

Effects of Reducing Television Viewing on Children's Requests for Toys: A Randomized Controlled Trial

THOMAS N. ROBINSON, M.D., M.P.H.

*Division of General Pediatrics, Department of Pediatrics, and Center for Research in Disease Prevention,
Department of Medicine, Stanford University School of Medicine*

MELISSA NICHOLS SAPHIR, Ph.D.

Center for Research in Disease Prevention, Department of Medicine, Stanford University School of Medicine

HELENA C. KRAEMER, Ph.D.

Department of Psychiatry and Behavioral Medicine, Stanford University School of Medicine

ANN VARADY, M.S.

K. FARISH HAYDEL

*Center for Research in Disease Prevention, Department of Medicine, Stanford University School of Medicine,
Palo Alto, California*

ABSTRACT. Previous attempts to reduce the effects of television advertising on children's purchase requests have had little success. Therefore, we tested the effects of a classroom intervention to reduce television, videotape, and video game use on children's toy purchase requests, in a school-based randomized controlled trial. Third- and fourth-grade children (mean age, 8.9 years) in two sociodemographically and scholastically matched public elementary schools were eligible to participate. Children in one randomly selected elementary school received an 18-lesson, 6-month classroom curriculum to reduce television, videotape, and video game use. In both schools, in September (before intervention) and April (after intervention) of a single school year, children and parents reported children's prior week's purchase requests for toys seen on television. After intervention, children in the intervention school were significantly less likely to report toy purchase requests than children in the control school, with adjusting for baseline purchase requests, gender, and age (odds ratio, 0.29; 95% confidence interval, 0.12–0.69). Among intervention school children, reductions in self-reported purchase requests were also associated with reductions in television viewing. There was no significant difference between schools in parent reports of children's requests for toy purchases. These findings suggest that reducing television viewing is a promising approach to reducing the influences of advertising on children's behavior. *J Dev Behav Pediatr* 22:179–184, 2001. Index terms: *television, media, advertising, consumerism, children, toys.*

Since the 1970s, parents and child advocates have expressed concern about the large number of television commercials seen by American children.^{1–3} On average, the number of commercials a child sees has increased from 20,000 per year in the 1970s to about 40,000 commercials per year today. This increase is caused not only by the shorter length of today's commercials, but also by the greater number of minutes per hour that commercials are now shown.^{4,5} A recent content analysis found that approximately 16% of children's television viewing time consists of advertisements,⁶ not including entertainment programming that either is based on specific toys or has its

own accompanying line of toys. This excessive exposure is worrisome because many commercials promote consumeristic and unhealthful behavior.

Half of children's commercials advertise toys.^{6,7} Toy commercials often give misleading impressions about the quality of products, and disclaimers, if they are given at all, are usually unintelligible to children.⁸ Experimental studies demonstrate that exposure to television commercials inflates children's perception of the value of advertised toys.⁹ It is not surprising that time spent watching television is positively correlated with children's requests for toys,^{9,10} because exposure to commercials is a function of television viewing. It is also not surprising that parents report that television is the most common source of children's purchase requests.^{11–13}

To date, attempts to prevent commercials from influencing child behavior have had little success. Meaningful

Address for reprints: Thomas N. Robinson, M.D., M.P.H., Department of Pediatrics and Center for Research in Disease Prevention, Stanford University School of Medicine, 1000 Welch Road, Palo Alto, CA 94304; e-mail: tom.robinson@stanford.edu; fax: 650-725-6906.

regulation of broadcast commercials has repeatedly been stymied by lobbying from the advertising industry.⁵ Parents are often urged to mediate the effects of television on their children,¹ but parental concern about commercials is uncorrelated with parental monitoring of children's viewing,² and the average parent exerts little control over children's viewing.¹⁴ Media literacy programs can increase children's knowledge of the television industry and special effects,^{15,16} understanding of ads' persuasive intent,¹⁷ and skepticism about commercials,¹⁸ but such literacy programs have failed to demonstrate that children subsequently use these skills when watching television.^{15,19}

One reason for the lack of success of media literacy programs may be that young children lack the cognitive abilities to resist commercial messages. For example, children under 8 years of age identify the persuasive intent of commercials no better than chance, and children who do not recognize persuasive intent are more likely to trust and like commercials and to express "consumption motivations."²⁰ Sprafkin et al¹⁶ suggest that the goal for future efforts should be to reduce children's exposure to television, an outcome that no media literacy program to date has produced. We therefore conducted a randomized, controlled, school-based trial of reducing third- and fourth-grade children's television, videotape, and video game use to assess the effects on children's purchase requests for toys. We hypothesized that, compared with controls, children exposed to the intervention would reduce the frequency of their purchase requests. We have previously reported the effects of this intervention on obesity and obesity-related behaviors²¹ and aggressive behaviors,²² from this same trial.

METHODS

All third- and fourth-grade students in two public elementary schools in one school district in San Jose, CA, were eligible to participate. Schools were sociodemographically and scholastically matched by district personnel. School principals and teachers agreed to participate before randomization. Parents or guardians provided written informed consent for their children to participate in assessments, and for their own participation in phone interviews. One school was randomly assigned to implement a program to reduce television, videotape, and video game use. The other school was assigned to be an assessments-only control. All assessments were performed by trained staff, blinded to the experimental design, at baseline (September 1996) and after the intervention (April 1997). Participants and school personnel, including classroom teachers, were informed of the nature of the intervention and assessments, but consumeristic behavior was only one of several outcomes assessed,^{21,22} and they were blinded to the specific study hypotheses. The study was approved by the Stanford University Panel on Human Subjects in Research.

Intervention

The intervention was based on Bandura's social cognitive theory²³ and has been previously described.²¹ It consisted

of eighteen 30- to 50-minute lessons taught by the regular third- and fourth-grade classroom teachers (trained by the research staff) as part of the standard curriculum in the intervention school. The majority of lessons were taught during the first 2 months. Early lessons included self-monitoring and reporting of television, videotape, and video game use to motivate children to reduce the time they spent in these activities. These lessons were followed by a TV Turnoff,²⁴ during which children were challenged to watch no television or videotapes and play no video games for 10 days. After the turnoff, children were encouraged to follow a 7 hr/wk budget. To help with budgeting, each household also received an electronic television time manager (TV Allowance, Miami, FL). Additional lessons taught children to use their viewing and video game time more selectively. Several final lessons enlisted children as advocates for reducing media use. Newsletters were sent home to motivate parents to help children stay within their budgets and suggested strategies for limiting television, videotape, and video game use for the entire family. Unlike media literacy programs, this intervention targeted media use alone and did not attempt to teach critical viewing skills or antiadvertising knowledge and attitudes.

Child Self-Report Measures

At baseline and posttest, on the same days in both schools, children completed self-report questionnaires over a 40-minute class period on 2 days, Tuesdays through Fridays. A research staff member read each question out loud, and students followed along together. Teachers did not participate in assessments.

Demographics and Media Use. Children reported their date of birth, age in years, gender, number of televisions, videocassette recorders, and video game players in their home, whether there was a television in their bedroom, and their hours of television, videotape, and video game use.²¹

Toy Purchase Requests. Children were asked, "In the past week, have you asked your mother or father to buy any toys that you have seen on TV?" Children who responded yes were asked to write the names of up to four items that they had requested.

Parent Measures

Parents were interviewed by phone at baseline and posttest by trained interviewers, who followed a standardized protocol. At least 10 call attempts were made at various times of day, and up to three messages were left on answering machines before classifying a parent as a nonrespondent. Mothers or female guardians were requested for interviews, but fathers or male guardians were interviewed if mothers were not available. All interviews were completed within a 23-day period at baseline and a 36-day period at posttest, with more than 85% of interviews completed during the first 16 days of each assessment period.

Demographics. Parents reported the ethnicity of their child, the highest level of education completed for all parents or guardians living in the household, and marital status.²¹

Parent Reports of Children's Toy Purchase Requests. Parents were asked, "In the past week, has your child requested that you purchase any toys that he/she has seen on TV?" Parents who responded yes were asked to name up to five items that the child had requested.

Statistical Analysis

Baseline comparability of treatment and control groups was assessed with nonparametric Wilcoxon rank sum tests for scaled variables and χ^2 tests for categorical variables. For the outcome analysis, the toy purchase requests variables were dichotomized (yes or no) because their distributions were highly skewed. To test the hypothesis, we used logistic regression with posttest toy purchase request as the dependent variable, the intervention group (intervention vs control) as the independent variable, and baseline toy purchase request, age, and gender as covariates. Each outcome was also tested for treatment $\times$ age and treatment $\times$ gender interactions. This analysis assumed that there would be no nonzero correlation between subjects' responses within a school. We checked this assumption by repeating the analysis with a mixed-model logistic regression (SAS GLIMMIX procedure, SAS version 6.12; SAS Institute, Inc., Cary, NC), which adjusts for observed between subjects correlations within schools,²⁵ because randomization was by school, and subjects within a school may have correlated responses. All students were analyzed in their schools as randomized, regardless of their participation in or compliance with the intervention or their school at posttest, and all available data were included in the analyses. All tests of statistical significance were two-tailed, with $\alpha = .05$. With this analysis and an anticipated sample size of approximately 100 participants per group, the study was designed to have 80% power to detect an effect size of 0.2 SD units or greater.²⁶

RESULTS

At baseline, 105 third and fourth graders were enrolled in the intervention school, and 120 third and fourth graders were enrolled in the control school. Self-report survey data were excluded for two intervention school students and nine control school students, whose teachers classified them as having a significant learning disability or limited English proficiency. Of the remaining students, 88 (85.4%) children in the intervention school and 87 (78.3%) children in the control school completed the toy purchase request measure at both baseline and posttest. Intervention and control participants were comparable in age (mean [SD] 8.9 [0.6] vs 8.9 [0.7] years, $p = .64$), gender (45.5% vs 47.1% girls, $p = .82$), mean (SD) number of televisions in the home (2.7 [1.3] vs 2.7 [1.1], $p = .67$), mean (SD) number of video game players (1.5 [2.3] vs 1.2 [1.7], $p = .50$), and percentage of children with a TV in their bedroom (43.2% vs 43.7%, $p = .95$).

Baseline and posttest phone interviews were completed by 66 (62.8%) and 75 (61.7%) of the parents of all enrolled children in the intervention and control schools, respectively. Among this subsample of parents who completed interviews, intervention school parents reported greater

maximum household education levels than interviewed control school parents (87.9% vs 73.0% with at least some education beyond high school, $p = .01$) but did not differ significantly in ethnicity (82% vs 74% white, $p = .29$), gender of respondent (82% vs 88% female, $p = .33$), or marital status (77% vs 68% married, $p = .20$).

Participation in the Intervention and Changes in Media Use

Intervention participation and effects of the intervention on media use have been previously reported.²¹ In brief, teachers reported teaching all lessons, 95 (90%) of 105 students in the intervention school participated in at least some of the TV Turnoff, and 71 (68%) completed the entire 10 days without watching television and videotapes or playing video games. During the budgeting phase of the intervention, 58 (55%) of the students stayed under their budget for at least 1 week. Forty-four parents (42%) returned slips reporting that they had installed the TV Allowance, and 29 families (28%) requested one or more additional TV Allowances. In response to the intervention, children in the intervention school significantly decreased their television viewing compared with controls, according to both child and parent reports (mean relative reductions of about one third). Treatment group children also reported significantly greater reductions in video game use than controls and had greater, but not statistically significant, decreases in parent reports of children's video game use, parent and child reports of videotape viewing, and parent reports of overall household television viewing. There were no significant treatment $\times$ gender or treatment $\times$ age interactions for any of the media use outcomes.²¹

Effects of the Intervention on Children's Requests for Advertised Toys

At baseline, intervention and control samples were comparable for children's toy purchase requests, as measured by children's self-reports (30.7% vs 25.3% yes, respectively; $p = .43$) and parent reports (22.7% vs 21.6% yes, respectively; $p = .88$). Baseline and posttest responses are presented in Table 1. Effects of the intervention are presented as adjusted odds ratios (OR) and 95% confidence intervals (CI), representing the odds of an intervention child requesting a toy at posttest compared with the odds of a control child requesting a toy at posttest, adjusted for requests for toys at baseline, gender, and age. There were no significant treatment $\times$ gender or treatment $\times$ age interactions for any of the outcomes, so main effects of the intervention are presented for boys and girls together.

To check our assumption of no nonzero correlation between subjects' responses within a school, we repeated the analysis by using a mixed-model logistic regression. As expected, this analysis produced the same results (OR, 0.29; 95% CI, 0.12–0.69; $p < .006$ for children's self-reports and OR, 0.40; 95% CI, 0.10–1.63; $p = .20$ for parents' reports). The results were also similar when parent education level, ethnicity, and parent marital status were included as additional covariates for the subsample of children with completed parent interviews.

Table 1. Intervention and Control Group Reports of Children's Purchase Requests for Toys Seen on Television

Variable	Baseline Request	Posttest Request	Intervention		Control		Adjusted Odds Ratio (95% CI) ^a	<i>p</i> -Value
			N	%	N	%		
Children's self-reported	Yes	No	19	21.6	9	10.3	0.29 (0.12, 0.69)	<.005
toy purchase requests	No	No	57	64.8	53	60.9		
	Yes	Yes	8	9.1	13	14.9		
	No	Yes	4	4.5	12	13.8		
Parent reports of children's	Yes	No	13	19.7	14	18.9	0.41 (0.11, 1.46)	.17
toy purchase requests	No	No	49	74.2	51	68.9		
	Yes	Yes	2	3.0	2	2.7		
	No	Yes	2	3.0	7	9.7		

CI, confidence interval.

^aIntervention effects presented as odds ratios and 95% CIs, representing the odds of an intervention child requesting a toy at posttest compared with the odds of a control child requesting a toy at posttest, adjusted for requests for toys at baseline, gender, and age.

To further explore the possible causal nature of the relationship between reduced television viewing and reduced toy purchase requests, we also examined whether the intervention school children who reduced their requests for toys were also the children who reduced their television viewing. To do so, we calculated mean pretest to posttest changes in television viewing for children in each of the four possible subgroups defined by baseline and posttest requests for toys (Table 2). These results showed a clear graded response in the expected direction (Kruskal-Wallis $\chi^2_3 = 7.81, p = .05$). Children who requested toy purchases at baseline but not at posttest decreased their television viewing the most, whereas those who requested toy purchases at posttest but not at baseline increased their viewing on average. Similar patterns did not emerge for changes in videotape or video game use.

DISCUSSION

In this study, an intervention to reduce television, videotape, and video game use decreased third- and fourth-grade children's self-reported requests for their parents to buy toys they saw on television. By the end of the school year, the odds of a child requesting a toy purchase in the prior week was about 70% lower among intervention school children than among control school children, adjusting for baseline purchase requests, gender, and age. These results are also additional evidence for a causal effect of exposure to television advertising on

children's consumeristic behavior because the intervention targeted reduction of media use alone, without substituting alternative activities or addressing advertising or consumerism directly.

There was no significant difference between groups in parent reports of children's requests for toy purchases. This difference in the results with children's self-reports and parent reports may be caused by a number of factors. First, it is possible that parent reports are a more accurate picture of children's toy purchase requests. However, we do not believe that is the case. Although not statistically significant, the direction of the differences in parent reports did favor the intervention group, and the effect size was not much smaller than for children's self reports. As a result, one explanation for this finding may be insufficient statistical power because of the smaller sample of parents who participated in interviews. In addition, parent reports in both groups indicated an overall lower prevalence of purchase requests and fewer changes from baseline to posttest. It is possible that our parent report measure was less sensitive because it captured only a subset of requests, because we interviewed only one parent or guardian for each child. In contrast, children would presumably report all their requests to all parents or guardians. In addition, parents or guardians may not be as aware of television as the source of their children's requests.

This study has a number of limitations. First, because it involved children in only two elementary schools, we cannot completely rule out the possibility that the results were caused by differences in the intervention and control groups that were unrelated to the intervention. This possibility is made less likely, however, because the schools were in a single school district and participants were comparable at baseline on almost all measured variables, including toy purchase requests. Second, our outcomes were limited to self-reports and parent reports of children's asking behavior. However, these measures have face validity and are regularly used in studies of children's consumeristic behavior.^{10,14,27,28} The lack of statistically significant changes in parent and guardian reports may indicate that more sensitive measures are needed in future studies. Finally, the intervention targeted all television, videotape, and video game use, instead of just commercial

Table 2. Relationship Between Children's Self-Reported Toy Purchase Requests and Changes in Weekly Hours of Television Viewing (Intervention Group Only)

Baseline Request	Posttest Request	Changes in Self-Reported Hours of Weekly Television Viewing	
		Mean	SD
Yes	No	-14.2	17.4
No	No	-4.9	12.1
Yes	Yes	-2.2	10.6
No	Yes	+1.8	2.3

SD, standard deviation.

television, and we did not assess children's exposures to advertising, so we do not know whether it was reduced. As a result, it may be argued that we have not sufficiently tested the causal relationship between exposure to television advertising and consumeristic behavior. However, we decided on this design for several practical reasons: in the current multimedia, multichannel, remote-control environment, actual exposure to advertising is extremely difficult to assess accurately. The definition of what constitutes advertising is not necessarily straightforward, particularly with the advent of sponsorship announcements on public television and entertainment programs that either are based on toys or have their own related line of toys.⁴ To specifically reduce exposure to advertising would have required parents and children to differentiate advertising from other types of content, making the intervention less likely to be adopted, much more difficult to implement, and less generalizable. However, because the intervention did not target just advertising, potentially diluting intervention effects, it can also be argued that our findings are even stronger evidence of the benefits of reducing children's television viewing.

Strengths of this study include the randomized, controlled trial design; the blinding of students, parents, and teachers to the specific study hypotheses; the blinding of data collectors to experimental assignment; and the use of a potentially generalizable intervention delivered by the regular classroom teachers.

Despite substantial evidence of the effects of television advertising on children's consumeristic behaviors, there has

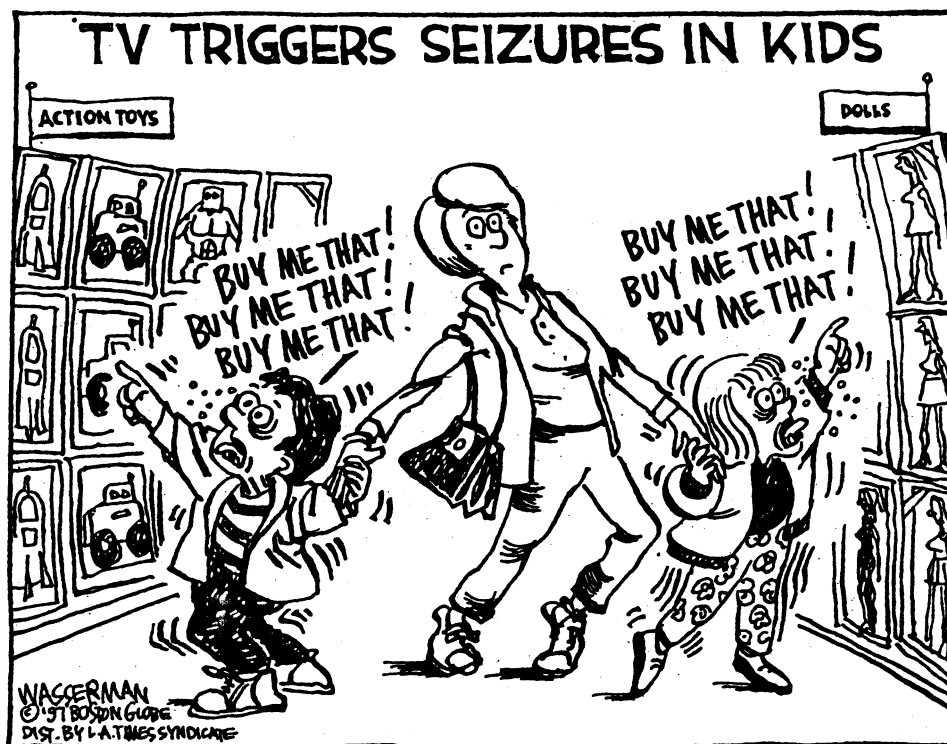
been a lack of successful interventions to reduce this effect. This small study indicates that reducing television viewing may be a particularly promising approach to reducing the influences of advertising on children's behavior. Although the interaction analysis was limited by the small sample size, there was no evidence that the intervention was differentially effective in boys and girls. It will now be important to replicate this study with larger and more sociodemographically diverse samples and longer follow-up to confirm these findings and to evaluate the generalizability of this approach. Additional reliable and valid measures of children's consumeristic attitudes and behaviors are also needed. Studies of the mechanisms by which this intervention influences children's behaviors will also improve our understandings of the effects of television advertising exposure on children. In addition, to inform public policy, future studies should be designed to identify whether subgroups of children are more or less likely to respond to the intervention, whether the same children respond on multiple outcomes, and which elements of the curriculum and implementation are most closely linked to reductions in children's consumeristic behaviors.

Acknowledgments. We are indebted to Marta L. Wilde, M.A., Joel D. Killen, Ph.D., Dina L.G. Borzekowski, Ed.D., Sally McCarthy, Connie Watanabe, M.S., and the students, teachers, and school administrators who participated in this project. This study was funded by grants from the American Heart Association, California Affiliate, the National Heart, Lung and Blood Institute (RO1 HL54102), and a Robert Wood Johnson Foundation Generalist Physician Faculty Scholar Award.

REFERENCES

1. American Academy of Pediatrics Committee on Communications: The commercialization of children's television. *Pediatrics* 89:343-344, 1992
2. Feldman S, Wolf A, Warmouth D: Parental concerns about child-directed commercials. *J Commun* 21:125-137, 1977
3. Ward TB: Opinions on television advertising to children: A content analysis of letters to the Federal Trade Commission. *Merrill-Palmer Q* 30:247-259, 1984
4. Comstock G, Paik H: *Television and the American Child*. San Diego, CA, Academic Press, 1991
5. Kunkel D, Roberts D: Young minds and marketplace values: Issues in children's television advertising. *J Social Issues* 47: 57-72, 1991
6. Taras HL, Gage M: Advertised foods on children's television. *Arch Pediatr Adolesc Med* 149:649-652, 1995
7. Atkin C, Heald G: The content of children's toy and food commercials. *J Commun* 27:107-114, 1977
8. Liebert RM, Sprafkin J: *The Early Window: Effects of Television on Children and Youth*. New York, NY, Pergamon Press, 1988
9. Sheikh A, Moleski LM: Children's perception of the value of an advertised product. *J Broadcasting* 21:347-354, 1977
10. Robertson TS, Rossiter JR: Children's responsiveness to commercials. *J Commun* 27:101-106, 1977
11. Burr P, Burr RM: Product recognition and premium appeal. *J Commun* 27:115-117, 1977
12. Burr PL, Burr RM: Parental responses to child marketing. *J Advertising Res* 17:17-20, 1977
13. Donohue TR: Effect of commercials on black children. *J Advertising Res* 15:41-47, 1975
14. Robertson TS: Parental mediation of television advertising effects. *J Commun* 29:12-25, 1979
15. Dorr A, Graves SB, Phelps E: Television literacy for young children. *J Commun* 30:71-83, 1980
16. Sprafkin J, Watkins LT, Gadow KD: Efficacy of a television literacy curriculum for emotionally disturbed and learning disabled children. *J Appl Dev Psychol* 11:225-244, 1990
17. Austin EW, Johnson KK: Immediate and delayed effects of media literacy training on third graders' decision making for alcohol. *Health Commun* 9:323-349, 1997
18. Roberts DF, Christenson P, Gibson WA, Mooser L, Goldberg ME: Developing discriminating consumers. *J Commun* 30:94-105, 1980
19. Lewin ZG: Children, television advertising, policy issues and practices: A cognitive developmental perspective. *Interdisciplinaria* 9:71-82, 1990
20. Robertson TS, Rossiter JR: Children and commercial persuasion: An attribution theory analysis. *J Consumer Res* 1:13-20, 1974
21. Robinson TN: Reducing children's television viewing to prevent obesity: A randomized controlled trial. *JAMA* 282:1561-1567, 1999
22. Robinson TN, Wilde ML, Navratil 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* 155:17-23, 2001

23. Bandura A: Social Foundations of Thought and Action. Englewood Cliffs, NJ, Prentice-Hall, 1986
24. Winn M: Unplugging the Plug-in Drug. New York, NY, Penguin Books, 1987
25. Murray DM: Design and Analysis of Group-Randomized Trials. New York, NY, Oxford University Press, 1998
26. Kraemer HC, Thiernann S: How many subjects? Statistical Power Analysis in Research. Newberry Park, CA, Sage Publications, 1987
27. Wiman AR: Parental influence and children's responses to television advertising. J Advertising 12:12-18, 1983
28. Isler L, Popper ET, Ward S: Children's purchase requests and parental responses: Results from a diary study. J Advertising Res 27:28-39, 1987



© Tribune Media Services, Inc. All Rights Reserved. Reprinted with permission.