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Commercial TV exposure, fast-food toy collecting and family visits to fast food restaurants among families living in rural communities

Jennifer A. Emond, PhD^{1,2}, Amy M. Bernhardt, Med¹, Diane Gilbert-Diamond, ScD^{1,2}, Zhigang Li, PhD^{1,3}, and James D. Sargent, MD^{1,3,4}

¹Norris Cotton Cancer Center, Geisel School of Medicine at Dartmouth, Lebanon, NH

²Department of Epidemiology, Geisel School of Medicine at Dartmouth, Hanover, NH

³Department of Community and Family Medicine, Geisel School of Medicine at Dartmouth, Hanover, NH

⁴Department of Pediatrics, Geisel School of Medicine at Dartmouth, Lebanon, NH

Abstract

Objective—To assess the associations between children's exposure to TV networks that aired child-directed advertisements for children's fast food meals with the collection of fast food meal toy premiums and frequency of family visits to those restaurants.

Study design—One hundred parents of children 3–7 years old were recruited from a rural pediatrics clinic during 2011; families receiving Medicaid were oversampled. Parents reported the child's television viewing habits and family visit frequency to the fast food restaurants participating in child-directed TV marketing at the time, and their child's requests for visits to and the collecting of toy premiums from those restaurants. Logistic regression models assessed adjusted associations between a child's TV viewing with more frequent restaurant visits (monthly in this population). Structural equation modeling assessed if child requests or toy collecting mediated that association.

Results—Thirty-seven percent of parents reported monthly visits to the select fast food restaurants. Among children, 54% requested visits to and 29% collected toys from those restaurants. Greater child commercial TV viewing was significantly associated with more frequent family visits to those fast food restaurants (adjusted odds ratio 2.84 for each one-unit increase in the child's commercial TV viewing scale, $p < 0.001$); toy collecting partially mediated that positive association.

Address correspondence to: Jennifer A. Emond, Department of Epidemiology, Geisel School of Medicine at Dartmouth, Hinman Box 7920, Hanover, NH 03755. Jennifer.A.Emond@Dartmouth.edu.

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The authors declare no conflicts of interest.

Conclusions—Higher exposure among children to commercial TV networks that aired child-directed ads for children's fast food meals was associated with more frequent family visits to those fast food restaurants. Child desire for toy premiums may be a mediating factor.

Fast food companies have frequently participated in child-directed marketing (i.e., marketing that targets those under the age of 12). In 2009, more than \$714 million was spent in the U.S.¹ with TV advertising accounting for 90% of all child-directed marketing over traditional and newer media.¹ Exposure to food ads on TV influences the food preferences and requests of children,^{2–4} however, mediating mechanisms are not clear. A study of all fast food meal ads aired in the U.S. during July 2009–June 2010⁵ demonstrated that child-directed ads frequently featured premiums such as toys and were less likely to emphasize food compared with adult-directed ads. A study among 100 children aged 3–7 years old—those in the target audience for child-directed fast food meal ads—demonstrated that children were equally as likely to notice premiums after viewing a child-directed fast food meal ad as they were to notice food.⁶ Moreover, consumer data covering 2006–2009 submitted to the Federal Trade Commission (FTC) by major food, beverage and fast food companies¹ suggested that the decision among families to eat at a fast food restaurant is often driven by children, and the promotion of toys in fast food meals is an effective way to shape a child's requests. Data were proprietary, however, and specific data reported by any company were not included in that report.

This study examined cross-sectional associations between a child's commercial TV exposure over networks that featured child-directed ads for children's fast food meals with frequency of family visits to the two fast food restaurants that were the major participants in child-directed TV advertising at the time.⁵ We hypothesized that greater commercial TV viewing by the child would be associated with a greater frequency of family visits to those select fast food restaurants. Further, we hypothesized that child requests for visits to those restaurants and the collection of toy premiums from those restaurants would mediate that association.

Methods

Data were collected as part of a 2011 study to assess how young children interpret fast food advertising;⁷ data were analyzed in 2014. Briefly, families of children aged 3–7 years were identified from medical records at a rural New England hospital. Eligible families were sent letters describing the study with an opt-out option (3% declined). Of the 217 eligible parents, 133 agreed to participate; 23 participants failed to show for the study visit and 10 visits were excluded because of technical errors, resulting in a final sample of 100 children and one of their parents or guardians. Although children viewed TV advertisements for fast food meals and underwent a structured interview, parents completed a questionnaire. The Institutional Review Board at Dartmouth College approved all study procedures.

Outcome measure: Frequency of visits to fast food restaurants

Study measures were specific to the two fast food restaurants that were the primary participants in child-directed TV advertising at the time the study was completed.⁵ In separate questions, parents reported how often in a typical month they ate at a McDonald's or Burger King restaurant (never, <1 a month, 1–3 times a month, 1–6 times a week, every

day). A composite variable based on the most frequent response to either question was created. Only one parent reported visits 1–6 times a week, and no parent reported visits every day. Thus, responses were dichotomized as <1 a month versus 1 times a month.

Exposure: Child's commercial TV viewing

Nickelodeon, Nicktoons, Cartoon Network and Disney are ad-supported cable TV networks that cater to preschoolers and young children. Those four network channels are part of paid cable or satellite TV subscriptions in the U.S, and the majority of U.S. households (79%), including the majority of lower-income households with children (62%), have such subscriptions.⁸ During 2009–2010, 79% of all child-directed fast food ads were aired on those four networks.⁵ Parents reported how often their child watched TV over those four networks on a Likert scale (never, <1 a month, 1–3 times a month, 1–6 times a week and every day). Minutes per day of viewing on each network were not collected. We therefore took the average response over those four networks to create one scale to reflect exposure to children's TV networks that featured child-directed advertising for children's fast food meals (Cronbach's alpha=0.76), anchored at never (0) to daily (4) on each network. Parents also reported their child's frequency of viewing TV on PBS, which was included in analyses as a proxy for ad-free TV exposure. Additionally, parents reported the hours their child viewed TV on a weekday and over the weekend; response options for each item were 0, <1 hour, and 1–2, 2–4 hours and 4+ hours. Few parents reported no TV viewing or more than 4 hours of TV viewing a day, and therefore categories were collapsed as <1 hour, 1–2 hours and >2 hours per day. Parents also reported the number of TVs in the home and the presence of a TV in the child's bedroom.

Potential Mediators: Child requests for fast food and toy collecting

Parents were asked to rate their agreement with the following items with respect to the two specific fast food restaurants included in this study: 1) my child requests trips to these restaurants and 2) my child collects toys from these restaurants. Each item was scored on a 5-point Likert scale and responses were dichotomized as agree (strongly agree, agree) versus disagree (strongly disagree, disagree, no opinion).

Covariates

A scale for parental expectancies of fast food value (Cronbach's alpha=0.72) was created by summing parental responses to the following items: 1) I like the taste of the food at these restaurants, 2) you get a lot for your money at these restaurants, 3) my family likes the price of the food at these restaurants and 4) eating in these restaurants is convenient (strongly disagree (0) to strongly agree (4)). Parents reported on child race/ethnicity, parental education, household income and health insurance status. Child's weight and height were extracted from the medical record, and age- and sex-adjusted BMI percentiles were computed;⁹ overweight status was defined as 85th percentile.

Statistical analyses

Multivariate logistic regression was used to estimate the likelihood of more frequent visits to the select fast food restaurants on the child's commercial TV viewing time, adjusted for

parental education, Medicaid insurance status and parental fast food expectancies. Those covariates were included because they were related to monthly visits at the $p < 0.10$ level from bivariate analyses. Household income was also associated with monthly visits at the $p < 0.10$ level, yet health insurance status and household income were highly, positively correlated ($p < 0.001$). Thus, for a parsimonious model, health insurance status (objectively measured) was included as a covariate but household income (self-reported) was not. Finally, structural equation modeling was used to formally test if child requests for fast food or child toy collecting mediated the association between the child's commercial TV viewing and more frequent visits to the select fast food restaurants, adjusted for the same covariates list above. Results were interpreted under a joint significance approach,¹⁰ which concludes mediation is present when the direct paths from the exposure to the mediator and from the mediator to the outcome are both statistically significant. Robust weighted least-square estimators were used to estimate parameters in the model; p -values < 0.05 were considered statistically significant. All analyses were conducted using the R Language and Environment for Statistical Computing, version 3.0.2 (Vienna, Austria) and Mplus, version 6.12 (Muthén & Muthén, Los Angeles, CA).

Results

Among the 100 child participants, mean age was 5.3 years (standard deviation [SD] 1.4), one-half were male, and most were white (87%) and non-Hispanic (95%). Fifty-five percent of parents graduated college and 37% of families received Medicaid health insurance. Thirty-seven percent of parents reported more frequent visits to the select fast food restaurants. Factors significantly associated with more frequent visits (Table I) were lower levels of parental education, lower household income, receiving Medicaid health insurance, greater parental expectancies of fast food value, more TVs in the home and a TV in the child's bedroom (all $p < 0.05$). More time spent by the child watching TV on weekdays and on weekend days was also associated with more frequent visits, as was more time spent viewing commercial TV. Frequency of viewing PBS was not associated with more frequent visits to the select fast food restaurants.

Only 19 (19%) parents reported that their child did not view any of the four commercial cable networks. Among those 19 parents, 15 were college graduates and 14 received private health insurance. Children's mean commercial TV viewing scores were positively correlated with total time spent viewing TV on weekdays and on weekends. Mean (SD) commercial TV scores by hours of TV viewing on weekdays were: 0.8 (0.8) for < 1 hour of TV, 1.5 (0.9) for 1–2 hours of TV, and 2.3 (1.0) for > 2 hours of TV ($p < 0.001$). Mean (SD) commercial TV scores by hours of TV viewing on weekends were: 0.8 (0.9) for < 1 hour of TV, 1.3 (0.9) for 1–2 hours of TV, and 2.0 (0.9) for > 2 hours of TV ($p < 0.001$).

Fifty-four children (54%) requested visits to one of the two fast food restaurants. Mean commercial TV scores were greater among children who made requests compared with those who did not (1.5 vs. 1.1; $p = 0.030$). Twenty-nine children (29%) collected toy premiums from the restaurants, and mean commercial TV scores were greater among those who collected toys compared with those who did not (1.9 vs. 1.1; $p < 0.001$). Of the 29 children who collected toy premiums, 24 (82.8%) also made requests to visit the select fast

food restaurants; 5 (17.2%) collected toy premiums but did not request visits to the select fast food restaurants. PBS TV viewing was not associated with requests ($p=0.534$) or toy collecting ($p=0.391$).

In a series of adjusted logistic regression models (Table II) a greater frequency of viewing commercial TV by the child was significantly associated with more frequent visits to the fast food restaurants by the family (Model 1), but the child's PBS TV viewing frequency was not (Model 2). Specifically, families were 2.84 times more likely to frequently visit the select fast food restaurants with each 1-point increase in the child's commercial TV viewing score. We plotted the log-odds of the adjusted predicted probabilities of more frequent fast food restaurant visits against the child's commercial TV viewing scores, and results supported a linear dose response relationship (Pearson's ρ 0.88, $p<0.001$). Additionally, child requests for trips to the select fast food restaurants (Model 3) and child collecting of toy premiums from those restaurants (Model 4) were both associated with more frequent visits by the family.

Figure 1 (available at www.jpeds.com) presents results from the adjusted structural equation model that assessed the mediating effect of child toy collecting on the association between the child's commercial TV viewing and more frequent visits to the select fast food restaurants. Toy collecting was a partial mediator of that path under a joint significance test. Specifically, there was a statistically significant direct path from child's commercial TV viewing to toy collecting and from toy collecting to more frequent visits to the select fast food restaurants. The mediation was not complete, however, as there remained a statistically significant direct path between the child's commercial TV exposure and more frequent visits. In a similar adjusted structural equation model (not shown), child requests for visits to the select fast food restaurants appeared to be a mediator between the child's commercial TV viewing time and more frequent visits to the select fast food restaurants. Namely, there were positive direct paths from the child's commercial TV viewing to child requests (OR 1.58; 95% CI 0.97–2.56; $p=0.063$) and from child requests to more frequent visits (OR 1.63; 95% CI: 0.93–2.87; $p=0.091$). However, findings did not reach statistical significance.

Figure 2 presents the associations between the child's commercial TV score and toy collecting, stratified by family frequency of visiting the select fast food restaurants. The mean child's commercial TV score appeared greater among children who collected fast food toys within both strata, although neither difference reached statistical significance.

Discussion

Among this sample of parents and their young children, the more frequently a child viewed commercial TV that featured child-directed fast food meal advertising, the greater the likelihood their family visited fast food restaurants that marketed directly to children on TV at the time. In contrast, there was no association between a child's PBS TV viewing and visit frequency to those restaurants. Additionally, greater commercial TV exposure was associated with requests to and the collecting of toy premiums from fast food restaurants that marketed to children on TV, and the child's collecting of toy premiums partially mediated the positive association between commercial TV exposure and more frequent visits

to those restaurants. Results are consistent with consumer research data as summarized by the FTC that suggested child requests often shape a family's decision to visit a fast food restaurant, and that premiums are an effective way to influence a child's requests.¹ This study reports evidence of a mediating mechanism in that relationship in the publicly accessible scientific literature.

This study was cross-sectional, and we are unable to determine the temporality of the associations between toy collecting and fast food visits. Those associations are likely reciprocal, in that more frequent visits to the select fast food restaurants lead to more toys received by the child, which in turn increases a child's desire for more visits to the select fast food restaurants. Therefore, we assumed toy collecting by the child reflected the child's desire for fast food toys and was on the causal path between commercial TV viewing and fast food restaurant visits. In support of that assumption, children who collected toys were largely a subset of those who made visit requests to the select fast food restaurants. We also observed a positive, although not statistically significant, association between the child's commercial TV viewing and toy collecting among families that frequently visited the select fast food restaurants. Therefore, although we do not know if exposure to child-directed TV ads for fast food preceded the initial visit to one of the select fast food restaurants for the purpose of receiving a toy, study findings provide some of the first evidence that a child's commercial TV exposure likely reinforces the desire to visit fast food restaurants for the purpose of collecting toys.

Several studies have documented a positive link between a child's overall TV viewing and their food preferences and requests.^{2-4,11} The study is unique as it provides a framework to model potential mediating effects between a child's commercial TV exposure and family food purchases. Specifically, findings begin to document that a child's food preferences may be partially shaped by a desire for toy premiums featured in TV ads. Findings need confirmation in larger studies enrolling more diverse samples. Further, future studies should collect more detailed measures of a child's TV viewing habits, child pestering for fast food visits and toys, and a parent's behavior of visiting fast food restaurants. Importantly, prospective studies that monitor the change in a child's exposure to commercial TV, awareness of TV ads for fast food and requests to visit fast food restaurants are needed to clarify causal pathways.

Study findings must be interpreted cautiously in light of study limitations. Foremost, we argue that children who collected fast food toy premiums also desired those toys; however, we did not ask parents if their child requested visits to fast food restaurants in order to collect toys. Visit frequency to the two fast foods restaurants included in this study was lower than expected when considering national estimates. For example, 17% of children in the U.S. consume fast-food burgers on any given day.¹² Families in our study were recruited from a non-metropolitan area where there are limited fast food restaurants, and limited access to a motor vehicle among lower-income families in this area further impacts visit frequency to fast-food restaurants.¹³ Thus, study findings are not generalizable to the U.S. as a whole and in particular are not generalizable to metropolitan communities.

As with any cross-sectional study, we must be cautious in judging cause-and-effect. It is also possible that self-reported measures were underreported, or that other unmeasured variables confounded reported associations. For example, children with greater commercial TV exposure also likely view many ads including ads for toys, and fast food premiums are often cross-marketed with popular TV and movie characters.¹ Thus, it is possible that children with greater commercial TV exposure may be more receptive to fast food premiums because of greater exposure to toy ads or cross-promotional marketing practices. This study did not include other methods of child-directed marketing such as websites, advergames,¹⁴ restaurant signage and point of purchase marketing,¹⁵ and we did not assess the child's dietary intake or food purchases (including children's meals) at fast food restaurants. Those measures should be addressed in a larger, more generalizable longitudinal study. Finally, study measures were specific to the fast food restaurants that participated in child-directed TV advertising at the time, and we are not able to address if commercial TV exposure related to increased visits to other types of restaurants.

Results from this study provide an initial step in documenting the influence that fast food premiums may have on child requests and ultimately parental fast food purchases. Specifically, study findings provide preliminary evidence of a strong, positive association between the child's commercial TV exposure and more frequent family visits to the fast food restaurants that engaged in child-directed TV advertising at the time. Findings further suggest that a child's collection of toy premiums from those fast food restaurants may partially mediate that positive association. Given that most foods and beverages offered at fast food restaurants continue to be nutritionally poor, a more critical examination of child-directed marketing of fast food meals is warranted.

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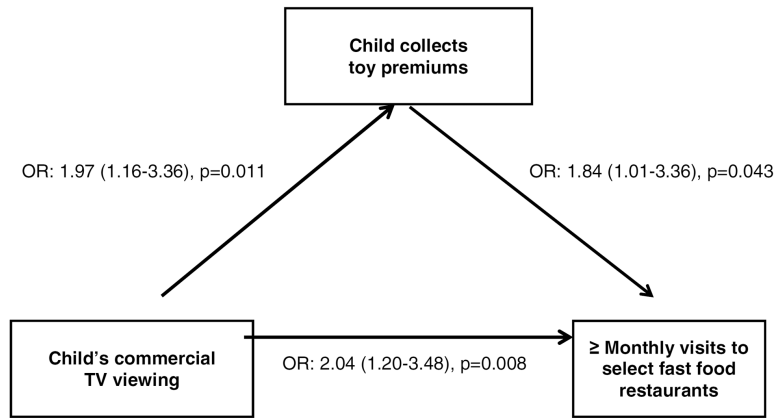


Figure 1. Associations between child's commercial TV viewing with more frequent fast food restaurant visits through child toy collecting. Structural equation model adjusted for parental education (college graduate vs. some college or less), health insurance status (private or self-pay vs. Medicaid) and parental fast food expectancies (continuous scale, range 0–16).



Figure 2.

Associations between child's commercial TV viewing with toy collecting by fast food restaurant visit frequency (n=63 visited the select fast food restaurants <1 per month and N=37 visited 1 times per month). *P-values from t-tests comparing mean score across child collecting of toy premiums, within each strata of fast food visit frequency.

Table 1Visit frequency to select fast food restaurants by child, parental and household characteristics.^{1,2}

| | Overall | By visit frequency to select fast food restaurants ² | | p-value ³ |
|---|---------|---|------------------|----------------------|
| | N | <1 Month N (%) | 1 Month N (%) | |
| Overall | 100 | 63 (63.0%) | 37 (37.0%) | |
| <u>Parental characteristics</u> | | | | |
| Parental education | | | | |
| High school degree or less | 17 | 6 (35.3%) | 11 (64.7%) | <0.001 |
| Some college or Associate's degree | 28 | 14 (50.0%) | 14 (50.0%) | |
| Bachelor's degree | 29 | 19 (65.5%) | 10 (34.5%) | |
| Master's, Doctorate or doctor of medicine | 26 | 24 (92.3%) | 2 (7.7%) | |
| Annual household income ⁴ | | | | |
| <\$30,000 | 13 | 7 (53.9%) | 6 (46.2%) | 0.014 ⁴ |
| \$30,000–\$49,999 | 23 | 10 (43.5%) | 13 (56.5%) | |
| \$50,000–\$74,999 | 15 | 6 (40.0%) | 9 (60.0%) | |
| \$75,000–\$100,000 | 15 | 11 (73.3%) | 4 (26.7%) | |
| >\$100,000 | 28 | 23 (82.1%) | 5 (17.9%) | |
| Health insurance status | | | | |
| Private/self-pay | 63 | 47 (74.6%) | 16 (25.4%) | 0.004 |
| Medicaid | 37 | 16 (43.2%) | 21 (56.8%) | |
| Parental expectancies of fast food value, mean (SD) | 100 | 7.9 (3.9) | 9.5 (2.8) | 0.021 |
| <u>Household Characteristics</u> | | | | |
| Number of TVs in the home | | | | |
| 0–2 | 67 | 48 (71.6%) | 19 (28.4%) | 0.020 |
| 3–5 | 33 | 15 (45.5%) | 18 (54.6%) | |
| TV in the child's bedroom | | | | |
| No | 75 | 56 (74.7%) | 19 (25.3%) | <0.001 |
| Yes | 25 | 7 (28.0%) | 18 (72.0%) | |
| <u>Child characteristics</u> | | | | |
| Age, mean (SD) | 100 | 5.2 (1.5) | 5.3 (1.2) | 0.798 |
| Gender | | | | |
| Male | 50 | 34 (68.0%) | 16 (32.0%) | 0.407 |
| Female | 50 | 29 (58.0%) | 21 (42.0%) | |
| Race | | | | |
| White | 87 | 55 (63.2%) | 32 (36.8%) | 0.723 |
| Non-white | 13 | 8 (61.5%) | 5 (38.5%) | |
| Ethnicity | | | | |
| Non-Hispanic | 95 | 60 (63.2%) | 35 (36.8%) | >0.999 |
| Hispanic | 5 | 3 (60.0%) | 2 (40.0%) | |
| <u>Child characteristics (cont.)</u> | | | | |

| | Overall | By visit frequency to select fast food restaurants ² | | p-value ³ |
|---|---------|---|------------------|----------------------|
| | N | <1 Month N (%) | 1 Month N (%) | |
| Weight status | | | | |
| Normal weight | 80 | 49 (61.3%) | 31 (38.8%) | 0.610 |
| Overweight | 19 | 13 (68.4%) | 6 (31.6%) | |
| TV Viewing on weekday | | | | |
| <1 hour | 38 | 33 (86.8%) | 5 (13.2%) | <0.001 |
| 1–2 hours | 48 | 24 (50.0%) | 24 (50.0%) | |
| >2 hours | 14 | 6 (42.9%) | 8 (57.1%) | |
| TV Viewing on weekend day | | | | |
| <1 hour | 29 | 25 (86.2%) | 4 (13.8%) | <0.001 |
| 1–2 hours | 43 | 29 (67.4%) | 14 (32.6%) | |
| >2 hours | 28 | 9 (32.1%) | 19 (67.9%) | |
| Commercial TV viewing, ⁵ mean (SD) | 100 | 1.0 (1.0) | 2.0 (0.8) | <0.001 |
| PBS TV viewing, mean (SD) | 100 | 1.8 (1.3) | 2.0 (1.3) | 0.420 |

Percents sum across columns.

¹ Among 100 children, 3–7 years old, and one of their parents or guardians.

² Study measures specific to the two fast food restaurants that were the major participants in child-directed TV advertising at the time the study was completed.

³ p-values from Chi-Square or Fisher's exact tests for percentages or Student's T-Tests for means.

⁴ Fisher's Exact Chi-square.

⁵ Commercial TV viewing is a scale to reflect the viewing frequency over four child-based TV networks that include child-directed advertisements for children's fast food meals.

Adjusted associations between child characteristics and more frequent visits to select fast food restaurants.^{1,2}

Table 2

| Outcome | Monthly visits to select fast food restaurants ² (N=100) | | | |
|---|---|------------------------|------------------------|------------------------|
| | Model 1 OR (95% CI) | Model 2 OR (95% CI) | Model 3 OR (95% CI) | Model 4 OR (95% CI) |
| Parent is college graduate | 0.52 (0.18, 1.50) | 0.33 (0.12, 0.87)* | 0.32 (0.12, 0.87)* | 0.34 (0.12, 0.93)* |
| Receives Medicaid insurance | 1.88 (0.64, 5.52) | 2.19 (0.82, 5.58) | 2.11 (0.77, 5.72) | 1.64 (0.58, 4.67) |
| Parental fast food expectancies | 1.10 (0.95, 1.27) | 1.11 (0.96, 1.27) | 1.1 (0.96, 1.27) | 1.09 (0.95, 1.25) |
| Child's commercial TV viewing ³ | 2.84 (1.58, 5.12)*** | -- | -- | -- |
| Child's PBS TV viewing | -- | 1.08 (0.75, 1.54) | -- | -- |
| Child requests visits to select fast food restaurants | -- | -- | 2.77 (1.08, 7.10)* | -- |
| Child collects toy premiums from select fast food restaurants | -- | -- | -- | 3.91 (1.41–10.9)** |

-- indicates that variable was not included in the model.

Statistical significance:

* p<0.05,

** p<0.01,

*** p<0.001.

¹ Among 100 children, 3–7 years old, and one of their parents or guardians..

² Study measures specific to the two fast food restaurants that were the major participants in child-directed TV advertising at the time the study was completed.

³ Commercial TV viewing is a scale to reflect the viewing frequency over four child-based TV networks that include child-directed advertisements for children's fast food meals.