Early Television Exposure and Subsequent Attentional Problems in Children

Dimitri A. Christakis, MD, MPH*‡§‖; Frederick J. Zimmerman, PhD‡§; David L. DiGiuseppe, MSc‡; and Carolyn A. McCarty, PhD*‡

ABSTRACT. *Objective.* **Cross-sectional research has suggested that television viewing may be associated with decreased attention spans in children. However, longitudinal data of early television exposure and subsequent attentional problems have been lacking. The objective of this study was to test the hypothesis that early television exposure (at ages 1 and 3) is associated with attentional problems at age 7.**

Methods. **We used the National Longitudinal Survey of Youth, a representative longitudinal data set. Our main outcome was the hyperactivity subscale of the Behavioral Problems Index determined on all participants at age 7. Children who were ≥1.2 standard deviations above the mean were classified as having attentional problems. Our main predictor was hours of television watched daily at ages 1 and 3 years.**

Results. **Data were available for 1278 children at age 1 and 1345 children at age 3. Ten percent of children had attentional problems at age 7. In a logistic regression model, hours of television viewed per day at both ages 1 and 3 was associated with attentional problems at age 7 (1.09 [1.03–1.15] and 1.09 [1.02–1.16]), respectively.**

Conclusions. **Early television exposure is associated with attentional problems at age 7. Efforts to limit television viewing in early childhood may be warranted, and additional research is needed.** ***Pediatrics*** **2004;113:708–713;** ***ADHD, television, attentional problems, prevention.***

ABBREVIATIONS. ADHD, attention-deficit/hyperactivity disorder; NLSY, National Longitudinal Survey of Youth; BPI, Behavioral Problems Index; SD, standard deviation; CES-D, Center for Epidemiologic Studies Depression scale.

Attention-deficit/hyperactivity disorder (ADHD) affects between 4% and 12% of US children and is the most common behavioral disorder of childhood.[1–5] Despite decades of research, there are still significant gaps in our understanding of this condition. In particular, we know surprisingly little about its cause and what, if any, environmental factors may influence its development. ADHD has been shown to have high heritability, and partly for this reason research has focused on the structural and neurochemical features of the brain,[6–8] yet the heritability of ADHD goes only so far in explaining its cause. Twin studies have established 50% to 80% concordance with monozygotics being more concordant than dizygotic.[6–11] However, the most prominent of the twin studies have not controlled for environmental influences.[9–11] Moreover, the emphasis on structural or operational neurologic features of the central nervous system has perhaps lent a sense of inevitability or immutability to the condition and contributed to an underappreciation of the potentially crucial role that early childhood experiences may have on either the development or the modulation of attentional problems.[12] Recent research suggests that gene–environment interactions may be important in conditioning the risk of ADHD as well as its severity and progression.[7,13,14]

It is widely known that the newborn brain continues to develop rapidly through the first few years of life and that considerable plasticity exists during this period.[15,16] Considerable evidence also exists that environmental exposures, including types and degrees of stimulation, affect the number and the density of neuronal synapses.[17–19] The types and intensity of visual and auditory experiences that children have early in life therefore may have profound influences on brain development.

In contrast to the pace with which real life unfolds and is experienced by young children, television can portray rapidly changing images, scenery, and events. It can be overstimulating yet extremely interesting. This has led some to theorize that television may shorten children's attention spans.[20,21] Others have speculated that it may lead to ADHD.[22] Koolstra and Van der Voort[23] found that television viewing reduces reading in later ages and self-reported levels of concentration. However, most studies have focused on television viewing during the school-age years.[24] The American Academy of Pediatrics recommends that parents exercise caution in letting their children under the age of 2 years watch television.[25]

We hypothesized that very early exposure to television during the critical periods of synaptic development would be associated with subsequent attentional problems. This study tested that hypothesis using observational data from a nationally representative longitudinal data set.

METHODS

Data Source

Data for this study were drawn from the National Longitudinal Survey of Youth 1979 Children and Young Adults (NLSY-Child),

From the *Department of Pediatrics, University of Washington, Seattle, Washington; ‡Child Health Institute, University of Washington, Seattle, Washington; §Department of Health Services, Seattle, Washington; and ‖Children's Hospital and Regional Medical Center, Seattle, Washington.

Received for publication Apr 17, 2003; accepted Aug 20, 2003.

Reprint requests to (D.A.C.) Child Health Institute, 6200 NE 74th St, Ste 210, Seattle, WA 98115-8160.E-mail: dachris@u.washington.edu

an outgrowth of the original National Longitudinal Survey of Youth 1979 (NLSY79). The NLSY79, sponsored by the US Department of Labor, began with a nationally representative sample of almost 12 700 individuals who were aged 14 to 22 years in 1979 and have been interviewed annually or biennially since (go to www.bls.gov/nls/y79summary.htm). Blacks and Latinos were oversampled to provide statistical power for subgroup analyses and population weights are available to draw valid national inferences. The NLSY-Child, begun in 1986 and conducted biennially, is an extensive collection of information for >11 000 children of the female respondents to the NLSY79 regarding developmental assessment, family background, home environment, and health history (go to www.bls.gov/nls/y79chyasum.htm). Information for the NLSY-Child is obtained from both the mother and the child, depending on the child's age. The records from NLSY79 and NLSY-Child are linkable via the mother's sample identification number. Data from both the 1986–2000 NLSY-Child and NLSY79 were analyzed for this study using the Center for Human Resource Research Database Investigator Software (The Ohio State University, Build 1.4.1.57, Columbus, OH).

Our sample consisted of children who were ~7 years of age in 1 of the 3 most recent survey waves: 1996, 1998, or 2000. We considered the first interview that occurred between the ages of 6 years 9 months and 8 years 9 months as the representative "age 7" or "index" interview. This index interview was then used to derive the outcome variable and a subset of the covariates (explained below). Age, in months, was determined by the age reported on the maternal supplement portion of the index survey.

Outcome Measure

Our outcome measure involved characterization of attentional problems at or near 7 years of age. Attentional problem status was derived from the hyperactivity subscale of the Behavioral Problems Index (BPI),[26] which consists of 5 items that ask whether the child has difficulty concentrating, is easily confused, is impulsive, has trouble with obsessions, or is restless. Each item allowed 3 responses: often true, sometimes true, and not true. After the survey, the administrators of the NLSY collapsed each item into a binary score (often or sometimes true vs not true). The 5 binary scores were summed, and the resulting subscale scores were coupled with national norms to create age-specific percentile and standardized scores, based on both same-gender and combined-gender distributions.

We created a binary classification representing attentional problems as either present or absent, using a cut point of 120 on the same-gender standardized BPI subscale score. That is, children with scores ≥1.2 standard deviations (SDs) above the mean were classified as having attentional problems. Although this cannot be viewed to be equivalent to a diagnosis of ADHD, the endorsed symptoms on the subscale are derived from items from the Achenbach Child Behavior Checklist,[27] as well as other similar behavior scales,[28–30] and are similar to symptoms that are consistent with a diagnosis of ADHD. We chose this cutoff in part because it yielded a prevalence for attentional problems that was similar to published reports of ADHD prevalence among similar-aged children in community samples.[31]

Main Predictor

Our main prediction variable was the number of hours of television watched per day. As of 1990, mothers were asked the number of hours of television the child (younger than 10 years) watched on a typical weekday and on a typical weekend day. When a response indicated no television in the home, television viewing hours were set to 0; when a response indicated >16 hours of viewing per day, the viewing was capped at 16 hours. The number of hours per week was computed as 5 times the number of hours watched during a typical weekday plus 2 times the number of hours watched on a typical weekend day. To get a daily average, we then divided this number by 7. This computation was performed for the survey years occurring 3 and 2 interview waves before the index year to ascertain the amount of television watched at approximately ages 1 and 3. We chose these 2 ages because they precede the age at which attentional problems are typically manifested or diagnosed and because television viewing at such young ages is controversial and discouraged.[25,32]

Covariates

Model covariates included gender, race/ethnicity (Hispanic, black, or non-Hispanic/nonblack), child age at the index interview (measured in months), gestational age at birth, maternal use of alcohol or tobacco during pregnancy, measures of cognitive stimulation and emotional support in the home environment at or near ages 1 and 3, the number of children in the household at or near ages 1 and 3, the presence of 2 parents in the household (mother and mother's spouse/partner) at or near ages 1 and 3, maternal self-esteem as of 1987, maternal depression as of 1992, urban/rural residence at index, maternal age at index (in years), maternal education at index, and calendar year at index,

When gestational age was missing but survey data indicated that the child was born late, gestational age was set to 41 weeks. For perinatal substance use, ordinal-scale variables indicating graduated levels of substance abuse during pregnancy were recoded as binary variables indicating "some" or "none."

Measures of cognitive stimulation and emotional support in the household were derived from items on the maternal supplement based on the Home Observation for Measurement of the Environment-Short Form (go to www.bls.gov/nls/y79cyaguide/1998/nlsy79childg6.pdf). Although the specific survey items differ for 0- to 2-year-olds and 3- to 5-year-olds, the cognitive stimulation score generally includes items related to outings, reading, playing, and parental role in teaching a child. For the youngest children, the emotional support score is composed of elements related to eating meals with both parents, parents talking to child while working, and spanking (reverse-scored). For the 3- to 5-year-olds, the emotional support score also includes items related to child's choice in food decisions and methods of dealing with a child who hits a parent. To facilitate interpretation, we normalized these scores using the sample SD for each score.

Maternal self-esteem was derived from 10 items on the 1987 NLSY79 survey, the most recent year for which a self-esteem inventory was administered. Five items were asked in a positive form: I am a person of worth; I have a number of good qualities; I am as capable as others; I have a positive attitude; I am satisfied with myself. Five items were asked in a negative form: I am inclined to feel that I am a failure; I feel I do not have much to be proud of; I wish I had more self-respect; I feel useless at times; I sometimes think I am no good at all. Each item had a 4-level response ranging from 1 (strongly agree) to 4 (strongly disagree). We reverse-coded the negatively formed items, summed the total, and normalized, yielding scores with lower values representing higher levels of self-esteem.

Maternal depression was taken from the 1992 NLSY79 survey, the only year in which the full 20-item Center for Epidemiologic Studies Depression scale (CES-D) was administered. Sixteen of the 20 items asked about recent feelings in a negative form: bothered by things not usually bothersome; did not feel like eating; felt unable to shake blues; had trouble keeping mind on tasks; felt depressed; felt that everything took extra effort; felt like life had been a failure; felt fearful; had restless sleep; talked less than usual; felt lonely; felt others were unfriendly; had crying spells; felt sad; felt disliked by others; could not get going. Four items were positively worded: felt as good as other people; felt hopeful; felt happy; enjoyed life. Valid responses ranged from 0 (rarely) to 3 (all of the time). We reverse-coded positively worded items, then summed to get an overall CES-D score, with higher scores indicating more depressive symptoms. The CES-D has been used in >500 published articles and has been shown to have very good validity and reliability.[33–36]

Exclusions and Sample Weights

Children whose index year was before 1996 were excluded because of the absence of television viewing history in 1986 and 1988. In addition, children with any of the following 4 health conditions were excluded: serious hearing difficulty or deafness, serious difficulty in seeing or blindness, serious emotional disturbance, or crippled/orthopedic handicap (NLSY label). All of these conditions might be associated with either decreased television viewing or attention span for reasons not related to our primary research question, thereby confounding any true possible associations. Sample weights were used to adjust for the fact that certain minority groups were oversampled by design in the NLSY data set.

Modeling

After examining the univariate characteristics of the independent variables, we developed 2 multivariable logistic regression models. The first related our outcome of attentional problems to the covariates, using the covariates relevant to early childhood as measured at or near age 1; the second substituted the covariates relevant to early childhood as measured at or near age 3. Regressions incorporated the sampling weights for the child as of the index interview. Given the possibility of multiple children sharing the same mother, we accounted for the potential lack of independence across observations by clustering on the mother's identification number. All analyses were performed in Intercooled Stata 7.0 (Stata Corporation, College Station, TX). The study protocol was reviewed and approved by the University of Washington Institutional Review Board.

RESULTS

A total of 1278 children had data from age "1" (mean: 1.8 years; SD: 0.6), and 1345 had data from age "3" (mean: 3.8 years; SD: 0.6). Approximately 50% of the children were male, and 57% were white. The demographic characteristics of included children are summarized in Table 1. Children watched an average of 2.2 hours (SD: 2.91) of television per day at age 1 and 3.6 hours (SD: 2.94) per week at age 3. The distributions of hours of television watched at each age are presented in Fig 1. Ten percent of children for whom data were available at ages 1 and 3 had attentional problems on the basis of our definition derived from the BPI.

In the logistic regression models, controlling for all of the previously listed covariates, television hours watched per day at both age 1 and age 3 was associated with having attentional problems at age 7 (1.09 [1.03–1.15] and 1.09 [1.02–1.16]), respectively (Table 2).

DISCUSSION

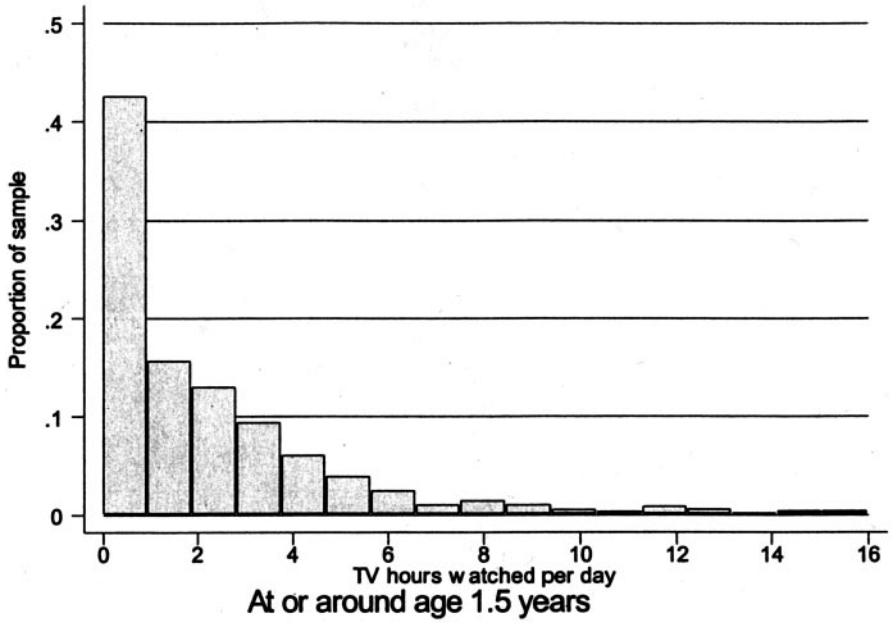
We found that early exposure to television was associated with subsequent attentional problems. This finding was present even while controlling for a number of potential confounding factors, including prenatal substance use and gestational age, measures of maternal psychopathology, and socioeconomic status. The magnitude of the risk associated with television viewing, expressed in our analysis in terms of hours per day of television viewed, is clinically significant when one considers the full range of hours of television viewed in our sample (0–16). A 1-SD increase in the number of hours of television watched at age 1 is associated with a 28% increase in the probability of having attentional problems at age 7. This result is robust and stable over time—a similar effect size is obtained for the number of hours of television watched at age 3. To our knowledge, ours is the first study to test the hypothesis of very early television viewing on subsequent inattention using a nationally representative longitudinal sample.

Several limitations to this study warrant consideration. First, the measure that we used for attentional

TABLE 1. Descriptive Statistics of Modeled Variables Measured at 2 Different Points in Early Childhood

Variable	Mean (SD) or %	
	Age "1" (n = 1278)	Age "3" (n = 1345)
Perinatal variables		
Male	50.9%	49.9%
Race/ethnicity		
Hispanic	16.8%	17.2%
Black	26.3%	25.7%
Non-Hispanic, nonblack	56.9%	57.1%
Gestational age, wk	38.6 (1.9)	38.6 (2.0)
Maternal alcohol use during pregnancy	30.6%	29.2%
Maternal tobacco use during pregnancy	23.3%	22.6%
Variables measured in early childhood (at age "1" or age "3")		
No. of children in household	2.3 (1.1)	2.5 (1.1)
Two-parent household	79.7%	79.2%
Emotional support score (normalized)	6.1 (1.0)	6.0 (1.0)
Cognitive stimulation score (normalized)	6.0 (1.0)	5.8 (1.0)
Television hours watched per day	2.2 (2.9)	3.6 (2.9)
Variables measured at index		
Child's age, mo	92.3 (6.8)	92.4 (6.8)
Mother's age, y	36.3 (2.6)	36.3 (2.6)
Urban/rural residence		
Non-MSA	14.6%	14.9%
MSA-not central city	52.1%	53.3%
MSA-central city unknown	10.5%	10.0%
MSA-central city	22.8%	21.8%
Index year		
1996	37.3%	37.9%
1998	39.7%	40.4%
2000	23.0%	21.7%
Maternal education, y	13.3 (2.3)	13.4 (2.3)
Attentional problem	10.4%	9.6%
Additional variables		
Maternal CES-D, 1992	10.1 (9.3)	9.8 (9.0)
Maternal self-esteem, 1987	4.0 (1.0)	4.0 (1.0)

MSA indicates Metropolitan Statistical Areas.



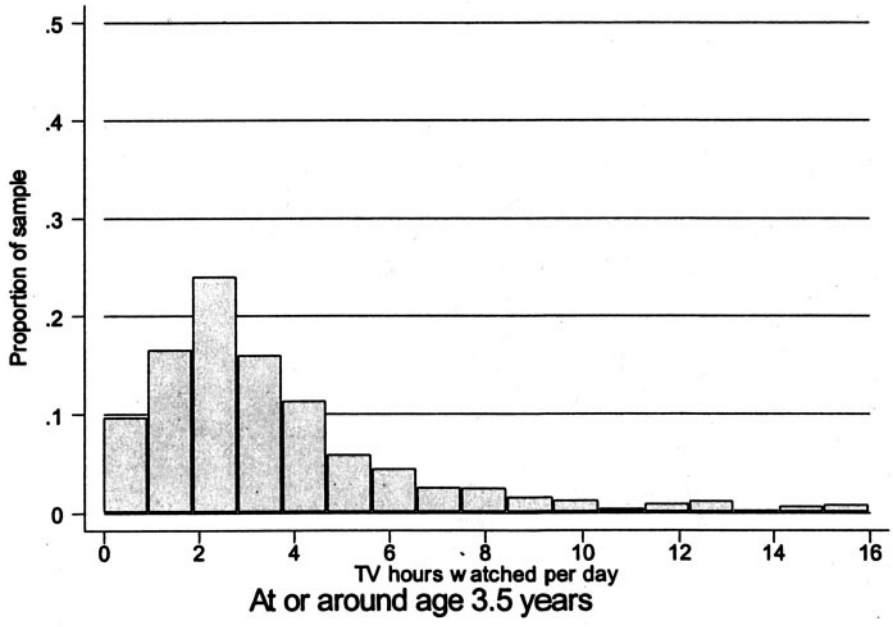


Fig 1. Histograms of television hours watched per day, at each early childhood study age.

problems is not necessarily indicative of clinically diagnosed ADHD. However, it was derived from the subscale of the Child Behavior Checklist, which was found to have a sensitivity of 75% and a specificity of 99% compared with *Diagnostic and Statistical Manual of Mental Disorders, Third Edition* criteria in a large, population-based sample.[37] In a population referred to a neuropsychology clinic, the overall accuracy of the Child Behavior Checklist relative to structured interview for ADHD using *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria was 69%.[38] Furthermore, the proportion of children who met our criterion for having "attentional problems" was 10%, which roughly corresponds with population-based estimates of the prevalence of ADHD.[1–4] Nevertheless, we have not in fact studied or found an association between television viewing and clinically diagnosed ADHD.

Second, we relied on parental report of television viewed. Although this may not be an entirely accurate measure of the true amount, there are no a priori reasons to believe that its imprecision would bias our findings in one direction or another. To the extent that it is merely inaccurate, it should bias them toward the null.

Third, we cannot draw causal inferences from these associations. It could be that attentional problems lead to television viewing rather than vice versa. However, to mitigate this limitation, we exploited the longitudinality of the data set and focused on television viewing at 1 and 3 years of age, well before the age at which most experts believe that ADHD symptoms are manifest.[32,39] It is also possible that there are characteristics associated with parents who allow their children to watch excessive amounts of television that accounts for the relation-

TABLE 2. Regression Results for 2 Models, Differing by Early Childhood Time Period Considered

	Odds Ratio (95% CI)	
	Age "1" (n = 1278)	Age "3" (n = 1345)
Variables measured in early childhood (at age "1" or age "3")		
Television hours watched per day	1.09 (1.03–1.15)	1.09 (1.02–1.16)
Emotional support score	0.82 (0.66–1.04)	0.81 (0.65–1.01)
Cognitive stimulation score	0.84 (0.65–1.07)	0.79 (0.61–1.00)
Variables measured at index		
Child's age, mo	1.03 (0.99–1.07)	1.04 (1.00–1.09)
Mother's age, y	1.02 (0.91–1.14)	0.94 (0.84–1.05)
Maternal education, y	0.91 (0.82–1.02)	0.95 (0.85–1.06)
Maternal psychopathology variables		
Maternal CES-D, 1992	1.03 (1.01–1.05)	1.03 (1.01–1.05)
Maternal self-esteem, 1987	1.36 (1.07–1.73)	1.30 (1.01–1.69)

CI indicates confidence interval.
Also adjusted for race/ethnicity, gender, gestational age, maternal alcohol and tobacco use during pregnancy, number of children in household, number of parents in household, urban versus rural residence, and index year.

ship between television viewing and attentional problems. For example, parents who were distracted, neglectful, or otherwise preoccupied might have allowed their children to watch excessive amounts of television in addition to having created a household environment that promoted the development of attentional problems. Although we adjusted for a number of potential confounders, including home environment, maternal depression, cognitive stimulation, and emotional support, our adjustment may have been imperfect. Finally, we had no data on the content of the television being viewed. Some research indicates that educational television (eg, Sesame Street) may in fact promote attention and reading among school-aged children.[24] Others have disagreed and posited that even such programming can be detrimental.[40] If exposure to certain kinds of programming is beneficial, even at a very young age, then our results represent conservative estimates of the risks of television as a medium in general because some proportion of the programming may have moderated the detrimental aspects of others and deviated the results toward the null. However, more research is needed on the effects of varying content of television, particularly for children who are preschool age.

Despite these limitations, our results have some important implications if replicated in future studies. First, we added inattention to the previously studied deleterious consequences of excessive television viewing, including violent behavior and obesity.[41–43] Second, our findings suggest that preventive action can be taken with respect to attentional problems in children. Limiting young children's exposure to television as a medium during formative years of brain development consistent with the American Academy of Pediatrics' recommendations may reduce children's subsequent risk of developing ADHD.[25]

ACKNOWLEDGMENTS

This study was funded in part by the Nesholm Family Foundation of Washington State as well as the Robert Wood Johnson Foundation (to Dr Christakis).

We are grateful to Dr Fred Rivara for thoughtful comments on a draft of this manuscript.

REFERENCES

1. Brown RT, Freeman WS, Perrin JM, et al. Prevalence and assessment of attention-deficit/hyperactivity disorder in primary care settings. *Pediatrics*. 2001;107(3). Available at: pediatrics.org/cgi/content/full/107/3/e43
2. Safer DJ, Malever M. Stimulant treatment in Maryland public schools. *Pediatrics*. 2000;106:533–539
3. Kelleher KJ, McInerny TK, Gardner WP, Childs GE, Wasserman RC. Increasing identification of psychosocial problems: 1979–1996. *Pediatrics*. 2000;105:1313–1321
4. Wasserman RC, Kelleher KJ, Bocian A, et al. Identification of attentional and hyperactivity problems in primary care: a report from pediatric research in office settings and the ambulatory sentinel practice network. *Pediatrics*. 1999;103(3). Available at: pediatrics.org/cgi/content/full/103/3/e38
5. Scahill L, Schwab-Stone M. Epidemiology of ADHD in school-age children. *Child Adolesc Psychiatr Clin N Am*. 2000;9:541–555, vii
6. Barkley RA. Attention-deficit hyperactivity disorder. *Sci Am*. 1998;279:66–71
7. Jensen PS. ADHD: current concepts on etiology, pathophysiology, and neurobiology. *Child Adolesc Psychiatr Clin N Am*. 2000;9:557–572, vii–viii
8. Cantwell DP. Attention deficit disorder: a review of the past 10 years. *J Am Acad Child Adolesc Psychiatry*. 1996;35:978–987
9. Gjone H, Stevenson J, Sundet JM. Genetic influence on parent-reported attention-related problems in a Norwegian general population twin sample. *J Am Acad Child Adolesc Psychiatry*. 1996;35:588–596
10. Gillis JJ, Gilger JW, Pennington BF, DeFries JC. Attention deficit disorder in reading-disabled twins: evidence for a genetic etiology. *J Abnorm Child Psychol*. 1992;20:303–315
11. Stevenson J, Pennington BF, Gilger JW, DeFries JC, Gillis JJ. Hyperactivity and spelling disability: testing for shared genetic aetiology. *J Child Psychol Psychiatry*. 1993;34:1137–1152
12. Joseph J. Not in their genes: a critical view of the genetics of attention deficit hyperactivity disorder. *Dev Rev*. 2000;20:539–567
13. Campbell SB. Attention-Deficit/Hyperactivity Disorder: A Developmental View. In: Sameroff AJ, Lewis M, Miller SM, eds. *Handbook of Developmental Psychopathology*. 2nd ed. New York, NY: Kluwer Academic/Plenum Publishers; 2000:383–401
14. Faraone SV, Biederman J. Nature, nurture, and attention deficit hyperactivity disorder. *Dev Rev*. 2000;20:568–581
15. Barkovich AJ, Kjos BO, Jackson DE Jr, Norman D. Normal maturation of the neonatal and infant brain: MR imaging at 1. *Radiology*. 1988;166:173–180
16. Yamada H, Sadato N, Konishi Y, et al. A milestone for normal development of the infantile brain detected by functional MRI. *Neurology*. 2000;55:218–223
17. Wallace CS, Kilman VL, Withers GS, Greenough WT. Increases in dendritic length in occipital cortex after 4 days of differential housing in weanling rats. *Behav Neural Biol*. 1992;58:64–68
18. Greenough WT, Black JE, Wallace CS. Experience and brain development. *Child Dev*. 1987;58:539–559
19. Turner AM, Greenough WT. Differential rearing effects on rat visual

cortex synapses. I. Synaptic and neuronal density and synapses per neuron. *Brain Res*. 1985;329:195–203
20. Singer JL. The power and limits of television: a cognitive-affective analysis. In: Tannenbaum P, ed. *The Entertainment Function of Television*. Hillsdale, NJ: Erlbaum; 1980:312–360
21. Healy J. *Endangered Minds: Why Children Don't Think and What We Can Do About It*. New York, NY: Simon and Schuster; 1990
22. Hartmann T. *Beyond ADD: Hunting for Reasons in the Past and Present*. Grass Valley, CA: Underwood; 1996
23. Koolstra C, Van der Voort T. Longitudinal effects of television on children's leisure time reading: a test of three explanatory models. *Hum Commun Res*. 1996;23:4–35
24. Anderson DR, Huston AC, Schmitt KL, Linebarger DL, Wright JC. *Early Childhood Television Viewing and Adolescent Behavior*. Boston, MA: Blackwell; 2001
25. American Academy of Pediatrics Committee on Public Education. Media education. *Pediatrics*. 1999;104:341–343
26. Center for Human Resource Research. *NLSY Child Handbook*. Rev ed. Columbus, OH: The Ohio State University; 1993
27. Achenbach TM, Edelbrock CS. *Manual for the Child Behavior Checklist and Revised Child Behavior Profile*. Burlington, VT: University of Vermont; 1983
28. Graham PJ, Rutter ML. The reliability and validity of the psychiatric assessment of the child. II. Interview with the parent. *Br J Psychiatry*. 1968;114:581–592
29. Kellam SK, Branch JD, Agrawal KC, Ensminger ME. *Mental Health and Going to School: The Woodlawn Program of Assessment, Early Intervention, and Evaluation*. Chicago, IL: University of Chicago Press; 1975
30. Rutter M, Tizard J, Whitmore K. *Education, Health, and Behavior*. London, UK: Longman; 1970
31. Wolraich ML, Hannah JN, Pinnock TY, Baumgaertel A, Brown J. Comparison of diagnostic criteria for attention-deficit hyperactivity disorder in a county-wide sample. *J Am Acad Child Adolesc Psychiatry*. 1996;35:319–324
32. American Academy of Pediatrics Committee on Quality Improvement Subcommittee on Attention-Deficit/Hyperactivity. Clinical practice guideline: diagnosis and evaluation of the child with attention-deficit/hyperactivity disorder. *Pediatrics*. 2000;105:1158–1170
33. Husaini BA, Neff JA, Stone RH. Psychiatric impairment in rural communities. *J Community Psychol*. 1979;7:137–146
34. Beekman AT, Deeg DJ, Van Limbeek J, Braam AW, De Vries MZ, Van Tilburg W. Criterion validity of the Center for Epidemiologic Studies Depression scale (CES-D): results from a community-based sample of older subjects in The Netherlands. *Psychol Med*. 1997;27:231–235
35. Thomas JL, Jones GN, Scarinci IC, Mehan DJ, Brantley PJ. The utility of the CES-D as a depression screening measure among low-income women attending primary care clinics. The Center for Epidemiologic Studies-Depression. *Int J Psychiatry Med*. 2001;31:25–40
36. Weissman MM, Sholomskas D, Pottenger M, Prusoff BA, Locke BZ. Assessing depressive symptoms in five psychiatric populations: a validation study. *Am J Epidemiol*. 1977;106:203–214
37. Boyle MH, Offord DR, Hofmann HG, et al. Ontario Child Health Study. I. Methodology. *Arch Gen Psychiatry*. 1987;44:826–831
38. Vaughn ML, Riccio CA, Hynd GW, Hall J. Diagnosing ADHD (predominantly inattentive and combined type subtypes): discriminant validity of the behavior assessment system for children and the Achenbach parent and teacher rating scales. *J Clin Child Psychol*. 1997;26:349–357
39. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 1994
40. Healy JM. *Endangered Minds: Why Our Children Don't Think*. New York, NY: Simon and Schuster; 1990
41. Robinson TN, Hammer LD, Killen JD, et al. Does television viewing increase obesity and reduce physical activity? Cross-sectional and longitudinal analyses among adolescent girls. *Pediatrics*. 1993;91:273–280
42. Robinson TN. Reducing children's television viewing to prevent obesity: a randomized controlled trial. *JAMA*. 1999;282:1561–1567
43. Robinson TN, Wilde ML, Navracruz LC, Haydel KF, Varady A. Effects of reducing children's television and video game use on aggressive behavior: a randomized controlled trial. *Arch Pediatr Adolesc Med*. 2001;155:17–23

STRANGLING IN RED TAPE

"About $400 billion, or nearly one-third of all the money spent on health care, is just for the paperwork. It's a staggering sum—a Pentagon-sized sum. And, according to the comprehensive study by researchers from the Harvard Medical School and from Public Citizen that produced this estimate, some $286 billion of that is utter waste. Compare that $286 billion savings to the estimated $80 billion cost of insuring every American. Or, to the $53 billion price-tag for covering out-of-pocket prescription drug costs not just for seniors, but for everyone."

Bivens M. Dr Red Tape. *The Nation*. January 16, 2004

Submitted by Student