, 1992). We employ a fixed effect model to eliminate child and parent time-invariant characteristics that might be correlated with both hours of television watched and test scores. We also carry out instrumental variable (IV) estimation to address the issues of potential measurement error in hours of television watched and time-varying child unobservable characteristics. We do not find any causal effect of hours of television watched on the mathematics and reading test scores of children. Our findings suggest that the observed negative correlations are results of intervening factors such as family structure, parental income and education, or unobserved child and parent characteristics that are correlated with both hours of television watching and measures of the child's cognitive development.

1.1. Television and child cognitive development

Two arguments have been put forward as to why television viewing may have a causal effect on child cognitive development.[7] First is the *time displacement* argument. Watching too much television takes time away from essential learning activities such as reading, homework, and structured play activities (Koolstra & Van der Voort, 1996).[8] Even if television is considered a learning device, it is a poor one at that: the passive nature of television watching, lack of interaction of the viewer, and lack of control of the learner on content, pace, and ordering of the material, makes it inferior to traditional devices such as reading. Besides, a large number of skills such as fine motor skills and gross motor skills cannot be learnt from television at all (Borden, 1997). Also, the strong association of television with leisure and relaxation may have a profound effect on learning by lowering the intellectual involvement in processing the information presented in television programs.[9]

The second argument relates to the plasticity of the child's brain. The brain continues to develop rapidly through the initial years of the child's life and a significant plasticity exists during this period (Barkovich, Kjos, Jackson, & Norman, 1988; Yamada et al., 2000). The types and intensity of visual and auditory experiences that children have early in life may have profound influences on brain development (Greenough et al., 1987; Wallace et al., 1992). Waldman, Nicholson, and Adilov (2006) call it an "environmental trigger" that creates hurdles in cognitive development with possible long term developmental consequences. A commonly tested hypothesis is that television may shorten children's attention spans (Healy, 1990; Singer, 1980) or lead to Attention Deficit Hyperactivity Disorder or ADHD (Christakis, Zimmerman, DiGiuseppe, & Carolyn, 2004; Hartmann, 1996). Koolstra and Van der Voort (1996) found that television viewing leads to lack of reading and reduction in concentration among children.

1.2. Contributions of this paper

Most studies in this literature are often limited to specific aspects of cognitive development such as reading (Koolstra & Van der Voort, 1996), ADHD (Christakis et al., 2004; Hartmann, 1996), autism (Waldman et al., 2006), or stand-alone measures of creativity, divergent thinking, ideational fluency, etc. (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001). Zavodny (2006), Gaddy (1986), Gortmaker et al. (1990) and Gentzkow and Shapiro (2008) are notable exceptions that look at comprehensive

[4] Gentzkow and Shapiro (2008) discuss the academic literature on these perceptions. Some of the media coverage on these issues and the popular movements can be found in the following sources: *More TV = Less Reading* at http://aapgrandrounds.aappublications.org/cgi/content/extract/17/6/68-a; *Children and Watching TV* at http://www.aacap.org/cs/root/facts_for_families/children_and_watching_tv (official website of American Academy of Child and Adolescent Psychiatry); *AAP News* at http://www.aap.org; Federal Communications Commission (FCC), Fact Sheet, 1995, http://www.fcc.gov/Bureaus/Mass_Media/Factsheets/kidstv.txt; *Kill Your Television* at http://www.turnoffyourtv.com; also, in web-logs such as http://www.csun.edu/science/health/docs/tv&health.html.

[5] See http://www.mediatransparency.org/recipientgrants.php?recipientID=6805.

[6] See http://www.screentime.org.

[7] Anderson et al. (2001) has a detailed literature review of the issues of television and child cognitive development.

[8] There is, however, a significant voice that contends this view and argues that television can in fact be a useful tool in children's learning (Huston & Wright, 1998); today's children enter kindergartens with a larger vocabulary than the pre-television generations.

[9] See Salomon (1983), Huston and Wright (1998), and Singer and Singer (1998) for more detailed discussions of these issues. The *Kaiser Family Foundation* Reports (Rideout et al., 2003) present strong negative correlations between television watching and reading. Some studies also show negative effects of television on measures of creativity, divergent thinking, and ideational fluency of children (Anderson et al., 2001).